Fresh air matters

Honi Poke Ventilation

Works specification

AOTQ120

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1. SCOPE

The scope of this project is the design and installation of ventilation system for a street food space located at the address 69 Clerkenwell Road, EC1R 5BU.

2. INITIAL DATA

The design parameters:

Air filtration class: F7
Supply air temperature: 21 C
Supply Airflow: 1100 m3/h (30 Air Changes per Hour)
Extract airflow: 1100 m3/h (30 Air Changes per Hour)

Space height – 3 m
Space area - 12 m2

Outdoor air temperature (winter): -4 C
Outdoor air relative humidity (winter): 100%

Cooking Equipment Type – electrical.

Type of exhaust according DW172 and Westminster City Council Environmental Health Department's Recommendations – 'low-level' externally discharging bespoke scheme

3. SYSTEM DESCRIPTION

The space is ventilated with a mechanical system. The exhaust fan extracts the air from a hood that covers all the pollutant sources. The extracted air is compensated by a same amount of fresh air supplied through an air handling unit.

All the equipment is located in the kitchen space.

The proposed design is based on the concept of low-level discharge. The recommendations and constraints described in DW172 and Westminster City Council Environmental Health Department's Recommendations are respected and reflected in the current design. The intake and exhaust are located on the different facades at 2.8 m from the ground level.

The following lines describe the strategies applied to compensate the low-level air discharge scheme:

3.1. ODOUR CONTROL

The extract system is equipped with two types of filtering devices:

- Electrostatic Precipitator (ESP) – ionises the particles and cause their consequent precipitation. The unit produces the ozone that helps eliminate the odour. The particles are negatively ionised in the ioniser section and they stick to the earthed plates. The ozone is produced as a result of ionization process. It contributes to odour removal.

- Carbon filters (MFU) – the Carbon filter unit is fitted with three carbon filters (AES Cadsorb). The carbon units remove the malodourous gasses.

3.2. NOISE CONTROL

A series of measures are designed to reduce the noise power level transferred through the ducts to exterior. The supply system and the exhaust systems are equipped with silencers and lined duct elements. The following table shows an estimation of noise reduction.

Exhaust system:

Bandwidth	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Fan, noise power level	66	71	76	76	73	69	64	60
Silencer insertion loss	4	7	13	24	28	28	17	24
Duct attenuation (bend, linned)	0	0	8	4	3	3	0	0
Duct attenuation (plenum with lining)	0	0	2	8	10	0	0	0
Resulting noise power level SWL at louvre	62	64	53	40	42*	38*	47	40

- - Limited by silencer regenerated noise

Supply system:

Bandwidth	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Fan, noise power level	65	65	64	65	66	63	59	59
Silencer insertion loss	3	6	11	19	21	18	21	7
Resulting noise power level SWL at louvre	62	59	53	44	45	41	38	52

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4. SCHEDULE

Ref	Type	Manufacturer / Model	Noise data , dB	Mechanical capacity	Dimensions , mm	Weight, kg	Electrical
AHU-1	Air handling unit	Komfovent VERSO-S-1300-F-E/15-X-F7/X-C5-X	Sound power level: Supply inlet- 70 dB(A) Supply outlet- 76 dB(A) Casing - 52dB(A)	Airflow 1100 m3/h Pressure drop - 100 Pa	700x350x893	46	Supply voltage- 3-400 V Air heater - 15 kw Max operating current – 24.4 A
MFU	Carbon filter	AES Environmental MFU 600 UNIT	-	AES Cadsorb filters use activated carbon to remove the malodourous gases within the commercial kitchen extract	640x630x925	55.5	-
TLL	Extract fan	T - Line 120 TLL250/21-3	Sound spectrum : 63: - 66 125: -71 250: -76 500: -76 1k: - 73 2k: - 69 4k: - 64 8k: - 60	Airflow 1100 m3/h 400 Pa	380x480x380	30	Phase – 3 Voltage – 400 Vac Motor full load Current – 1.0 A
ESP	Electrostatic filter	Filter Purified Air - ESP1500	-	The ionisation voltage runs at a negative potential which enhances both the ionisation of particles and their consequent precipitation and the production of ozone which helps eliminate odours in a kitchen environment.	450x630x640	55	220/240 V 50/60Hz, 1ph Power consumption – 20 Watts
ATT 01	Silencer	TLLVA250/1250	Induct Loss 63: - 4 125: -7 250: -13 500: -24 1k: -28 2k: -28 4k: -17 8k: -24	-	380x380x 1250	40	-

Ref	Type	Manufacturer/ Model	Noise data , dB	Mechanical capacity	Dimensions , mm	Weight, kg	Electrical
ATT 02	Silencer	Bespoken	Induct Loss 63: - 3 125: -6 250: -11 500: -19 1k: -21 2k: -18 4k: -12 8k: -7		500x200x L400	15	