



KITCHEN VENTILATION SPECIFICATION INFORMATION

Proposed Property

Bullgogi

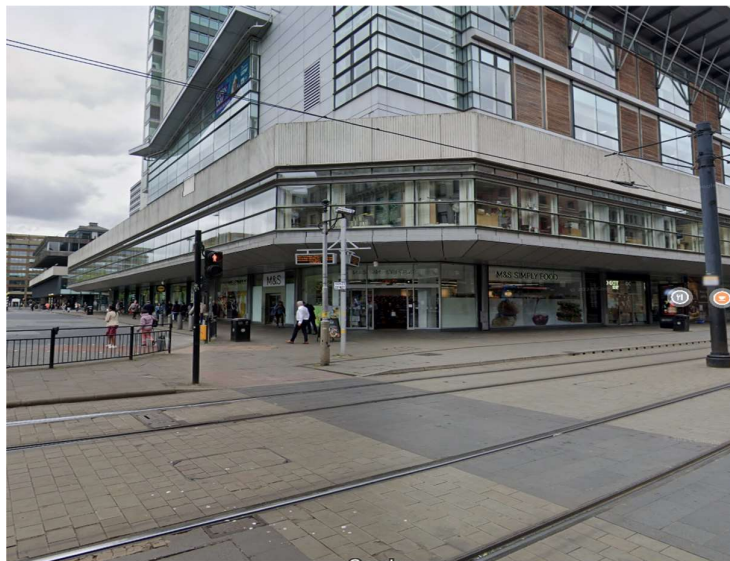
Unit 6A, Piccadilly Plaza

Manchester

M1 4AJ

Type of Cooking

BBQ Grill



Quality Management

Project : Bullgogi, Unit 6A, Piccadilly Plaza, Manchester, M14 AJ
Title : Kitchen Ventilation Specification Information
Document Ref : 6150- ME
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Revision Status/ History

Rev	Date	Issue/purpose /Comment
00	12/04/2024	Final Issue
01	29/05/2024	Updated based on Architect Comments
02	11/07/2024	Updated based on drawing changes

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Executive Summary

A. Site Address

Unit 6A, Piccadilly Plaza, Manchester, M14AJ

B. Surrounding Area

Mixed Use Commercial and residential, several kitchen extraction Systems already nearby.

C. System Summary

A high velocity, high dilution system will be utilised as it is optimum solution for dealing with high levels of grease laden hot air. The system has design features to minimize its odour, sound and visual footprint on the surrounding area.

Kitchen: Canopies are fitted over all steam, grease and heat producing equipment and a fresh air inlet is provided in the kitchen area.

Seating Area: The Seating areas are fitted with BBQ Smoke pipe for extraction of smoke and a fresh air supply is provided in the seating area.

To avoid any odours becoming a nuisance they are first diluted with fresh air and the grease removed from extracted air by means of baffle filters fitted in the canopy. The system also utilises an ionising odour neutraliser system and electrostatic precipitator before the air is exhausted in the high velocity.

To attenuate noise, the fan is mounted on anti-vibration rubber mouldings and connected to the ductwork by means of flexible connectors. A silencer is fitted behind the fan to prevent noise travelling through the ducting and air stream.

Please See General arrangement for a specification summary of equipment fitted and system diagram in Appendix A.

D. Summary of detailed Information attached in the specification.

Kitchen

i) Extraction

Volume m3/second	Resistance	Discharge Velocity	Filtration	Noise level DB(A)
2.25 m3/sec	400 pascals	12.071	Baffle Filters Ozone Filter-2 ESP-2	40

ii) Supply

Volume m3/second	Resistance	Replacement	Air Filter	Noise level DB(A)
1.91 m3/sec	182 pascals	85%	EU 4	39

Seating Area

i) Extraction

Volume m3/second	Resistance	Discharge Velocity	Filtration	Noise level DB(A)
1.773	390 pascals	14.107	Ozone Filter -1 ESP - 1	40

ii) Supply

Volume m3/second	Resistance	Replacement	Air Filter	Noise level DB(A)
1.82	200 pascals	85%	EU 4	40

Type of Cooking

Cuisine	Discharge Cowl Type	Discharge Termination
Korean table BBQ	Bird Beak Cowl	Low level Cut off Cowl

1. Introduction

1.1 Canopy Design

With the canopy supplied, the extraction air flow duty on the cooking type appliances underneath and calculated the volume required to capture the grease -laden air and heat removal over the appliance used.

Kitchen Canopies are manufactured out of 430 or 304 grade stainless steel. Stainless steel baffle filters within the canopy housing fully welded drain channel and complete with grease pot or grease tap.

Grease Tap: A stainless steel ball valve with plastic lever handle, threaded if you want to make a permanent grease run-off to grease pack.

These are installed at one or each end of canopy, where the grease runs down the welded drain channel.

Anticlockwise and drain off any excess grease or oil and was with soapy water and turn lever clockwise to shut off.

Grease pot: Installed in the bottom plenum a removable pot at one or each end of canopy, where grease runs through hole above into the drain pot, remove the pot and dispose the grease appropriately, wash out with hot soapy water and re-fit by pushing back in to the slides, wash drain channel with hot soapy water and drain off any excess grease or oil.

This is for good housekeeping for cleaning grease daily and is easily accessible.



