

**Proposed Broiler Units
at Land at Gibbet Fen
Fen Road
Donington
Spalding
PE11 4XE**

NOISE IMPACT ASSESSMENT

Acoustics Report M2150/R01
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To: Ian Pick Associates Ltd
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1. Introduction

This acoustic report documents a noise impact assessment for 6 broiler units at land at Gibbet Fen, Fen Road, Donington; Figures 1 and 2.

The report is divided into the following sections:

- Section 2: Overview of the Development
- Section 3: BS4142:2014
- Section 4: Background Noise survey
- Section 5: Noise Impact Assessment
- Section 6: Conclusion
- Appendix A: Noise monitor and weather station data
- Appendix B: Calculations
- Appendix C: Fan noise data

2. Overview of the Development

The proposal is for 6 broiler units at land at Gibbet Fen, Fen Road, Donington; Figures 1 and 2.

For the assessment, the noise emissions generated by external plant and transport activities have been considered. These consist of:

- **Plant noise:**
 - Ventilation fans: Manufacturers' data sheets for the fans are provided in Appendix C:
 - Roof mounted fans: 18 x Fancom 3680 fans per shed, arranged in two rows of 9 either side of the ridge
 - Gable end fans: 8 x Fancom 34130 units per shed, located on the north gable ends.
 - Backup generator: The generator is for emergency use only, and is a requirement for the health and safety of the livestock in the event of mains power failure. Testing of the generator will be undertaken during the working day period only and for a short duration. Taking into consideration the emergency use and day period testing of the generator, an assessment of its noise emissions is not considered warranted in this case.
- **Transport noise:** Transport noise includes commercial vehicles manoeuvring and loading/unloading on the concrete apron to the south of the units; Figure 1. A forklift will be used for the loading/unloading of HGVs. Vehicles will access the site via the access road off the A52.

The closest dwellings, labelled A – D in Figure 1, are approximately between 655m - 825m from the proposed poultry development.

There will be an unobstructed noise path between the roof extract fan duct terminations for Dwellings A – D. Dwellings A and B however will be fully acoustically shielded from the gable end fans and Dwellings C and D from the concrete apron by the sheds themselves.



Figure 1. Aerial view (source: www.bing.com) showing footprint of proposed broiler units, assessed dwellings and monitor positions

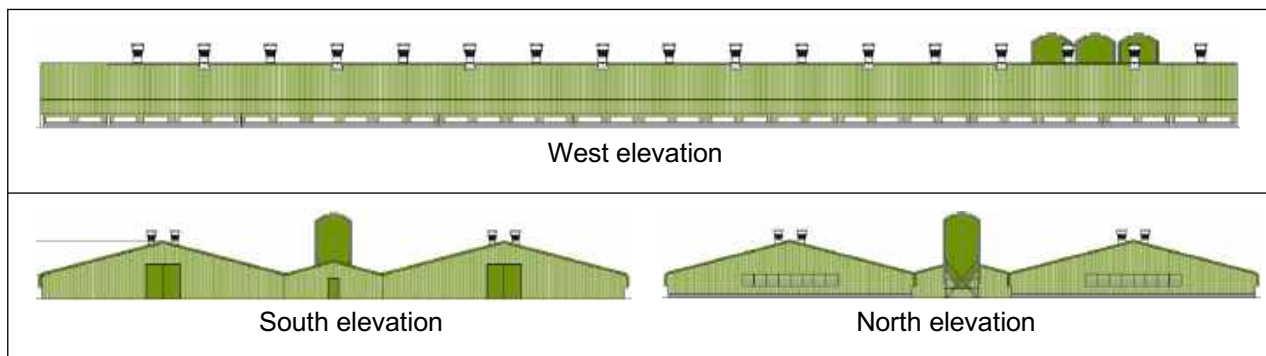


Figure 2. West, south and north elevations of proposed broiler units

3. BS4142:2014

The noise assessments detailed in this report of the plant and transport activities within the concrete aprons have been conducted in accordance of BS4142:2014 'Methods for Rating and Assessing Industrial and Commercial Sound'.

3.1 BS4142:2014

BS4142:2014 provides a methodology to assess the impact of industrial and commercial noise affecting dwellings, whereby the 'typical' background noise level is deducted from the industrial noise Rating Level (industrial noise corrected to account for the 'on-time' and noise character of the noise source; see sections 3.2 and 3.3 below). The following guidance is given based on the established difference:

- A difference of around +10dB or more is likely to be an indication of significant adverse impact, depending on context
- A difference of +5dB is likely to be an indication of an adverse impact, depending on context
- 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, depending on context

Context, as defined in BS4142:2014, includes the consideration of the following factors:

- The absolute level of the noise emissions
- Character and level of the residual sound compared to the character and level of the Specific Level
- Sensitivity of the receptor and any acoustic design measures (e.g. façade sound insulation, use of mechanical ventilation and acoustic screening) incorporated at premises used for residential purposes

Where background noise and Rating Levels are low, BS4142:2014 states that '*absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night*'. Low background noise and rating levels are not defined. However, in BS4142:1997 it states that '*background noise levels below 30dB and rating levels below about 35dB are considered to be very low*'.

3.2 On-time correction

To take account of industrial/commercial noise sources that do not operate continually an 'on-time' correction is applied using:

$$- 10 \log (r/r_{\text{ref}})$$

Where:

r_{ref} = reference time (1hr between 07:00 – 23:00hrs and 15 minutes between 23:00 – 07:00hrs)

r = total 'on-time' during the reference period

Note that the shorter reference time interval between 23:00 – 07:00hrs is designed to penalise industrial/commercial noise events that occur during the night.

3.3 Noise character correction

BS4142 provides four noise character correction categories with associated penalties that must be applied when determining the Rating Level, namely:

- **Tonality:**
 - Not perceptible = 0dB
 - Just perceptible = +2dB
 - Clearly perceptible = +4dB
 - Highly perceptible = +6dB
- **Impulsivity:**
 - Not perceptible = 0dB
 - Just perceptible = +3dB
 - Clearly perceptible = +6dB
 - Highly perceptible = +9dB
- **Intermittency:** +3dB if the intermittency of operation is readily distinctive against the residual noise environment
- **Other:** +3dB applied if the specific sound is neither tonal or impulsive but features noise characteristics that are readily distinctive against the residual noise environment

4. Noise Survey

A noise survey has been conducted in order to establish representative typical background noise levels at the nearest dwellings to the proposed development.

- **Survey dates:** Tuesday 14th – Wednesday 15th December 2021
- **Weather;** Table A2, Appendix A:
 - Precipitation: Dry
 - Wind Speed: Highest recorded wind speeds of 4.3m/sec, median 1.8m/s
 - Wind direction: SW
- **Noise monitor locations:** With the microphones attached to tripods the noise monitors were located at Positions 1 and 2 as shown in Figure 2.
- **Weather station location:** Weather station, mounted on a tripod, located at Position 1; Figure 1
- **Equipment:**
 - Weather Station: Kestrel type 4500
 - Noise monitors: Brüel & Kjær Type 2238 (Positions 1 and 2)
- **Monitor configuration:**
 - Weather station: Configured to measure the average wind speed and temperature over consecutive 10-minute periods

- Noise Monitors: configured to measure consecutive 15-minute samples of noise.
- **Calibration:** Noise monitors calibrated before and after the survey using a Brüel & Kjær Type 4231 calibrator with no deviations found

All noise measurements are free-field. Full tabulated results are given in Tables A1 and A2, Appendix A.

The weather conditions will not have adversely affected the noise measurements.

4.1 Survey observations

The dominant noise source affecting the local area was observed to be road traffic on the A52. This had the greatest impact at Position 1 due to its proximity to the road.

Other noted noise sources were occasional train passes on the railway line adjacent to the proposed broiler units and bird song.

4.2 Typical background noise level, L_{A90} , at Dwellings A - D

Figures 3 and 4 show the variation in the measured maximum (L_{Amax}), ambient (L_{Aeq}) and background (L_{A90}) noise levels obtained at Positions 1 and 2 respectively.

