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AUGUST 10, 2015

Matthew Ashton

MgMaStudio Ltd

Oriel Chambers, Liverpool

Dear Matthew,

MOOSE COFFEE – EXTRACT FAN NOISE CONTROL

As requested we have carried out an acoustic review of noise from the proposed extract fan at Moose Coffee (Queen Insurance Building, Liverpool) affecting hotel rooms overlooking the lightwell into which the extract discharges.

We understand that the discharge will be at basement level, adjacent to office windows. Please note that our calculations have been concerned with mitigating noise to the hotel bedrooms and that due to the proximity of the discharge to the offices it is not possible to rule out some disturbance to these spaces. It is hoped that occupants of these offices are tolerant of extract noise due to the existing system in place.

Information Reviewed and Assumptions

This assessment has been based on the following information;

- Fan sound power data published at http://www.nfan.co.uk/store/p/45jm1645301ph-long-cased-axial-flow-fan-by-flakt-woods
- MgMa elevational drawing reference 153_101 dated 24 July 2015
- PureVent site survey sketch and photographs
- PureVent proposed duct layout issued 10 August 2015

It is our understanding that the fan itself is existing, and is located internally to the building.

The assessment is based on an internal ambient noise level criterion of 35 dB L_{Aeq} within hotel bedrooms in line with the daytime requirements of BS8233:2014 for sleep and rest conditions. It is understood that the plant will not operate during the hours 11pm-7am when more stringent criteria would apply.

We have assumed a maximum window opening area of $1m^2$ to each hotel bedroom.

We understand from PureVent that the proposed ESP unit generates less than 20 dBA of noise and will therefore not contribute to the overall levels. This has therefore not been considered in the calculations.

Attenuation Requirements

We recommend that the attenuator be relocated part way between the ESP unit and the wall penetration in order to minimize regenerated noise from air turbulence.

The required installed insertion loss of the attenuator is presented in the table below;

	Octave Band Centre Frequency, Hz							
	63 Hz	**125 Hz**	**250 Hz**	**500 Hz**	**1 kHz**	**2 kHz**	**4 kHz**	**8 kHz**
Installed insertion loss, dB	12	19	27	31	25	29	31	30

Table 1: Required attenuator installed insertion loss

In order to control noise breakout through the duct walls, the duct system should either be fully enclosed within an imperforate enclosure (not louvres as shown on the drawings), or the ducts fully acoustically lagged.

The required insertion loss of the lagging or enclosure is shown in the table below;

	Octave Band Centre Frequency, Hz							
	63 Hz	**125 Hz**	**250 Hz**	**500 Hz**	**1 kHz**	**2 kHz**	**4 kHz**	**8 kHz**
Installed insertion loss, dB	16	20	24	26	24	23	18	15

Table 2: Required lagging or enclosure installed insertion loss

This is achievable by commercially available duct lagging, for example 25mm of 10kg/m^2 SuperLag Technowrap 1.

Alternatively an enclosure consisting of two layers of board of minimum total mass 20 kg/m^2 (e.g. two layers of 18mm plywood) would be appropriate.

We trust this information meets your needs at the current time but please call should you have any questions.

Kind regards,

Susan Witterick

DIRECTOR