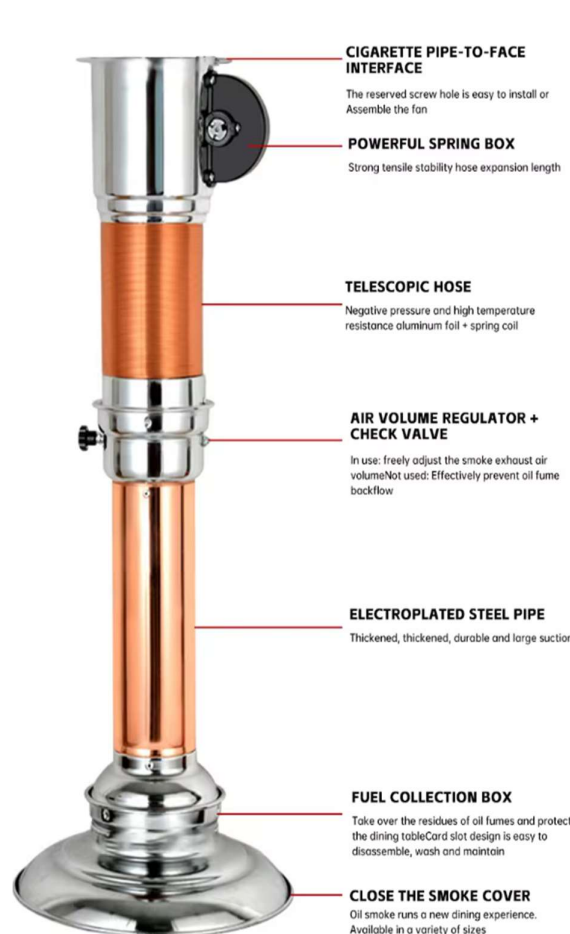
Canopies will be installed at a working height of 2000mm to 2100mm underneath the canopy. 300mm overhang on front and sides of appliances.

1.2 BBQ Smoke Exhaust Pipe design

The Korean BBQ Smoke pipe is provided for each seating area which is equipped with electric stoves. The BBQ Smoke Pipe is made of abrasion resistant electroplated stainless-steel material with aluminum foil.

The smoke pipe is equipped with the volume regulatory valve, which can be used to control air volume by adjusting the air volume valve and also equipped with check valve to restrict the backflow.

There is fuel collection box fixed just above the smoke cover which removes out the residues of the oil fumes.



2. Proposed System Specification

2.1 Brief description of site requirement

Low level discharge on the plant room louver with a cut off cowl with bird mesh. Electrostatic precipitator mounted internally to eliminate smoke and grease particles, ozone injection system is used to neutralize the odours before discharging at low level, fan and silencer mounted internally on antivibration hangers.

The extraction plant is mounted in the plant room. The odour neutralizing system will reduce any odour, emanating from the premises.

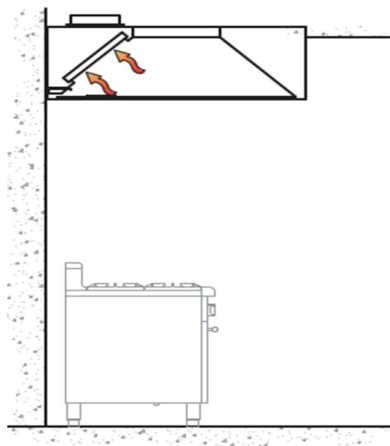
The proposed system to be mounted or hung on anti-vibration mountings to reduce any reverberation type vibration from the extraction system, travelling through the building.

Access doors installed in the ducting system for every 1.5m centers for cleaning and maintenance.

We can confirm that the design and specification for the extraction system at the above address is in accordance to DW 172 Specification.

2.2 Canopy Information

Above Griddle hot plate, fryers, this will give a canopy size for calculations of 6.0m (Wide)* 1.1m (Depth) 430 grade, brushed stainless steel overhead wall mounted canopy, complete with stainless steel baffle filters. Incorporated within each canopy would be a full-length plenum-built filter housing to accommodate 6 off, 500mm (wide) x 500mm (high) x 50mm (deep) grease filters.



EXTRACTION CANOPY FLOW RATE CALCULATIONS - THERMAL CONVECTION METHOD							
Appliance			Width x Depth = Area			X coefficient	Total Flow rate
ITEM	QTY	DESCRIPTION	mm	mm	m2	m3/s per m2	m3/sec
1	1	Gas Wok Type (3f,1r)	1500	600	0.9	0.9	0.81
2	2	Free Standing Gas Fryer	450	812	0.3654	0.5	0.3654
3	2	Convection oven range	900	812	0.7306	0.4	0.58448
4	1	Worktops	1593	812	1.2933	0.03	0.03879888
Theoretical Extraction Volume required in m3/sec							1.79867888
Canopy factor							1.25
Required Specific Extract Flow Rate in m3/s							2.2483486
Required Specific Replacement Air Flow Rate at 85% of Extract							1.91109631
CALCULATIONS ARE FOR VENTILATION OF EQUIPMENT BELOW THE CANOPY AND DO NOT ALLOW FOR GENERAL VENTILATION. ALL AS PER DW172 SECTION 5							

2.3 BBQ Smoke Pipe Exhaust information

Below are the details of BBQ Smoke pipe:

Product Name	Brand name	Pipe Dia (cm)	Flow Rate
BBQ Smoke Extractor for Grill	Worldwide BBQ	8.5	2.8m3/min

2.4 Baffle Filter information

It is universally recognized that there is an increasing need to maintain & improve hygiene standards & reduce fire hazards with kitchens. The baffle grease filter accomplishes both needs through its clever design of interlocking baffles that provide a tortuous route for the passage of air through the filter by creating two rapid 180 air direction changes simultaneously. The grease molecules having a far greater inertial force than air impact themselves on the vanes.

A series of vertical stainless vanes are housed in a channel frame, with each of the baffles strategically aligned to provide the highest potential for grease removal.

Due to the smooth nature of the vanes the grease naturally runs downwards through the drainage holes and into the collecting trays normally provided within the canopy holding casings.

Below are the details for the baffle filters:

Length (mm)	Width (mm)	Brand	Flow rate (m3/s)	Grade Satin	No of filters	Pressure Drop (Pa)	Filter type	Canopy Style
500	500	Air Clean	0.39	430	6	125	Baffle	wall

3. Risk Assessment for Odour Neutralization

In addition to the basic HVHD Principle and baffle filtration, detailed above, additional odour control measures will be fitted, as described forthwith.