From the analysis of the survey data, typical background noise levels have been established:

- Position 1 (represents Dwellings A and B):
 - Day (07:00 – 20:00hrs): L_{A90} 50dB
 - Evening (20:00 – 23:00hrs): L_{A90} 37dB
 - Night (23:00 – 07:00hrs): L_{A90} 25dB
- Position 2 (represents Dwellings C and D):
 - Day (07:00 – 20:00hrs): L_{A90} 39dB
 - Evening (20:00 – 23:00hrs): L_{A90} 31dB
 - Night (23:00 – 07:00hrs): L_{A90} 29dB

Note that the night period representative background noise levels at both Positions 1 and 2 are very low.

Figure 3. Position 1 noise monitor data (free-field)

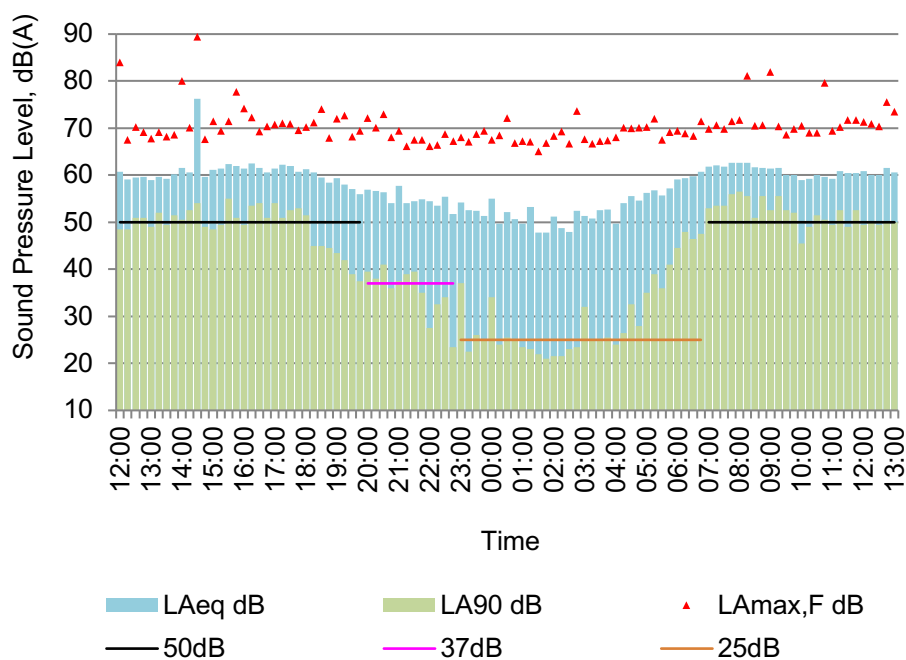
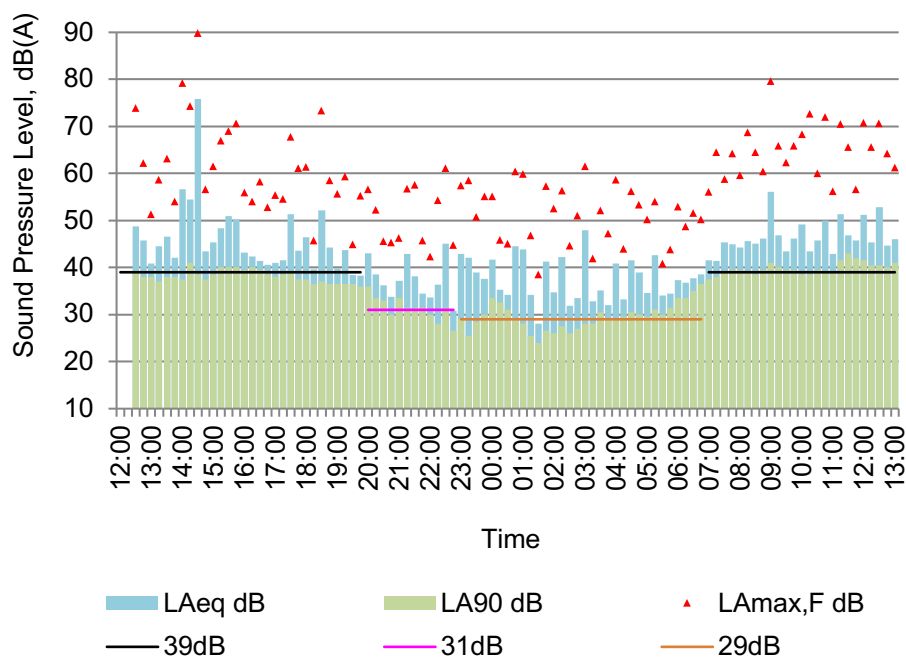


Figure 4. Position 2 noise monitor data (free-field)



5. Noise Impact Assessment

5.1 Calculation of aggregate extract fan and transport noise at Dwellings A - D

The full calculations of the noise emissions from the proposed poultry development are provided in Tables B1 – B6, Appendix B. The resultant aggregate BS4142 Rating and Assessment Level at Dwellings A - D are given in Table 2.

5.2 Source noise data

- **Ventilation fans**
 - Ridge extract fan type:
 - Type: Fancor 3680
 - Sound pressure level: 70dB(A) at 2m, 45° lateral; see Appendix C for manufacturers data sheet
 - Total number of fans: 18 per shed, arranged in two rows of 9 either side of the ridge, with duct terminations at terminating 7.6m above local ground
 - Gable end extract fans:
 - Type: Fancor 34130
 - Sound pressure level: 75dB(A) at 2m, 45° lateral; see Appendix C for manufacturers data sheet
 - Total number of fans: 8 per shed
 - Grille locations: North gable end
- **Transport noise:** Inhouse measured source noise levels
 - Stock delivery/collection (HGV arriving/departing, manoeuvring and loading/unloading using a diesel forklift): $L_{Aeq,1hr}$ 60dB, $L_{Aeq,15 mins}$ 62dB, $L_{Amax,F}$ 79dB at 20m
 - HGV pass on access road: SEL 87dB at 5m

5.3 Extract fan operation

The temperature within the sheds is determined by a combination of the heat generated by the birds themselves, the external temperature and the ventilation provided by the extract fans.

To provide sufficient ventilation of the bird generated heat, as required to maintain the ideal internal operating temperature of around 20°C, up to 25% of the roof extract fans will be required to operate (either intermittently or on variable speed).

With the influence of the external temperature additional extract fans may be required in order to maintain the ideal operating internal temperature. Here the fans are operated in Stages, triggered with each 1°C rise above the ideal internal temperature. The highest Stage will typically only be triggered when the internal temperature rises above 23°.

Normally the roof extract fans will provide sufficient extraction on their own; the gable end fans are only required during periods of extreme external temperatures or due to failure of the roof extract fans.

The operation of 100% of the roof extract fans, and additionally the gable end fans if required, are only expected to occur during the day period when the external temperatures have the potential to be higher.

During the evening and night, when the external temperature will fall, there will be a corresponding decrease in the number of roof extract fans needed above those for bird generated heat alone; the expected percentage of ridge extract fans required to maintain the set temperature are 50% and 25% for the evening and night periods respectively.

For the assessment the calculations have therefore reviewed the following scenarios:

- Day (07:00 – 20:00hrs):
 - 100% roof and gable end extract fans operating (this is the worst-case scenario; typically, the gable end fans will not be required to operate)
 - 100% roof extract fans operating
- Evening (20:00 – 23:00hrs): 50% roof extract fans operating
- Night (23:00 – 07:00hrs): 25% roof extract fans operating

5.4 Transport vehicle operation

Table 1 provides the type and frequency of commercial vehicles per flock cycle.

Loading/unloading of the HGVs will be undertaken using a forklift on the concrete apron to the south of the broiler units.

The majority of transport movements will only occur during the working day (07:00 – 20:00hrs). However, in order to avoid stressing the birds catching is typically undertaken during the night.

