

Gromac Design and Build

Unit 24 Phoenix Business Park, Avenue Close, Aston Birmingham B7 4NU
Tel: 0121 359 1109 Company Reg No: 08283353 Trading Co. CT88.

Date: 05-11-2015

Project: Mr Rice Chinese Takeaway

Site Address: , 47F Broad Street, Banbury OX16

Noise Risk Assessment

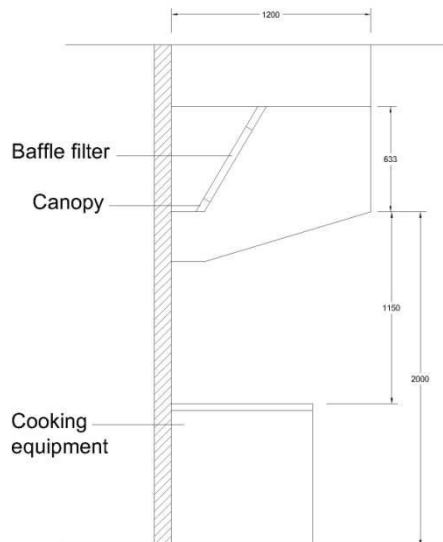
The premises has been running as Chinese takeaway for three years. It was installed with an extraction system on the rear of the building after it was granted with the consent. Due to the recent enforcement from the local authority for improving the noise insulation to the next door unit, the existing extraction flue requires to be modified or relocated in order to reduce the noise and vibration transmission to the neighbour through the external back wall.

Existing Extraction System

The existing extraction system comprises of the following components:

1) Canopy

The canopy was manufactured in stainless steel and includes full length of baffle filter for grease filtration.



The canopy is 3.5m long, 1200mm wide and 2000 above the floor level. The extraction flue is connected onto one end of the canopy through the external wall.

2) The flue component is mainly using galvanized 500 x500 square and 500 dia round duct.

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- galvanized duct
- In-line silencer
- 500mm short case axial Fan
- Flexible connector and anti-vibration bracket



3) The fan is the 500mm short case axial fan. According to the previous design document, it has the following specification

Case (mm)	Ø 500, long	
Speed (rev/min)	1420	
Motor type	CTS: 1 phase, 4 pole, 230 V	
Motor rating (kW)	0.52	
Blades	6, aerofoil	
Blade pitch angle (°)	32	
Full load current (A)	3.9	
Starting current (A)	7.8	
Speed controller	ME1.6	
Sound level (dB(A) at 3 m from source)	56	
m³/s at Pa (static)	0	2.61
	50	2.42
	100	2.20
	150	1.94
	200	1.62

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- 4) In-line silencer provide max attenuation 8db on noise 56db produced from the system. The silencer can reduce the overall noise to 48db which is under the background noise.
- 5) Anti-vibration bracket and flexible connector are used for isolating the vibration noise transmitted through the connection on the brick wall and canopy.

The design of the existing system is perfectly correct and the system should not produce the noise level above 50db.

Site Inspection

The site inspection was carried out on 19th October 2015. The area of inspection include:

- a) The bedroom on 1st floor direct above the canopy
- b) Kitchen area with the extraction canopy
- c) Back yard with the external ducting and fan

Before the system is turned on, the average background noise was recorded at 8:30pm as follows:

Bedroom - 50db
Kitchen - 55db
Backyard - 51db

While the system is turned on, the airborne noise within 3m and impact noise (measure against the party wall, floor and external wall) are recorded as follows:

	Airborne Noise (DB)	Impact Noise (DB)
Bedroom	53	62
Kitchen	75	75
Backyard	56	65

The result shows that the impact noise is dominant to the effect of the noise pollution when the system is turned on.

However the site inspection report also shows a few installation defects:

- 1) The flexible connector is not installed.
- 2) The enclosure of the fan is attached to the exterior brick wall.
- 3) The Hi-speed Jet cowl is not installed.
- 4) Some metal flicking noise due to the lose fixing.

The above defect will degrade the noise insulation performance of the overall system and cause excessive noise transmitted through the exterior wall to the next door neighbour.

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Proposed Improvement

In order to improve the noise insulation from the extraction system to the next door unit, the prime solution is to relocate the system to the rear side wall on the extension that is further away from the next door and will reduce the 3m airborne and impact noise affecting the next door neighbour.

In addition to the relocation of the system, an additional 1-D silencer before the fan will be fitted to further reduce the noise from the air flow and fan.

The proposed solution in addition to the existing system:

- 1) Relocation of existing extraction system to a further 3m away from the next door will reduce the noise another approx. 8db from the system.
- 2) The refit of the system will eliminate the fault contact between the system and brick wall, and will eliminate the loose fitting problem.
- 3) The fan will be reinstalled with the new flexible connector that eliminate the vibration noise generated from the fan.
- 4) High speed jet cowl is proposed to be fitted at the opening end which give two benefit,
 - a. exhaust air will be expelled to high level with high speed flow.
 - b. The jet effect of the air flow will provide a smoother and quieter air flow on the opening end.



- c. The additional benefit is to collect the excessive rain water from the opening.
- 5) In order to further reduce the airborne noise, a enclosure based on 100mm insulation and 18mm plywood board painted in black colour will be fitted to enclose the whole ducting and fan system. The installation require the enclosure to be detached from the ducting and fan equipment.

The proposed system

The system will require additional length and bend of the galvanized duct that increase the system pressure to approx. 180db, the existing short cased fan will be capable to work under the new pressure.

Silencer

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Under the specification of the noise 56db generated by the fan, By adding a 1DEPM silencer as shown in the table below, the attenuation will increase by a further 6db that bring the noise level to approx.. 41db comparing to the measured background noise 51db

Silencer Data

Product Code	dBA Attenuation		ΔP (Pa) 1DEPM	dBA Attenuation		ΔP (Pa) 2DEPM
	1DENPM	1DEPM		2DENPM	2DEPM	
SCPP450/4-1	-6	-10	22	-11	-16	36
SPPP500/4-1	-6	-11	28	-11	-18	46
SCPP560/4-1	-6	-11	27	-11	-19	44
SCPP630/4-1	-4	-12	31	-9	-21	50

System Specification

The system details is listed as below:

- 1) Existing 500mm 4-pole single phase Fan with speed controller
- 2) New Anti-vibration bracket and washer for every fitting
- 3) New 2x Flexible connector at both side of fan
- 4) Existing 1DENPM silencer after the fan
- 5) New 1DEPM silencer before the fan
- 6) New 500mm ducting
- 7) New 500mm Hi-speed jet cowl

The calculated resultant noise will be 41db.

Enclosure

The enclosure is constructed based on 18mm plywood painted in black and 100mm insulation. It is supported by the steel frame structure mounted on the exterior wall. This construction is to further reduce the airborne noise to the next door neighbor.