According to DEFRA's "Guidance on the control of Odour and Noise.

Impact Risk	Odour Control Requirement	Significance Score*
Low to Medium	Low level odour control	Less than 20
High	High level odour control	20 to 35
Very high	Very high level odour control	more than 35

* based on the sum of contributions from dispersion, proximity of receptors, size of kitchen and cooking type:

Criteria	Score	Score	Details
Dispersion	Very poor	20	Low level discharge, discharge into courtyard or restriction on stack.
	Poor	15	Not low level but below eaves, or discharge at below 10 m/s.
	Moderate	10	Discharging 1m above eaves at 10 -15 m/s.
	Good	5	Discharging 1m above ridge at 15 m/s.
Proximity of receptors	Close	10	Closest sensitive receptor less than 20m from kitchen discharge.
	Medium	5	Closest sensitive receptor between 20 and 100m from kitchen discharge.
	Far	1	Closest sensitive receptor more than 100m from kitchen discharge ¹ .
Size of kitchen	Large	5	More than 100 covers or large sized take away.
	Medium	3	Between 30 and 100 covers or medium sized take away.
	Small	1	Less than 30 covers or small take away ¹ .
Cooking type (odour and grease loading)	Very high	10	Pub (high level of fried food), fried chicken, burgers or fish & chips. <i>Turkish, Middle Eastern or any premises cooking with solid fuel</i>
	High	7	<i>Vietnamese, Thai, Indian, Japanese, Chinese, steakhouse</i>
	Medium	4	<i>Cantonese, Italian, French, Pizza (gas fired),</i>
	Low	1	<i>Most pubs (no fried food, mainly reheating and sandwiches etc), Tea rooms¹</i>

Below is the scoring summary for the restaurant based on the above assessment.

Details	Dispersion	Proximity of receptors	Size of Kitchen	Cooking Type (Odour and grease loading)	Total Score
Korean BBQ Restaurant	20	10	5	7	42

Based on the above odour assessment the emission would require a very high level of odour control

Based on EMAQ, for very high level of odour control, we will using below option

- Fine Filtration or ESP followed by UV Ozone System

Maintenance must be carried out to ensure these performance levels are always achieved.

3.1 Odour Control Method

Kitchen:

3.1.1 ESP precipitator Unit (Eliminate the oil, Smoke and grease)

First stage.

Eliminates up to 98% of smoke, oil and grease particles, Filters particles down to sub-micron levels.

Produce ozone to help reduce mal Oduors, Designed with an integral sump.

Modular in design. Specifically designed for commercial kitchen applications.

Greatly reduces grease build-up within the duct run.

Grease Drain point to be provided below unit.



Below are the Selection Details –

System	Model No	Brand	Size (mm)	Resistance (pa)	No of Units (no's)	Power requirement	Flow Rate (m3/s)
Kitchen Extract	1HX	Air Clean	1243W	80	2	240V	0.69-
	2W		X540HX620D			Single Phase	1.36
Seating Extract	1H X3W	Air Clean	1790W X 540H X 620D	80	1	240V Single Phase	1.36- 2.08

3.1.2 Ozone injection System

The Ozone has been recognised as a very effective medium for neutralising of cooking odours and injection into the extraction system to be effective in the control of odour.

However, ozone emissions must be within safe levels. The accepted industry guidelines of 1 gram per 0,09m/s of air volume @1.5 seconds of dwell time within the ducts.



Below are the selection details-

System	Type	Size (mm)	No of Injectors (no's)	Power requirement	Max Air Volume Treatment (m3/s)
Kitchen Extract	30-40 gram	150x150x330	2	240V Single Phase	2-4
Seating Extract	10-20 gram	150 x 150 x 330	1	240 V Single Phase	1-2

4. Extraction System information

Galvanised mild steel sheet of lock -formed ducting in accordance with DW144. Constructed from hot -dip galvanized steel sheet. Joints and spigot sealed with high pressure ducting sealant, which complies with HVCA specification DW172.

Off the top of the canopies to one common extraction duct running to the rear of the premises, with an electrostatic precipitator remove smoke first stage filtration with odour injection system to deal with the odour with a mixed flow fan, silencer, and speed controller. With the ducting through rear wall to a cut off cowl with bird mesh.

Criteria: Which our design is based on regarding air flow velocities.

High velocity cowl: 10-15 M/sec to give a high efflux velocity to disperse higher into the atmosphere and dilution.

Duct velocities should be as follows:

Extract: Main runs 6-9 m/sec with the branch and spigots 5-7 M/sec.

Supply: Main runs 6-8 m/sec, branch runs 4-6 m/s and spigots 3-5m/s

4.1 Type of Discharge cowl

Kitchen Extract

500 dia cut off cowl with mesh

500mm mesh guard to increase velocity.

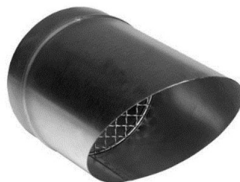
Volume 2.25 m³/sec divided by 0.196 m² = 11.48 m/sec this will create a higher efflux velocity to discharge high into the atmosphere.

Seating Extract

400 dia cut off cowl with mesh would be discharging @ 14.107 m/sec.

400mm mesh guard to increase velocity.

Volume 1.773 m³/sec divided by 0.12568 m² = 14.107m/sec this will create a higher efflux velocity to discharge high into the atmosphere.



4.2 Extraction fan details

4.2.1 Kitchen

Located internally 4 pole, three-phase mixed flow fan at the designed duty: 2.25 m³/s @ 400 pa.

Grease filter resistance.

Baffle filters	Quantity (Nos)	System Volume	Equals each	Resistance in Pascal's
500 x 500	6	2.25	0.39 m3/sec	125

System resistance calculations for Kitchen Fan Extract.