Table 1. Proposed commercial traffic generation		
Activity	Vehicle Size	Proposed Frequency per Flock Cycle
Shavings Delivery	16.5m Articulated HGV	2
Chick Delivery	16.5m Articulated HGV	4
Feed Delivery	16.5m Articulated HGV	32
Bird Removal	16.5m Articulated HGV	37
Manure Removal	16.5m Articulated HGV	16
Dirty Water Removal	Tanker	4
Dead Bird Collection	7.5 tonne lorry	5
Fuel Delivery	Tanker	4
Total Per Flock		104
Total Per Annum (7.5 flocks)		780 (1560 movements)

5.5 Derivation of aggregate Specific Level

The individual noise level of each noise source has been calculated at Dwellings A - D; Figure 1. The following corrections have been applied to the source noise data:

- **Directivity correction (extract fans only):**
 - Ridge fans: correction to convert the fan noise data from the manufacturers stated level at 45° lateral to 90° lateral (the propagation angle for the assessed dwellings), determined using the corrections given in Duct Directivity Index Applications (Day H. Hansen C & Bennett B, Acoustics Australia 96 Vol. 37 December (2009) No. 3). For the calculation a frequency spectra has been used
 - Gable end fans: correction to convert the fan noise data from the manufacturers stated level at 45° from the termination to the propagation angle for the assessed dwellings, determined using the corrections given in Figure 11.2, p322, Noise Control in Building Services, SRL Ltd. For the calculation a frequency spectra has been used
- **Reflections (extract fans only):** 3dB added to account for reflections off the poultry shed roof/façade
- **Distance correction:** $20 \times \log (d_1/d_0)$, where d_1 = distance between receptor and the noise source and d_0 = reference distance.

- **Shielding attenuation:** Where the line of sight between the noise source and dwelling is fully blocked by a solid barrier (e.g., by the sheds themselves) 10dB shielding correction has been applied in accordance with BS5228-1 2009.
- **Ground absorption correction:** ISO 9613-2: Attenuation of sound during propagation outdoors, Formula 10:

$$A_{gr} = 4.8 - (2h_m/d)[17 + (300/d)]$$

Where,

h_m = mean height of the propagation path above ground

d = distance from source to receptor

In accordance with ISO 9613-2 the ground absorption correction is assumed to be zero when the line of sight of the noise source is partially or fully blocked by a solid body (i.e. when a shielding correction is applicable)

- **Atmospheric attenuation:** ISO 9613-2: Attenuation of sound during propagation outdoors, Formula 8:

$$A_{atm} = \alpha d / 100$$

Where,

α = is the atmosphere attenuation coefficient for a temperature of 10°C and 70% relative humidity

d = distance from source to receptor

The attenuation at 500Hz has been used.

Tables B1 – B5, Appendix B provide the full calculations with the resultant aggregate Specific Levels at the Dwellings A - D.

5.6 Derivation HGVs access road movements Specific Level

The Specific Level of HGV movements on the access road have been calculated using:

$$L_{Aeq(T)} = SEL - 20 \times \log((d_1/d_0) - A_{gnd} - A_{atmos} + 10 \times \log(N) - 10 \times \log(T)$$

Where,

SEL = Sound Exposure Level

d_1 = distance between receptor and the centre of the access road

d_0 = measurement distance from the noise source (5m)

A_{gnd} = ground absorption correction as detailed in section 5.5

A_{atmos} = atmospheric attenuation as detailed in section 5.5

N = number of HGV passes in time period T ; 4/hr during the day (arriving and departing) and 1 with a 15-minute night assessment period

T = Time period in seconds; 3600 seconds during the day/evening periods and 900 seconds during the night

The calculation of the Specific Levels are given in Table B6, Appendix B.

5.7 Rating Level

To establish the Rating Levels the following BS4142 character corrections have been applied to the established Specific Levels.

- **Extract fans:**
 - Tonality: 0dB; measurements of in-situ Fancom fans at other poultry sites confirm that they are not tonal according to BS412's objective assessment methodology
 - Impulsivity: 0dB; The proposed extract fans will not contain an impulsive noise element such as bangs or a very sudden jump in sound output due to quick start-up/change in fan speed.

- Intermittency: 0dB; the starting/stopping of individual fans will not be readily distinctive against the residual noise environment and consequently an intermittency penalty is not applicable
- Other: 0dB; no 'other' noise characteristics of the fans are expected
- **Stock collection/delivery**
 - Tonality: 0dB; measurements confirm that the stock collections/deliveries are not tonal.
 - Impulsivity: 6dB; the use of a forklift has the potential to generate 'highly perceptible' impulsive noise. Note that we have observed that with careful operation of the forklift (i.e., slowing loading crates) impulsive noise can be minimised.
 - Intermittency: 3dB; stock collections and HGV movements will be intermittent.
 - Other: 0dB; no 'other' noise characteristics are expected/have been identified

As is standard practice, the total character corrections have been capped at 6dB

Note that it is a bit of a grey area with regard to the suitability of BS4142 assessments for determining the impact of transport movements on access roads. As a robust approach however, we have included HGV movements on the access road.

The resultant aggregate Rating Levels are provided in Table 2.

5.8 Assessment Level

We define Assessment Level = $RL - \min L_{A90}$ dB, where:

RL = Rating Level, dB(A)

L_{A90} dB = the typical background noise level, L_{A90} , derived from the noise survey data

Table 2 provides the resultant Assessment Levels at Dwellings A - D for each assessed noise source together with the aggregate level.

Where the Rating Level is at parity with the typical background noise level (Assessment Level = 0 dB) BS4142 states that the Specific Level will have a low impact; an adverse impact is indicated where the Rating Level is ≥ 5 dB and <10 dB above the typical background noise level.

As can be seen in Table 2, the highest calculated Assessment Levels during the day and evening are:

- Extract fans: -12dB (just roof fans) and 0dB (with the addition of the gable end fans); indicates a negligible noise impact with just the roof fans and a low impact with the addition of the gable end fans
- Transport (deliveries and movements on the access road): -17dB; indicates a negligible noise impact
- Aggregate (extract fans + transport): 0dB to -11dB; indicates a low to negligible noise impact

During the night period (23:00 – 07:00hrs) both the typical background noise levels and Rating Levels are very low at all four assessed dwellings. We therefore consider, in accordance with BS4142, that the absolute noise levels at Dwellings A - D during the night are of more relevance in determining the noise impact than the Assessment Levels in this case.

We consider it is reasonable to assume that the occupiers of the nearest dwellings will be within their houses during the night period. A room with an open window will provide 10 – 15dB sound reduction. Using the lower 10dB reduction the highest plant and transport activity noise ingress at any of the assessed dwellings would be:

- Extract fans: L_{Aeq} 12dB
- Transport: $L_{Aeq,15min}$ 10dB, $L_{Amax,F}$ 27dB
- Aggregate: $L_{Aeq,15min}$ 14dB

The above ambient noise ingress levels are very low, being significantly below both the typical background noise level and BS8233 L_{Aeq} 30dB noise ingress limits for bedrooms (noise limit applicable to road traffic noise and continuous operating plant).

ProPG: Planning & Noise (2017) provides guidance with regard to maximum noise events and sleep quality. Where individual noise events do not normally exceed 45dB more than 10 times a night within a bedroom ProPG states that this represents a reasonable threshold below which the effects of individual noise events on sleep can be regarded as negligible; the maximum noise ingress levels generated by the transport activities fall significantly below this threshold.

We therefore conclude that during the night the noise emissions from the development will result in a negligible noise impact.

