

DESIGN BULLETIN 01: Kitchen Ventilation Report

PROJECT NO/TITLE:	6045 Brewdog – Fountain Street Manchester	PACKAGE OF ELEMENT:	MEP	DOC REF/REV:	A
PROJECT/DESIGN PHASE:	PLANNING	PREPARED BY:	CRAIG SUTHERLAND	ISSUE DATE:	10.03.21
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1 INTRODUCTION

This desktop design bulletin has been prepared to review the proposed design philosophy for the kitchen extract fume in order to satisfy planning. It shall highlight the main design characteristics of the system in relation to odour control and noise in line with relative guidance such as EMAQ “Control of Odour and Noise from Commercial Kitchen Exhaust Systems” and local planning conditions.

2 Design Principles

Ventilation Rates

In line with Best Practice for Design and Operations of Commercial Kitchens the following design criteria shall be achieved with regards to the design and installation for the kitchen exhaust system for the bar at Brewdog development at Fountain Street, Manchester:

- An internal ambient air temperature of 28°C maximum
- Maximum humidity levels of 70%
- Internal noise level should be between NR40 NR50
- Dedicated make up air system to be approximately 85% of the extract flow rate
- Minimum air change rate of 40 per hour (bases on canopy and general room extraction)

Using DW/172 Extract Flow Rate Calculation Method 1, based on the equipment schedule provided by the kitchen installer, the following ventilation rates shall be achieved:

Theoretical extract volume required	1.1130
Canopy Factor	1.2
Extract Flow Rate M3/SEC	1.336
Supply Flow Rate (85%) M3/SEC	1.135

All exhaust ductwork within the building shall be fire rated Low Pressure Class “A” and constructed in accordance with BESA Specification DW/144, the ductwork has been sized to ensure in duct velocities shall be n more than:

	Supply(m/s)	Extract(m/s)
In Duct Velocity	6-8	6-9
Extract Flow Rate M3/SEC	4-6	5-7
Supply Flow Rate (85%) M3/SEC	3-5	5-7

Consideration to the size of the duct is important to ensure that in duct resistances are kept to a minimum so that in duct and discharge noise is minimised.

All internal surfaces of the ductwork shall be accessible for cleaning and inspection complete with access panels installed at 2.0m centres.

The fan specified shall be capable of achieving an additional 10% airflow and 20% pressure margin allowed in order to future proof the system for any potential future extensions to the kitchen plan.

The discharge stack shall be installed no less than 1m above the roof ridge of the building and away from any window of the building housing the commercial kitchen.

At termination point at roof level, a jet cowl shall be installed, this cowl ensures the air is ejected in an upwards-directed jet. This avoids contaminating the air in the vicinity of the hood, and soiling of the area around the hood. The cowl shall ensure that the exhausted air is ejected at a minimum velocity of 15m/s.

The hood is made of galvanised sheet steel. It has a net over the opening and an internal rain funnel to collect rainwater and snow, which is drained out of the hood through a hose. The hose can withstand temperatures of between -45 and +65 °C.

In order to reduce noise from the system, the fan shall be fitted with attenuated housings to ensure that noise levels are in accordance with local standards, attenuation shall be installed in order to prevent any grease impregnation of the acoustic structure.

Acoustic Analysis Spreadsheet - - Kitchen Fan

Client:	Brewdog	
Contract:	Brewdog - Manchester	Sheet No 1 of 1
Area:	Bar	Date: 14 January 2021

	Hz		63	125	250	500	1K	2K	4K	8K	dBA	Line
MUB 062 630												1
Extract			54.0	72.0	72.0	75.0	78.0	76.0	74.0	66.0		2
550 x 550mm Duct	29	m	29.0	20.3	8.7	8.7	8.7	8.7	8.7	8.7		3
550 x 550mm Duct tee			0	0	0	0	0	0	0	0		4
550 x 550mm Duct		m	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		5
600x500mm Bend	6		18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0		
Louvre Effect			6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0		6
db reduction at 10m			20	22	22	23	25	28	35	8		7
Resultant Noise Levels			-19	6	17	19	20	15	6	25	21	8

The ventilation system shall come complete with ESP filtration and Ozone dosing in order to manage odour control from the system, this considers the two phases of contamination in a kitchen exhaust, particulate (grease, smoke hydrocarbons/VOC) and gaseous (odour).

A maintenance regime shall be implemented post completion of the development ensuring that odour control systems installed shall work at optimal performance this shall include:

- ESP systems cleaned, and sump emptied on a four weekly basis.
- UV-C systems used in line, cleaned on a four weekly basis
- Side Stream UV-C systems, cleaned every 3 to 6 months.
- Carbon filters with ESP pre-treatment change carbon filter every 6 to 12 months.

It is intended to install Purified Air – Electrostatic Precipitation (ESP) filter which is capable of providing a filter efficiency of 98%. Ozone is produced as a function of the charging of the Collector Cell's plates in Purified Air's range of Electrostatic Precipitators. This helps to combat the gaseous or odour phase of kitchen exhaust pollution.

In order to combat the remaining odour, the ventilation system shall come complete with Ozone Dosing via Purified Air – UV-O 1000 Odour control unit.

3 Conclusion

Great consideration has been taken with regards to the installation of the kitchen exhaust system within the bar, with the inclusion of ozone dosing, ESP filtration, all efforts have made to mitigate all levels of odour which may cause a nuisance to the surrounding area.

The ventilation system has been sized in accordance with using DW/172 Extract Flow Rate Calculation Method 1 to ensure the system is capable of providing sufficient supply and extract ventilation to the commercial kitchen.

In duct noise has been reduced by ensuring ductwork has been sized accordingly, and resulting noise levels have been reduced through the use of attenuated enclosures on the ventilation systems.