*	Extraction System	Pascal's
1	Ducting and fittings	90
1	Low level discharge cowl with bird guard	30
6	Baffle grease units	125
2	Electrostatic Precipitator ESP	80
1	Attenuator	60
Total ESP Requirement		385

Selected Fan details

Fan Model	Type	Volume m3/sec	Resistance	Speed rpm	Phase	Noise level @3 meters
MUB/T 062 560EC	Mixed Flow	2.25	385	1420	3Phase/400V	61

Attenuator information

To reduce the discharge noise, we would install a 800mm * 800 * 1250 mm long splitter attenuator with baffle silence panels which would reduce noise by 21DB(A)

Noise level the source	61Db(A)
Silencer reduction after fan	-21 Db(A)
Total Noise level at 3 meters from discharge cowl	40 DB(A)

4.2.2 Seating Area

Located internally 4 pole, three-phase mixed flow fan at the designed duty: 1.773m3/s @ 390 pa.

System resistance calculations for Kitchen Fan Extract.

*	Extraction System	Pascal's
	Duct and Fitting System	220
1	Low level discharge cowl with bird guard and system	30
1	Electrostatic Precipitator ESP	80
1	Attenuator	60
Total ESP Requirement		390

Selected Fan details

Fan Model	Type	Volume m3/sec	Resistance (Pa)	Speed rpm	Phase	Noise level @3 meters
MUB/T 042	Mixed Flow	1.773	390	1465	3 Phase	50

Attenuator information

To reduce the discharge noise, a 700mm * 700 * 650mm long splitter attenuator with baffle silence panels is installed which would reduce noise by 11DB(A)

Noise level the source	50Db(A)
Silencer reduction after fan	-11 Db(A)
Total Noise level at 3 meters from discharge cowl	39 DB(A)

4.3 Air Supply System

4.3.1 Kitchen

Replacement air

It is advisable to install an air supply system either built into the front of the canopy with the fan and ducting mounted in the wall or through ceiling diffusers.

Fans complete with silence and speed controller, supplying fresh ambient air through grilles mounted in the canopies front face.

Supplying fresh ambient air to replace approximately 85% of the extract flow rate volume of the extracted air.

System resistance Calculations

*	Supply system	Pascal's
1	Weather louver	45
1	EU4 Filter box	35
1	Grilles and ducting	70
Total Static resistance on the system		150

Selected fan details

Fan Model	Type	Brand	Volume (m3/sec)	Resistance (Pa)	Heat Battery	Phase	Noise level @ 3 meters
Eco Inline Fans	Mixed Flow - EMF40032	Vent Axia	1.91	190	No	3	55

Attenuator information

To reduce the discharge noise, an 800mm * 800 * 900mm long splitter – 2nos attenuator with baffle silence panels which would reduce noise by 15 dBA.

Noise level the source	55Db(A)
Silencer reduction after fan	-15 Db(A)
Total Noise level at 3 meters from Weather louver	40 DB(A)

4.3.2 Seating Area

Replacement air

Located internally 4 pole, single-phase mixed flow fan at the designed duty :1.81/sec @200Pascal's resistance.

System resistance calculations

*	Supply System	Pascal's
1	Weather Cowl/ Louver	45
1	EU Filter Box	35
1	Attenuator	60
1	Grilles and Ducting	50
Total static resistance on the system		200

Selected Fan details

Fan Model	Type	Volume m3/sec	Resistance	Resistance (Pa)	Heat Battery	Phase	Noise level @3 meters
Eco line fans	Mixed flow	Vent Axia	1.812 l/s	225	Yes	3 Phase	52

Attenuator information

To reduce the discharge noise, a 700 mm * 700 * 650 mm long splitter – 2nos attenuator is installed with baffle silence panels which would reduce noise by 12 dBA.

Noise level the source	52Db(A)
Silencer reduction after fan	-12 Db(A)
Total Noise level at 3 meters from weather louver	40 DB(A)

5. Cleaning and Maintenance

5.1 General guidelines to cleaning and maintaining an extraction system.

The fans and ducting have been situated to maximise the full extraction potential; it is important that the following procedures are carried out as stipulated.

The canopy must be externally cleaned on a weekly basis.

All grease filters must be cleaned at least three times a week using hot soapy water, to avoid grease carry over.

5.2 Cleaning and maintenance of extraction system

The canopy and full extraction system must be professional deep cleaned no later than twelve months after installation and certified.

Failure to adhere to these guidelines will prevent the system working to its full potential, and odours may arise due to grease residue inside the ducting giving a carry over.

Summary cleaning information

Canopy

Wash down weekly with hot soapy water ensures all fat channels are clear and clean.

Grease filters.