Table 2. Typical background and calculated Rating and Assessment Levels at Dwellings A - D														
Noise Source		Dwelling	Day: 07:00 - 20:00hrs						Evening : 20:00 - 23:00hrs			Night : 23:00 - 07:00hrs		
			100% roof & gable end fans operating			100% roof fans operating			50% fans operating			25% fans operating		
			Rating Level, dB	Assessment Level, dB		Rating Level, dB	Assessment Level, dB		Rating Level, dB	Assessment Level, dB		Rating Level, dB	Assessment Level, dB	
Plant	[A] Extract fans	A	50	26	-24	26	-24	37	23	-14	25	20	-5	
		B	50	28	-22	28	-22	37	25	-12	25	22	-3	
		C	39	39	0	26	-13	31	23	-8	29	21	-8	
		D	39	38	-1	27	-12	31	24	-7	29	22	-7	
Transport	[B] Stock collection/ delivery	A	50	22	-28	22	-28	37	N/A		25	24	-1	
		B	50	24	-26	24	-26	37	N/A		25	26	1	
		C	39	21	-18	21	-18	31	N/A		29	23	-6	
		D	39	22	-17	22	-17	31	N/A		29	24	-5	
	[C] HGV on access road	A	50	14	-36	14	-36	37	N/A		25	14	-11	
		B	50	19	-31	19	-31	37	N/A		25	19	-6	
		C	39	3	-36	3	-36	31	N/A		29	3	-26	
		D	39	4	-35	4	-35	31	N/A		29	4	-25	
Aggregate	[A] + [B] + [C]	A	50	28	-22	28	-22	37	23	-14	25	26	1	
		B	50	30	-20	30	-20	37	25	-12	25	28	3	
		C	39	39	0	27	-12	31	23	-8	29	25	-4	
		D	39	38	-1	28	-11	31	24	-7	29	26	-3	

5.9 Calculation uncertainty

With all calculations there is a level of uncertainty, which in this case we do not expect to be greater than +/-3dB (3dB is a just perceptible change in noise level). This small level of uncertainty is not considered to have any significance to the outcome of the assessment.

The established typical background noise levels are in line with the observed noise environment. No significant variation in the underlying noise environment that will alter the assessment findings is expected.

The difference between halving or doubling the number of fans operating (e.g., 50% to 100%) is 3dB. With smaller changes in the number of fans operating, for example, 50% to 70%, the change in aggregate noise emissions will be less than 2dB; this represents an imperceptible change in noise.

We therefore consider the used percentage of fans as suitably robust for the purpose of the assessment; it reflects the percentage of fans used in poultry units as advised by both operators and experts and would not result in a perceptible change in noise emissions with a 20 – 25% increase/decrease in the number of fans operating.

6. Conclusion

A BS4142 assessment of the main operational noise sources of the proposed poultry development at Gibbet Fen, Fen Road, Donington (Figures 1 and 2) has been undertaken.

The assessment included:

- A noise survey to establish representative background noise levels at the nearest dwellings to the development
- Calculation of the BS4142 Rating Levels generated by the external plant and transport activities

Via analysis of the survey data and calculation (Appendix B), it has been demonstrated that the aggregate BS4142:2014 noise impact of the operating noise sources during the day and evening for the proposed poultry development will range between low to negligible.

Due to the very low Rating Levels and typical background noise levels during the night, the absolute noise emissions have been assessed to review acceptability; this is in accordance with guidance given in BS4142.

At the nearest dwellings the aggregate noise ingress via an open window during the night for the extract fans and transport activities will be very low, being significantly below the typical background noise level and the BS8233 L_{Aeq} 30dB noise ingress limits for bedrooms (noise limit applicable to road traffic noise and continuous operating plant). The transport activity generated maximum noise levels will be below the WHO/PROPG sleep disturbance threshold. We therefore conclude that during the night the poultry development noise emissions will result in a negligible noise impact.

On the basis that the poultry development will not result in an adverse noise impact at the nearest dwellings, we conclude that on noise grounds the proposed scheme is acceptable.

Table A1. Noise monitor data (free-field)

Start Time	Position 1			Position 2			Start Time	Position 1			Position 2		
	L _{Amax} , F dB	L _{Aeq} dB	L _{A90} dB	L _{Amax} , F dB	L _{Aeq} dB	L _{A90} dB		L _{Amax} , F dB	L _{Aeq} dB	L _{A90} dB	L _{Amax} , F dB	L _{Aeq} dB	L _{A90} dB
12:00	84.0	60.8	48.5				00:45	66.9	50.6	25.0	60.4	44.5	29.0
12:15	67.5	59.1	48.5				01:00	67.3	49.7	23.5	59.9	43.8	28.0
12:30	70.2	59.5	51.0	73.9	48.7	39.0	01:15	67.1	53.2	23.0	46.9	34.2	25.5
12:45	69.2	59.7	51.0	62.2	45.7	38.0	01:30	65.1	47.8	22.0	38.5	28.0	24.0
13:00	67.8	58.9	49.0	51.4	40.9	38.0	01:45	66.8	47.8	21.0	57.3	41.3	26.5
13:15	69.2	59.7	52.0	58.7	44.5	37.0	02:00	68.4	51.2	21.5	52.6	34.7	26.0
13:30	68.2	59.3	49.5	63.2	46.6	38.0	02:15	69.3	48.8	21.5	56.4	42.2	27.5
13:45	68.6	60.2	51.5	54.1	42.1	38.0	02:30	66.7	47.9	23.0	44.7	31.9	26.0
14:00	80.1	61.5	50.5	79.2	56.7	37.5	02:45	73.6	52.4	23.5	51.0	33.5	27.0
14:15	70.1	60.6	52.5	74.4	54.4	41.0	03:00	67.7	51.3	32.0	61.5	48.0	28.0
14:30	89.4	76.2	54.0	89.9	75.9	38.5	03:15	66.7	50.8	25.0	41.9	32.8	28.0
14:45	67.7	59.6	49.0	56.6	43.4	37.5	03:30	67.2	52.5	25.0	52.1	35.2	30.5
15:00	71.5	61.2	48.5	61.6	45.4	38.5	03:45	67.4	52.7	25.5	47.3	32.0	29.0
15:15	69.4	61.4	49.5	67.0	48.3	40.0	04:00	68.1	49.7	24.0	58.7	40.9	29.0
15:30	71.5	62.3	55.0	69.0	50.9	40.0	04:15	70.1	54.0	26.5	44.0	33.2	29.5
15:45	77.8	62.0	51.0	70.7	50.2	40.0	04:30	70.0	55.5	32.5	56.2	41.5	30.5
16:00	74.2	61.4	49.5	55.9	43.2	39.5	04:45	70.1	54.6	28.0	53.4	39.0	30.0
16:15	72.3	62.5	53.5	54.1	42.4	40.0	05:00	70.3	56.3	35.0	50.3	34.6	29.5
16:30	69.3	61.6	54.0	58.3	41.4	39.5	05:15	72.0	56.8	39.0	54.0	42.6	31.0
16:45	70.4	60.6	51.0	52.8	40.6	38.5	05:30	67.6	55.7	36.0	40.8	34.0	30.0
17:00	70.8	61.4	54.0	55.4	41.0	38.0	05:45	69.2	57.2	41.0	43.9	34.5	31.5
17:15	71.1	62.2	51.0	54.6	41.5	38.5	06:00	69.4	59.1	44.5	53.0	37.3	33.5
17:30	70.9	61.9	52.5	67.8	51.3	39.0	06:15	68.9	59.4	48.0	48.7	36.8	33.5
17:45	69.6	60.7	53.0	61.2	43.6	37.5	06:30	68.4	59.8	46.5	51.6	37.7	35.0
18:00	70.3	61.3	51.5	61.4	46.5	37.5	06:45	71.5	60.8	47.5	50.3	38.5	36.5
18:15	71.2	60.6	45.0	45.8	39.6	36.5	07:00	69.8	61.8	53.0	56.1	41.5	37.5
18:30	74.1	59.5	45.0	73.4	52.2	37.0	07:15	70.7	62.1	53.5	64.6	41.4	38.0
18:45	67.9	58.4	44.5	58.5	44.2	36.5	07:30	69.9	61.8	53.5	58.8	45.3	39.0
19:00	72.0	59.4	43.5	55.7	39.8	36.5	07:45	71.5	62.6	56.0	64.2	44.9	39.5
19:15	72.7	58.0	42.0	59.4	43.7	36.5	08:00	71.7	62.7	56.5	59.6	44.2	39.5
19:30	68.2	57.0	39.0	44.9	38.4	36.5	08:15	81.1	62.7	55.5	68.8	45.6	39.0
19:45	69.5	56.0	37.5	55.3	38.3	36.0	08:30	70.5	61.7	51.0	64.6	45.1	38.5
20:00	72.2	56.9	39.5	56.7	43.0	36.0	08:45	70.7	61.6	55.5	60.4	46.1	39.5
20:15	70.1	56.6	38.0	52.3	38.5	33.5	09:00	82.0	61.4	52.5	79.6	56.1	41.0
20:30	73.0	56.4	41.0	45.6	36.2	33.0	09:15	70.4	61.6	55.5	65.9	46.9	40.0
20:45	68.1	54.0	36.0	45.4	33.8	30.0	09:30	68.6	60.0	52.5	62.3	43.4	39.5
21:00	69.4	57.8	37.5	46.3	37.2	33.5	09:45	69.9	60.1	52.0	65.9	46.1	39.5
21:15	66.2	54.0	39.0	56.8	42.9	31.5	10:00	70.5	58.9	45.5	68.4	49.2	38.5
21:30	67.5	54.5	39.5	57.6	38.1	31.5	10:15	69.0	59.3	49.0	72.7	43.4	38.5
21:45	67.5	54.9	35.0	45.7	34.5	31.5	10:30	69.1	60.1	51.5	60.1	45.8	39.5
22:00	66.2	54.5	27.5	42.3	33.7	30.0	10:45	79.6	59.7	50.5	72.0	50.0	39.0
22:15	66.4	53.5	32.5	54.3	36.4	28.0	11:00	69.5	59.3	49.5	56.3	42.9	39.0
22:30	68.7	55.4	34.0	61.1	45.1	31.5	11:15	70.2	60.9	52.5	70.5	51.3	41.5
22:45	67.2	51.7	23.5	44.8	30.8	26.5	11:30	71.7	60.5	49.0	65.6	46.8	43.0
23:00	68.1	54.2	37.0	57.4	42.9	29.0	11:45	71.7	60.5	52.5	56.7	45.7	42.0
23:15	67.1	52.5	22.5	58.6	42.1	25.5	12:00	71.3	60.9	49.5	70.8	51.2	41.5
23:30	68.7	52.4	26.0	50.8	39.0	28.5	12:15	70.9	60.0	50.0	65.6	45.3	40.5
23:45	69.5	51.3	25.0	55.1	37.6	30.0	12:30	70.4	60.1	49.5	70.7	52.8	40.5
00:00	67.6	55.0	34.0	55.2	41.7	33.5	12:45	75.5	61.5	50.0	64.3	44.7	40.0
00:15	68.5	49.7	24.0	45.9	35.3	32.5	13:00	73.5	60.6	50.0	61.3	46.0	41.0
00:30	72.2	52.2	25.5	45.1	34.2	31.0							

Table A2. Weather station data

Start Time	Wind Speed, m/s	Temp, °C	Start Time	Wind Speed, m/s	Temp, °C	Start Time	Wind Speed, m/s	Temp, °C	Start Time	Wind Speed, m/s	Temp, °C
12:00	2.9	12.5	18:20	1.6	11.0	00:40	0.0	8.2	07:00	1.5	9.6
12:10	2.3	12.0	18:30	2.5	10.9	00:50	1.6	8.6	07:10	1.3	9.8
12:20	2.9	11.8	18:40	3.0	11.1	01:00	1.1	8.7	07:20	1.9	9.7
12:30	1.7	13.0	18:50	1.8	10.9	01:10	1.2	8.5	07:30	1.4	9.8
12:40	4.1	12.8	19:00	2.6	10.9	01:20	1.5	9.0	07:40	1.3	9.9
12:50	2.1	12.3	19:10	2.6	10.8	01:30	2.5	9.0	07:50	2.2	10.1
13:00	4.2	12.0	19:20	1.2	10.6	01:40	2.1	9.2	08:00	3.0	10.4
13:10	4.0	11.8	19:30	2.3	10.5	01:50	1.5	9.1	08:10	2.0	10.2
13:20	3.9	11.7	19:40	2.2	10.0	02:00	2.5	9.3	08:20	1.4	10.1
13:30	1.9	11.7	19:50	1.0	10.1	02:10	2.7	9.4	08:30	1.8	10.2
13:40	1.4	11.8	20:00	1.3	9.9	02:20	2.1	9.5	08:40	1.8	10.3
13:50	2.3	11.7	20:10	2.9	10.3	02:30	1.7	9.4	08:50	0.6	10.1
14:00	1.9	11.6	20:20	1.5	10.5	02:40	3.5	9.7	09:00	2.5	10.2
14:10	1.6	11.9	20:30	3.8	11.0	02:50	1.7	9.4	09:10	1.5	9.5
14:20	1.5	11.6	20:40	1.5	10.6	03:00	2.8	9.6	09:20	0.8	9.9
14:30	1.3	11.6	20:50	1.7	10.3	03:10	3.2	9.7	09:30	0.0	9.9
14:40	3.1	11.7	21:00	1.7	10.5	03:20	4.3	9.7	09:40	0.4	10.1
14:50	2.3	11.6	21:10	1.4	10.4	03:30	2.6	9.8	09:50	2.2	10.1
15:00	1.3	11.6	21:20	1.7	10.3	03:40	2.2	9.7	10:00	1.7	10.3
15:10	0.9	11.5	21:30	2.2	10.0	03:50	3.3	10.0	10:10	2.2	10.2
15:20	0.0	11.6	21:40	2.2	9.9	04:00	2.4	9.6	10:20	2.1	10.3
15:30	1.3	11.5	21:50	1.5	9.3	04:10	1.5	9.7	10:30	1.9	10.6
15:40	1.8	11.6	22:00	1.4	10.0	04:20	1.6	9.5	10:40	1.1	10.6
15:50	1.9	11.5	22:10	3.1	9.6	04:30	0.5	9.3	10:50	2.0	10.8
16:00	0.6	11.5	22:20	1.9	9.5	04:40	1.0	8.9	11:00	1.6	10.9
16:10	0.7	11.7	22:30	1.4	9.5	04:50	0.6	8.8	11:10	1.3	11.1
16:20	2.5	12.0	22:40	1.9	9.5	05:00	1.0	8.7	11:20	2.2	11.3
16:30	0.8	11.5	22:50	1.1	9.7	05:10	1.3	8.7	11:30	4.1	11.5
16:40	0.7	11.4	23:00	1.5	9.9	05:20	1.4	8.6	11:40	2.4	11.6
16:50	1.3	11.6	23:10	2.7	10.2	05:30	2.2	8.7	11:50	2.8	11.7
17:00	1.4	11.5	23:20	2.1	9.7	05:40	1.5	8.7	12:00	2.0	11.5
17:10	0.8	11.5	23:30	2.0	9.6	05:50	2.3	9.1	12:10	2.2	11.6
17:20	2.4	11.4	23:40	1.7	9.7	06:00	1.6	8.8	12:20	1.8	12.0
17:30	2.4	10.9	23:50	3.2	9.7	06:10	2.1	8.7	12:30	3.6	11.9
17:40	2.4	11.1	00:00	2.3	9.4	06:20	1.9	8.9	12:40	2.4	11.9
17:50	0.7	10.7	00:10	2.5	9.2	06:30	1.7	8.9	12:50	2.9	11.9
18:00	1.3	11.0	00:20	3.2	8.8	06:40	1.4	9.0	13:00	1.5	12.0
18:10	0.0	10.7	00:30	1.9	8.9	06:50	0.9	9.0			

[illegible]

Note 1: Assumed only odd numbered roof fans operating
Note 2: Assumed only 1, 5, 9, 14 & 18 numbered roof fans operating