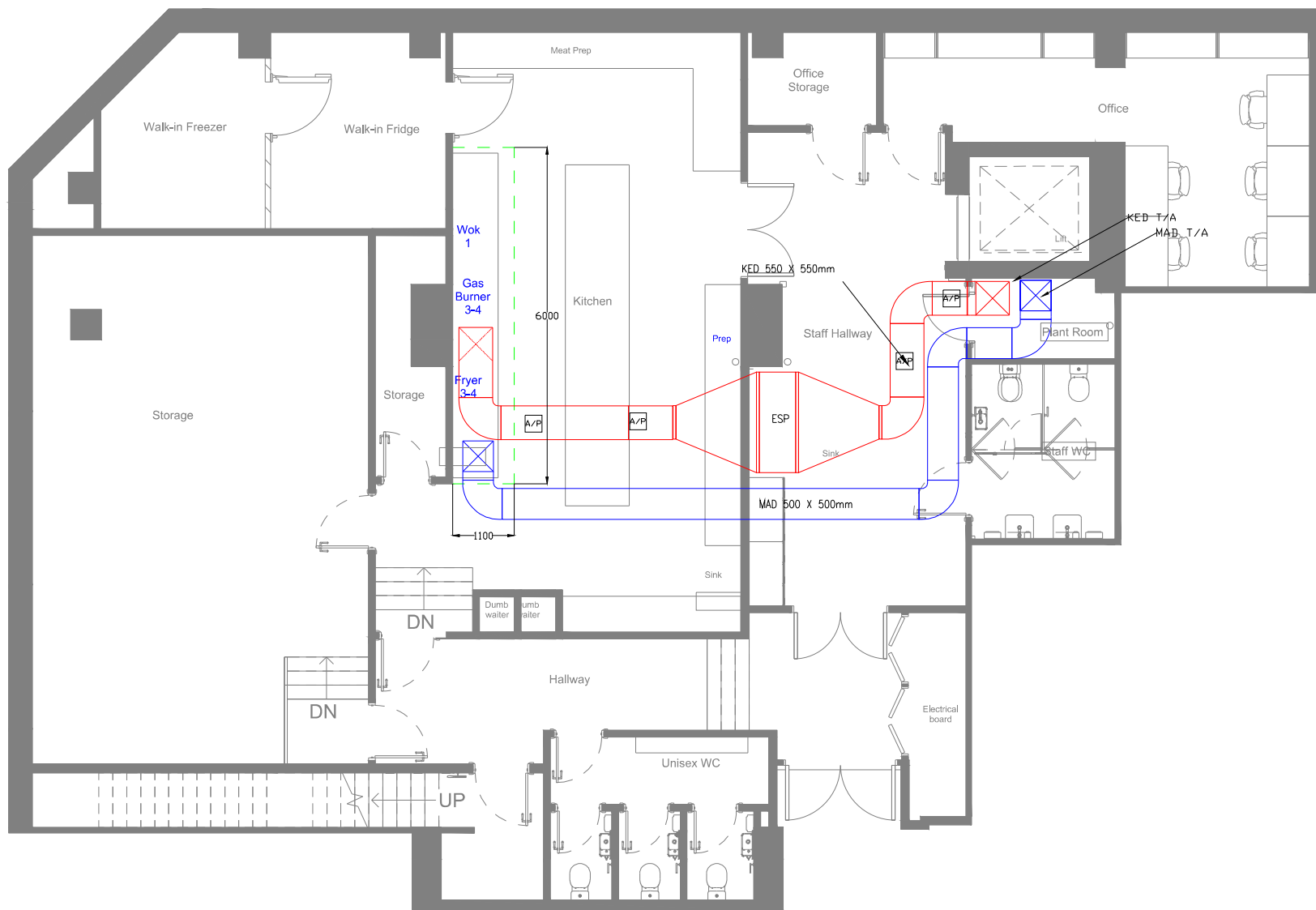
Clean at least three times a week using hot soapy water.

Ensure oil and fat outlets are clear and clean.

Replace filters with the drainage slots at the bottom facing down.

APPENDIX A

DRAWINGS



NOTES:

Legend

KED - KITCHEN EXTRACT DUCT
 MAF - MAKE UP AIR DUCT
 SED - SEATING EXTRACT DUCT
 FAD - FRESH AIR DUCT
 A/P - ACCESS PANEL

02 Tender Design

Ref Revision

Client

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GROUP

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Project Title

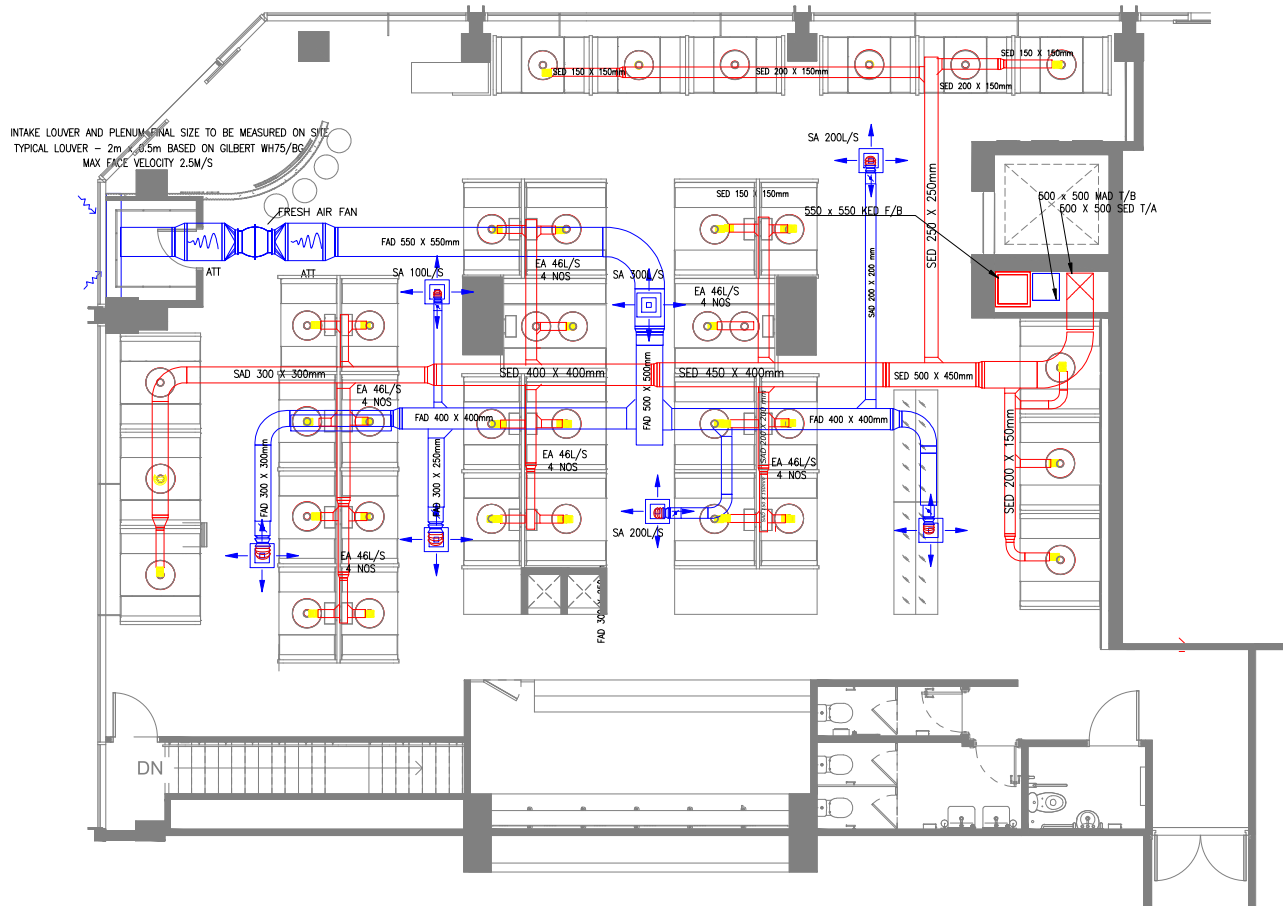
BULLGOGI, MANCHESTER

Drawing Title

**BASEMENT FLOOR
KITCHEN VENTILATION**

Scale	Drawn By	Checked By	Date	Sheet
NA	JS		11.07.2024	1 OF 1

Drawing Number				
project	Originator	system	level	type
6150-SEA-ME-B-HVAC-MEP-001-C				



- NOTE - i) ROCKWOOL INSULATION TO BE PROVIDED FOR THE KITCHEN & SEATING EXTRACT DUCT INSIDE THE RISER.
- ii) ACCESS PANEL TO BE PROVIDED FOR KITCHEN EXTRACT AND SEATING EXTRACT FOR CLEANING PURPOSE.

GENERAL

- DO NOT SCALE FROM THIS DRAWING
 - THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL PREMIER CK INFORMATION.
 - ALL PLANT AND EQUIPMENT WILL BE INSTALLED AND COMMISSIONED FULLY IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. ENTILATION INSTALLATION
 - VENTILATION SYSTEMS TO BE COMPLETE WITH ALL ACCESSORIES, CONTROLS AND FITTINGS TO PROVIDE A COMPLETE AND FUNCTIONAL INSTALLATION
 - ALL VENTILATION SYSTEMS AND COMPONENTS TO BE INSTALLED, TESTED AND COMMISSIONED IN ACCORDANCE WITH BUILDING REGULATIONS APPROVED DOCUMENT F.
 - DUCTWORK SHALL BE INSTALLED IN GALVANISED STEEL WITH CIRCULAR PROFILE AND SPIRAL SEAMS WHERE POSSIBLE OR OTHERWISE STATED IN ACCORDANCE WITH HVCA DW 144 AND BS EN 1506, OTHERWISE RECTANGULAR GALVANISED STEEL. DUCTWORK SHALL BE INSTALLED IN ACCORDANCE WITH HVCA DW 144 AND BS EN 1505.
 - VOLUME CONTROL DAMPERS IN ACCORDANCE WITH HVCA DW 14 ARE TO BE PROVIDED TO ALL DUCTWORK BRANCHES.
 - EXTERNAL LOUVRES ARE TO BE COMPLETE WITH REMOVABLE INSECT MESH.
 - ACCESS SHALL BE PROVIDED IN ALL DUCTWORK FOR INSPECTION, MAINTENANCE AND COMMISSIONING IN ACCORDANCE WITH HVCA DW 145 AND HVCA TR19.
 - FLEXIBLE DUCTING SHALL BE USED FOR THE FINAL UNIT / GRILLE / PLENUM CONNECTION, NO MORE THAN 300mm PER LEG SHOULD BE USED AS PER BRECC GUIDANCE.
 - ALL DUCTING WITHIN AN UNHEATED SPACE MUST BE INSULATED IN ACCORDANCE WITH PART F OF THE 2010 BUILDING REGULATIONS. EXHAUST AIR LEGS ARE TO BE FULLY INSULATED BACK TO THE UNIT.
 - SUPPLY AND EXTRACT GRILLES SHALL BE COMMISSIONED / TRIMMED AT THE GRILLE TO ENSURE THE CORRECT FLOW RATE IS ACHIEVED.
 - THE CONTRACTOR IS TO ENSURE ANY DUCTWORK PASSING THROUGH FIRE RATED WALLS IS PROVIDED WITH A FIRE DAMPER TO SUIT THE RATING OF THE FIRE WALL.
 - ALL FINAL POSITIONS OF CONTROLLERS TO BE AGREED ON SITE.
 - ALL MAINS WIRING TO BE CARRIED OUT BY THE APPOINTED ELECTRICAL CONTRACTOR.
- ONTRACTORS GENERAL SCOPE OF WORKS IN RELATION TO THIS RAWING:
- CONTRACTOR SCOPE OF WORKS GENERALLY BUT NOT LIMITED TO: PRE-ORDER SURVEY TO MARK OUT POSITIONS, DETERMINE ANY UNFORESEEN ISSUES AND ESTABLISH THE SITE CONSTRAINTS.
 - FULL CEILING SPACE COORDINATION AND SETTING OUT EXERCISE WITH ALL OTHER SERVICES.
 - PROVIDE SUITABLE METHOD OF INSTALLING HIGH LEVEL EQUIPMENT AND NEW EXTERNAL LOUVRES
 - INSTALLATION OF NEW VENTILATION UNITS, DUCTWORK, GRILLES, DAMPERS, SENSORS, CONTROLLERS
 - POWER SUPPLIES BY OTHERS.
 - FULL COMMISSIONING AND TO PROVIDE A FUNCTIONAL SYSTEM THROUGHOUT
 - MAKING GOOD OF ANY DAMAGE TO WALLS/FLOORS/CEILING
 - TRAINING TO CLIENT/SITE CARETAKER
 - O&M MANUAL/COMMISSIONING CERTIFICATES / AS FITTED DRAWING FOR ALL MODIFICATIONS AND NEW INSTALLATIONS