Table B2: Calculation of extract fan Rating Levels at Dwelling B																																																									
[A] Lp at 2m, 45° lateral; [B] directly correction; [C] Reflection off poultry shed roof/acadie; [A] - [B] + [C] Lp at 2m;																		Roof Fans: Fancom 3680										Sheds 1 - 8										Sheds 1 - 4																			
																		Distance correction, dB										Shielding attenuation, dB										Ground absorption, dB										Atmospheric attenuation, dB									
																																																Sound pressure level at dwelling, dB									
Roof										Shed										Shed										Shed										Shed																	
Row 2										Row 1										Fan										Fan										Fan																	
Direct distance, m										Distance correction, dB										Shielding attenuation, dB										Ground absorption, dB										Atmospheric attenuation, dB																	
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Table B3: Calculation of extract fan Rating Levels at Dwelling C

Fan		Octave Band Centre Frequency, Hz												Octave Band Centre Frequency, Hz															
		Sheds 1 - 8						Sheds 1 - 4						Sheds 1 - 8						Sheds 1 - 4									
		at 90°						at 90°						at 90°						at 90°									
		63	125	250	500	1k	2k	4k	(Y)	Gable End Fans: Fancom 34130						63	125	250	500	1k	2k	4k	(Z)						
Roof Fans: Fancom 3680		72	1.5	3	4.5	9	11	18		45° to 0°						84	78	74	74	68	66	62	75	45° to 0°					
[C] Reflection off poultry shed roof/facade: [A] - [B] + [C] L _w at 2m		3	3	3	3	3	3	3	65	at 90°						3	3	3	3	3	3	3	80	at 90°					
Shed		1	2	3	4	5	6	7		Shed						1	2	3	4	5	6	7		Shed					
Roof		1	2	3	4	5	6	7		Shed						1	2	3	4	5	6	7		Shed					
Direct distance, m		893.0	889.2	887.0	886.0	886.0	887.5	887.5	53.0	53.0	52.9	52.9	52.9	52.9	4.6	4.6	4.6	4.6	4.6	4.6	4.6	1.7	1.7	1.7	1.7	1.7	1.7		
Distance correction, dB		880.9	877.1	874.8	873.8	873.8	875.3	875.3	52.9	52.8	52.8	52.8	52.8	52.8	4.6	4.6	4.6	4.6	4.6	4.6	4.6	1.7	1.7	1.7	1.7	1.7	1.7		
Shielding attenuation, dB		868.8	865.0	862.7	861.6	861.6	863.1	863.1	52.8	52.7	52.7	52.7	52.7	52.7	4.6	4.6	4.6	4.6	4.6	4.6	4.6	1.7	1.7	1.7	1.7	1.7	1.7		
Ground absorption, dB		856.8	852.9	850.5	849.4	849.4	850.9	850.9	52.6	52.6	52.6	52.6	52.6	52.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	1.6	1.6	1.6	1.6	1.6			
Atmospheric attenuation, dB		844.8	840.8	838.3	837.2	837.2	838.7	838.7	52.5	52.5	52.4	52.4	52.4	52.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	1.6	1.6	1.6	1.6	1.6			
Sound pressure level at dwelling, dB		832.7	828.7	826.2	825.0	825.0	826.6	826.6	52.4	52.3	52.3	52.3	52.3	52.3	4.5	4.5	4.5	4.5	4.5	4.5	4.5	1.5	1.5	1.5	1.5	1.5			
BS4142 character correction		820.7	816.6	814.0	812.8	812.8	814.4	814.4	52.3	52.2	52.2	52.2	52.2	52.2	4.5	4.5	4.5	4.5	4.5	4.5	4.5	1.5	1.5	1.5	1.5	1.5			
		808.7	804.5	801.9	800.7	800.6	802.2	802.2	52.1	52.1	52.1	52.1	52.1	52.1	4.5	4.5	4.5	4.5	4.5	4.5	4.5	1.5	1.5	1.5	1.5	1.5			
		796.6	792.4	789.7	788.5	788.4	790.0	790.0	52.0	52.0	52.0	52.0	52.0	52.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	1.5	1.5	1.5	1.5	1.5			
		784.5	780.3	777.6	776.4	776.4	778.0	778.0	51.9	51.9	51.9	51.9	51.9	51.9	4.6	4.6	4.6	4.6	4.6	4.6	4.6	1.7	1.7	1.7	1.7	1.7			
		772.4	768.2	765.5	764.3	764.3	765.9	765.9	51.8	51.8	51.8	51.8	51.8	51.8	4.6	4.6	4.6	4.6	4.6	4.6	4.6	1.7	1.7	1.7	1.7	1.7			
		760.3	756.1	753.4	752.2	752.2	753.8	753.8	51.7	51.7	51.7	51.7	51.7	51.7	4.6	4.6	4.6	4.6	4.6	4.6	4.6	1.7	1.7	1.7	1.7	1.7			
		748.2	744.0	741.3	740.1	740.1	741.7	741.7	51.6	51.6	51.6	51.6	51.6	51.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	1.7	1.7	1.7	1.7	1.7			
		736.1	731.9	729.2	728.0	728.0	729.6	729.6	51.5	51.5	51.5	51.5	51.5	51.5	4.6	4.6	4.6	4.6	4.6	4.6	4.6	1.7	1.7	1.7	1.7	1.7			
		724.0	719.8	717.1	715.9	715.9	717.5	717.5	51.4	51.4	51.4	51.4	51.4	51.4	4.6	4.6	4.6	4.6	4.6	4.6	4.6	1.7	1.7	1.7	1.7	1.7			
		711.9	707.7	705.0	703.8	703.8	705.4	705.4	51.3	51.3	51.3	51.3	51.3	51.3	4.6	4.6	4.6	4.6	4.6	4.6	4.6	1.7	1.7	1.7	1.7	1.7			
		699.8	695.6	692.9	691.7	691.7	693.3	693.3	51.2	51.2	51.2	51.2	51.2	51.2	4.6	4.6	4.6	4.6	4.6	4.6	4.6	1.7	1.7	1.7	1.7	1.7			
		687.7	683.5	680.8	679.6	679.6	681.2	681.2	51.1	51.1	51.1	51.1	51.1	51.1	4.6	4.6	4.6	4.6	4.6	4.6	4.6	1.7	1.7	1.7	1.7	1.7			
		675.6	671.4	668.7	667.5	667.5	669.1	669.1	51.0	51.0	51.0	51.0	51.0	51.0	4.6	4.6	4.6	4.6	4.6	4.6	4.6	1.7	1.7	1.7	1.7	1.7			
		663.5	659.3	656.6	655.4	655.4	657.0	657.0	50.9	50.9	50.9	50.9	50.9	50.9	4.6	4.6	4.6	4.6	4.6	4.6	4.6	1.7	1.7	1.7	1.7	1.7			
		651.4	647.2	644.5	643.3	643.3	644.9	644.9	50.8	50.8	50.8	50.8	50.8	50.8	4.6	4.6	4.6	4.6	4.6	4.6	4.6	1.7	1.7	1.7	1.7	1.7			
		639.3	635.1	632.4	631.2	631.2	632.8	632.8	50.7	50.7	50.7	50.7	50.7	50.7	4.6	4.6	4.6	4.6	4.6	4.6	4.6	1.7	1.7	1.7	1.7	1.7			
		627.2	623.0	620.3	619.1	619.1	620.7	620.7	50.6	50.6	50.6	50.6	50.6	50.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	1.7	1.7	1.7	1.7	1.7			
		615.1	610.9	608.2	607.0	607.0	608.6	608.6	50.5	50.5	50.5	50.5	50.5	50.5	4.6	4.6	4.6	4.6	4.6	4.6	4.6	1.7	1.7	1.7	1.7	1.7			
		603.0	598.8	596.1	594.9	594.9	596.5	596.5	50.4	50.4	50.4	50.4	50.4	50.4	4.6	4.6	4.6	4.6	4.6	4.6	4.6	1.7	1.7	1.7	1.7	1.7			
		590.9	586.7	584.0	582.8	582.8	584.4	584.4	50.3	50.3	50.3	50.3	50.3	50.3	4.6	4.6	4.6	4.6	4.6	4.6	4.6	1.7	1.7	1.7	1.7	1.7			
		578.8	574.6	571.9	570.7	570.7	572.3	572.3	50.2	50.2	50.2	50.2	50.2	50.2	4.6	4.6	4.6	4.6	4.6	4.6	4.6	1.7	1.7	1.7	1.7	1.7			
		566.7	562.5	559.8	558.6	558.6	560.2	560.2	50.1	50.1	50.1	50.1	50.1	50.1	4.6	4.6	4.6	4.6	4.6	4.6	4.6	1.7	1.7	1.7	1.7	1.7			
		554.6	550.4	547.7	546.5	546.5	548.1	548.1	50.0	50.0	50.0	50.0	50.0	50.0	4.6	4.6	4.6	4.6	4.6	4.6	4.6	1.7	1.7	1.7	1.7	1.7			
		542.5	538.3	535.6	534.4	534.4	536.0	536.0	49.9	49.9	49.9	49.9	49.9	49.9	4.6	4.6	4.6	4.6	4.6	4.6	4.6	1.7	1.7	1.7	1.7	1.7			
		530.4	526.2	523.5	522.3	522.3	523.9	523.9	49.8	49.8	49.8	49.8	49.8	49.8	4.6	4.6	4.6	4.6	4.6	4.6	4.6	1.7	1.7	1.7	1.7	1.7			
		518.3	514.1	511.4	510.2	510.2	511.8	511.8	49.7	49.7	49.7	49.7	49.7	49.7	4.6	4.6	4.6	4.6	4.6	4.6	4.6	1.7	1.7	1.7	1.7	1.7			
		506.2	502.0	499.3	498.1	498.1	499.7	499.7	49.6	49.6	49.6	49.6	49.6	49.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	1.7	1.7	1.7	1.7	1.7			
		494.1	489.9	487.2	486.0	486.0	487.6	487.6	49.5	49.5	49.5	49.5	49.5	49.5	4.6	4.6	4.6	4.6	4.6	4.6	4.6	1.7	1.7	1.7	1.7	1.7			
		482.0	477.8	475.1	473.9	473.9	475.5	475.5	49.4	49.4	49.4	49.4	49.4	49.4	4.5	4.5	4.5	4.5	4.5	4.5	4.5	1.5	1.5	1.5	1.5	1.5			
		469.9	465.7	463.0	461.8	461.8	463.4	463.4	49.3	49.3	49.3	49.3	49.3	49.3	4.5	4.5	4.5	4.5	4.5	4.5	4.5	1.5	1.5	1.5	1.5	1.5			
		457.8	453.6	450.9	449.7	449.7	451.3	451.3	49.2	49.2	49.2	49.2	49.2	49.2	4.5	4.5	4.5	4.5	4.5	4.5	4.5	1.5	1.5	1.5	1.5	1.5			
		445.7	441.5	438.8	437.6	437.6	439.2	439.2	49.1	49.1	49.1	49.1	49.1	49.1	4.5	4.5	4.5	4.5	4.5	4.5	4.5	1.5	1.5	1.5	1.5	1.5			
		433.6	429.4	426.7	425.5	425.5	427.1	427.1	49.0	49.0	49.0	49.0	49.0	49.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	1.5	1.5	1.5	1.5	1.5			
		421.5	417.3	414.6	413.4	413.4	415.0	415.0	48.9	48.9	48.9	48.9	48.9	48.9	4.5	4.5	4.5	4.5	4.5	4.5	4.5	1.5	1.5	1.5	1.5	1.5			
		409.4	405.2	402.5	401.3	401.3	402.9	402.9	48.8	48.8	48.8	48.8	48.8	48.8	4.5	4.5	4.5	4.5	4.5	4.5	4.5	1.5	1.5	1.5	1.5	1.5			
		397.3	393.1	390.4	389.2	389.2	390.8	390.8	48.7	48.7	48.7	48.7	48.7	48.7	4.5	4.5	4.5	4.5	4.5	4.5	4.5	1.5	1.5	1.5	1.5	1.5			
		385.2	381.0	378.3	377.1	377.1	378.7	378.7	48.6	48.6	48.6	48.6	48.6	48.6	4.5	4.5	4.5	4.5	4.5	4.5	4.5	1.5	1.5	1.5	1.5	1.5			
		373.1	368.9	366.2	365.0	365.0	366.6	366.6	48.5	48.5	48.5	48.5	48.5	48.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	1.5	1.5	1.5	1.5	1.5			
		361.0	356.8	354.1	352.9	352.9	354.5	354.5	48.4	48.4	48.4	48.4	48.4	48.4	4.5	4.5	4.5	4.5	4.5	4.5	4.5	1.5	1.5	1.5	1.5	1.5			
		348.9	344.7	342.0	340.8	340.8	342.4	342.4	48.3	48.3	48.3	48.3	48.3	48.3	4.5	4.5	4.5	4.5	4.5	4.5	4.5	1.5	1.5	1.5	1.5	1.5			
		336.8	332.6	330.0	328.8	328.8	330.4	330.4	48.2	48.2	48.2	48.2	48.2	48.2	4.5	4.5	4.5	4.5	4.5	4.5	4.5	1.5	1.5	1.5	1.5	1.5			
		324.7	320.5	317.9	316.7	316.7	318.3	318.3	48.1	48.1	48.1	48.1	48.1	48.1	4.5	4.5	4.5	4.5	4.5	4.5	4.5	1.5	1.5	1.5	1.5	1.5			
		312.6	308.4	305.8	304.6	304.6	306.2	306.2	48.0	48.0	48.0	48.0	48.0	48.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	1.5	1.5	1.5	1.5	1.5			
		300.5	296.3	293.7	292.5	292.5	294.1	294.1	47.9	47.9																			

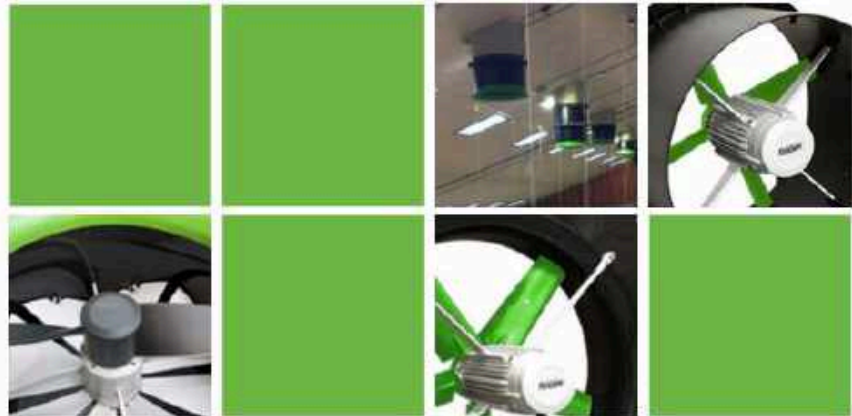
[illegible]

Table B5. Calculation of HGVs loading/unloading BS4142 Assessment Level at Dwellings A - D					
Source noise levels	Stock delivery/collection at 20m (HGV arriving/departing, manoeuvring and loading/unloading using a diesel forklift)	$L_{Aeq,1hr}$ dB	$L_{Aeq,15 mins}$ dB	L_{Amax} dB	
		60	62	79	
		Dwelling A	Dwelling B	Dwelling C	Dwelling D
Corrections	Distance to nearest shed, m	814	702	904	822
	Distance correction, dB	32.2	30.9	33.1	32.3
	Shielding correction, dB	10	10	10	10
	Ground absorption, dB	0.0	0.0	0.0	0.0
	Atmospheric attenuation, dB	1.5	1.3	1.7	1.6
BS4142 Specific Level					
Day	Specific Level, dB	16	18	15	16
Night	Specific Level, dB	18	20	17	18
BS4142 Rating & Assessment Level					
BS4142 character corrections		6	6	6	6
Day	Rating Level	22	24	21	22
Night	Rating Level	24	26	23	24
Noise ingress via open window (assumed 10dB sound insulation)					
$L_{Aeq,15minutes}$ dB		8	10	7	8
$L_{Amax,F}$ dB		25	27	24	25