NOTES:

Legend

KED - KITCHEN EXTRACT DUCT
MAF - MAKE UP AIR DUCT
SED - SEATING EXTRACT DUCT
FAD - FRESH AIR DUCT
ATT - ATTEUNATOR

02	Updates based on Layout Changes
01	Updates based on Architect Comments
00	Tender Design
Ref	Revision

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Project Title

BULLGOGI, MANCHESTER

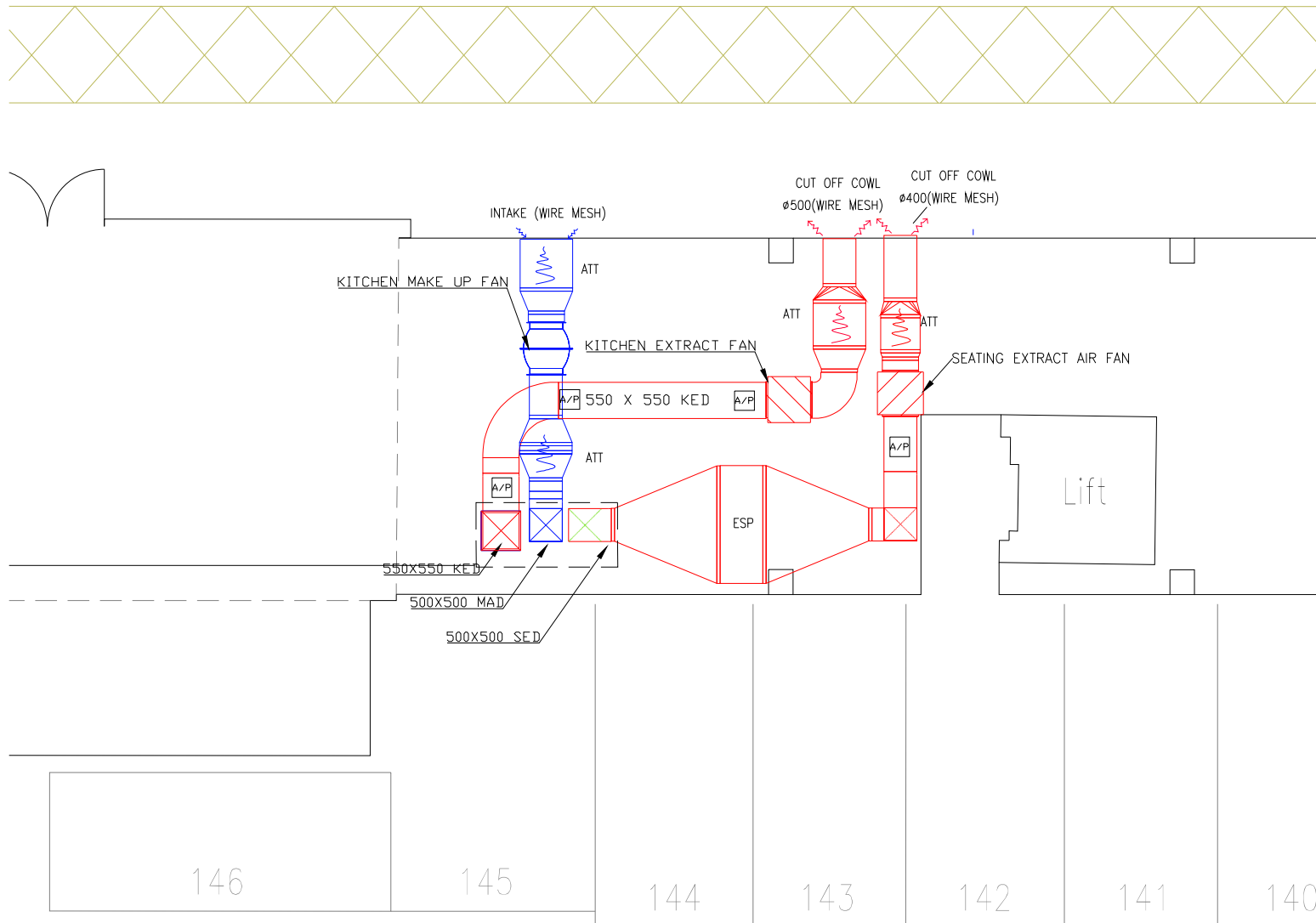
Drawing Title

GROUND FLOOR
KITCHEN VENTILATION LAYOUT

Scale	Drawn By	Checked By	Date	Sheet
NA	JS	AR	13.07.2024	1 OF 1

Drawing Number	project	Originator	system	level	type	role	no.	rev
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6150-SEA-ME-B-HVAC-MEP-002-C



PLANT ROOM PLAN

NOTE:
PLEASE MAKE SURE DUCT LENGTH TO BE ATLEAST 8.5M
AFTER LAST RISER TO ACHIEVE 1.5 SECOND CONTACT
TIME

NOTES:

Legend

KED - KITCHEN EXTRACT DUCT
MAF - MAKE UP AIR DUCT
SED - SEATING EXTRACT DUCT
FAD - FRESH AIR DUCT
ATT - ATTEUNATOR
F/B - FROM BELOW
T/B - TO BELOW
ESP - ELECTRO STATIC PRECIPITATOR
A/P - ACCESS PANEL