Table B6. Calculation of Rating Levels of HGVs on the access road					
		Dwelling A	Dwelling B	Dwelling C	Dwelling D
HGV pass SEL dB		87	87	87	87
Distance to dwelling, m		560	342	1000	1000
Distance correction, dB		41.0	36.7	46.0	46.0
Shielding attenuation, dB		0	0	10	10
Ground absorption, dB		4.6	4.5	0.0	0.0
Atmospheric attenuation, dB		1.1	0.7	1.9	1.9
Day (07:00 - 20:00hrs)	No. HGVs movements per	4	4	4	4
	No. HGVs correction, dB	6	6	6	6
	Time correction, dB	35.6	35.6	35.6	35.6
	Specific Level, dB	10.8	15.6	-0.5	-0.5
Night (23:00 - 07:00hrs)	No. HGVs movements per	1	1	1	1
	No. HGVs correction, dB	0	0	0	0
	Time correction, dB	29.5	29.5	29.5	29.5
	Specific Level, dB	10.8	15.6	-0.5	-0.5
BS4142 character correction		3	3	3	4
Rating Level, dB	Day	14	19	3	4
	Night	14	19	3	4

AGRICULTURAL FANS

Fancom fans are specially developed for the use in livestock buildings and they have an IP66 classification. Fancom fans have an aluminium motor housing, synthetic or coated steel housing and synthetic fan blades. The fans combine high air flow capacity with low energy consumption and noise levels. The low energy consumption and superb controllability mean that the motors run at a lower temperature - which also benefits the durability.



Complete fan

The complete fan from Fancom is extremely easy to mount either in or on a wall. The fans in the 35 to 56cm diameter series are supplied in a robust synthetic housing. Fans with diameters of 63, 71 and 80 cm are solidly housed in steel. The coated housing prevents corrosion.

Modular fan

To mount fans underneath a chimney module Fancom's fans are supplied in a robust, shape retaining synthetic module with the Fancom quick mounting system. Fancom measuring and damping units complete the ventilation system. The control valve and air flow transmitter have been built into the same module which can be directly connected to the fan module.

Central exhaust systems

Fancom has specially developed the 3480P and 3480D fans for central air exhaust systems and other installations which operate with high counter pressures. The maximum counter pressures are 270Pa, resp. 320Pa. This fan is notable for its large air displacement capacity. Noise production and energy consumption are, however, kept to a minimum.

TYPE	Diameter cm	Voltage (+/- 10%)	Revolutions RPM	Motor current (50% - 100%)	Power (100%) W	Air power (100%) W	Noise level (10% demand) dB(A) 2m	Noise level (10% demand) dB(A) 7m	Control	Airflow in m³/h									
										Pressure in Pa (Pascal)									
										0	30	50	100	150	200	250	300	Debit max/pressure max	
1436	35	230-240	1404	0.06	211	111	61	50	T, E	3040	3580	3250						2680 / 78	
1440	40	230-240	1347	1.19	273	163	64	53	T, E	5040	4630	4250						3300 / 92	
1445	45	230-240	1326	1.5	372	235	65	54	T, E	6880	6140	5760	4400					4310 / 102	
1450	50	230-240	1317	2.08	474	314	66	55	T, E	8580	7800	7300	5780					5710 / 102	
1450P	50	230-240	1361	2.99	720	566	68	58	T, E	9720	9260	9010	7960					6800 / 128	
1455	56	230-240	1366	3.16	741	569	70	59	T, E	12060	11290	10830	9250					8520 / 113	
1856	56	230-240	854	2.23	488	378	88	65	T, E	10380	9950	8340						8920 / 87	
1463	63	230-240	1361	3.1	721	566	68	57	T, E	14600	13200	12380	9970					8990 / 101	
1671	71	230-240	901	4.19	824	639	88	67	T, E	18030	16410	15320						11620 / 92	
1680	80	230-240	903	4.64	1091	756	89	68	T, E	20750	19050	17820	14180					13020 / 113	
1602	92	230-240	806	4.54	1068	778	89	67	T, E	24430	21840	19940	12787					13940 / 109	
3435	35	Y400 Δ230	1420	Y0.34 Δ0.39	157	116	61	50	F	3710	3400	3140						2520 / 83	
3440	40	Y400 Δ230	1376	Y0.42 Δ0.73	227	175	64	53	F	5120	4750	4370						3430 / 96	
3445	45	Y400 Δ230	1307	Y0.55 Δ0.95	312	220	65	54	F	6540	5910	5470						4020 / 99	
3450	50	Y400 Δ230	1304	Y0.73 Δ1.26	414	305	66	55	F	8240	7630	7010	5440					5240 / 105	
3455	56	Y400 Δ230	1364	Y1.17 Δ2.03	657	567	70	59	F	11830	10920	10260	8480					7700 / 120	
3656	56	Y400 Δ230	858	Y1.05 Δ1.82	384	322	85	64	F	10190	9880	8020						6690 / 85	
3483P	63	Y400 Δ230	1430	Y2.75 Δ4.76	1351	1224	74	63	F	17590	16740	16270	15150	13030	12370	10240		10240 / 250	
3683	63	Y400 Δ230	951	Y1.38 Δ2.58	687	512	87	66	F	14180	12920	12080						9000 / 97	
3671	71	Y400 Δ230	949	Y1.89 Δ3.27	884	741	89	68	F	17970	16500	15450	12190					11320 / 110	
3680	80	Y400 Δ230	941	Y2.03 Δ3.52	1047	850	70	60	F	20230	20555	19380	15910					14070 / 122	
3480P	80	Y400 Δ230	1429	Y4.58 Δ7.93	2308	2150	77	66	F	26650	27582	26876	25290	23580	21225	18355		17440 / 208	
3490D	80	Y400 Δ230	1436	Y4.26 Δ7.38	1981	1520	89	68	F	21610	21130	20810	19990	19050	17920	16495	14770	11050 / 380	
3602	92	Y400 Δ230	838	Y2.16 Δ3.74	1033	859	88	67	F	24870	22570	20840	15470					14110 / 110	
3692P	92	Y400 Δ230	869	Y3.64 Δ6.3	1360	1384	71	60	F	28080	26800	25680	22810	17020				15200 / 197	


FANS
GB
FAN 34130 (400V 50HZ)

Fan 34130 BOX 400V 50Hz
Fan 34130 BOX KIT 400V 50Hz

4305110
4305140

Images


KIT
4305110
4305140

Technical data

Voltage:	400	[$\pm$ V ac] +/-10%
Phase:	3	
Frequency:	50	[Hz]
Max. current:	3,08	[A]
Current (at 50 Pa and 400V):	3,08	[A]
Input power (at 50 Pa and 400V):	1695	[W]
Max. input power:	1716	[W]
Max. air volume:	44650	[m ³ /h]
Max. pressure:	70	[pa]
Max. rotations:	570	[RPM]
Poles:	4	
Cos phi:	0,81	
Controllable:	On / Off	
Insulation class:	F	
Protection class:	IP 55	
Sound production (calculated):	75 (64)	[dB(A)]
Impeller:	10 / 3 / N	Type / n / system
Weight 4305110 (excl. pack.):	65,3 / 144	[Kg] / [lbs]

- Air density 1,2 kg/m³, 1 Pa (Pascal) = 1N/m² ~ 0,102 mm wk. (20°C).
- Sound production is measured according to "free field method" at a distance of 2 meter. (The value between brackets is the sound production at a distance of 7 meter).
- The above data is from a fully assembled fan with safety grid and shutter..
- According to AMCA 210 / ISO 5801.
- Images may differ slightly from reality.