00 Tender Design
Ref Revision

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Project Title

BULLGOGI, MANCHESTER

Drawing Title

**ROOF
KITCHEN & SEATING VENTILATION
LAYOUT**

Scale	Drawn By	Checked By	Date	Sheet
NA	JS	AR	12.04.2024	1 OF 1

Drawing Number

project	Originator	system	level	type	role	no.	rev
6150-SEA-ME-B-HVAC-MEP-003-B							

NOTES:

Legend

KED – KITCHEN EXTRACT DUCT
MAF – MAKE UP AIR DUCT
SED – SEATING EXTRACT DUCT
FAD – FRESH AIR DUCT
ATT – ATTEUNATOR

01 Updates based on Architect comments

00 Tender Design

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Project Title

BULLGOGI, MANCHESTER

Drawing Title

ELEVATIONS

Scale	Drawn By	Checked By	Date	Sheet
NA	JS	AR	29.05.2024	1 OF 1

Drawing Number					
project	Originator	system	level	type	role no. rev
6150-SEA-ME-B-HVAC-MEP-004-B					



NOTE:
ALL DIMENSIONS ARE IN MM

APPENDIX B

DATA SHEETS

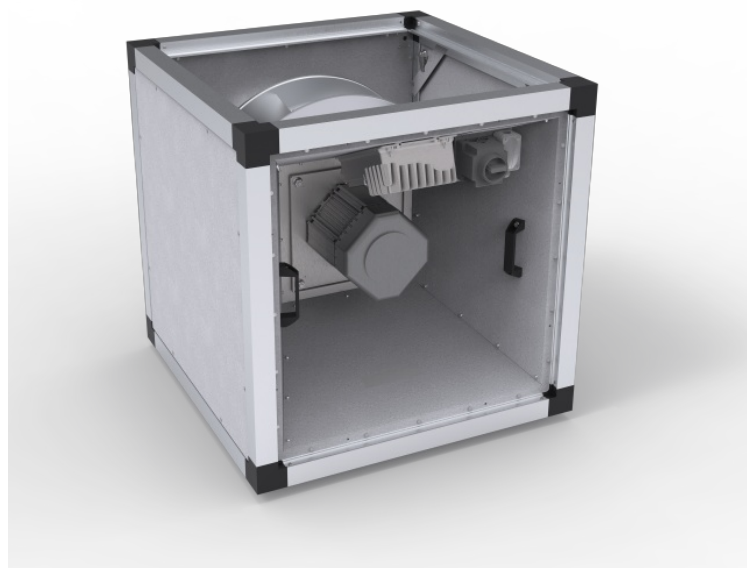
KITCHEN EXTRACT FAN

MUB/T Insulated duct fans

Powerful and efficient exhaust fans for medium temperatures up to 120°C

- For kitchen and industrial environments
- Up to 120°C medium temperature, continuous operation
- Drip pan and drain plug included
- Acoustic and thermal insulation 30 mm
- Flexible airflow direction
- Indoor and outdoor installation
- Modular system of accessories
- Available with AC and EC motors for 50 and 60Hz

[Find more details in our online catalogue](#)



Application

The MUB/T fans are specially designed to **extract** air from **kitchen environments** or **industrial applications**, where **motor** must be placed **outside of air stream**. **Drip pan** with **drain plug** on bottom (except MUB/T 100 630D4-K2-L) are constructed for **collecting** a draining **dust, oil, water**.

By MUB/T and MUB/T-S fans an easy **maintenance** is provided through **service door** with handle.

Flexibility

Depending on the type, MUB/T fans are designed for **straight through** or **90°** airflow. The **air direction** can be easily **changed** on site. The construction of the casing and thermal insulation permits **outdoor** and **indoor** use.

Performance

High performance aluminium impeller together with **high efficient** motors are designed to ensure high-level performance to **minimize power consumption** and **maximize efficiency**.

Modularity

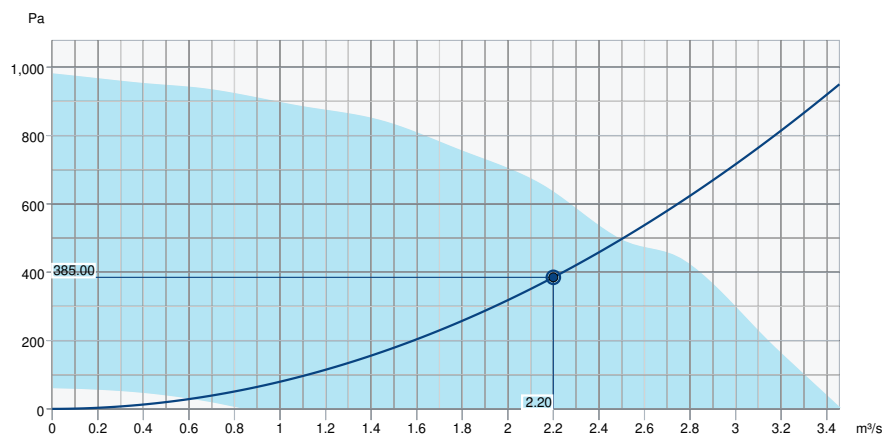
Thanks to variety types of **accessories** as flexible connections, dampers, roof, base frame, etc. it is easy to design any ventilation system according to your demand.

By using special **modular systems**, where some accessories as **heaters, coolers, silencers, filters** or **carbon filters** are built-in in **the same type of casing**, you can even design a simple supply or exhaust **air handling unit**.

Performance

KITCHEN EXTRACT FAN

Performance curve



Hydraulic data

Required air flow	2.20 m³/s
Required static pressure	385 Pa
Working air flow	2.20 m³/s
Working static pressure	385 Pa
Air density	1.204 kg/m³
Power	1,837.2 W
Fan control - RPM	1,208 rpm
Current	2.81 A
SFP	0.835 kW/m³/s
Control voltage	8.6 V
Supply voltage	400 V

Sound power level		63	125	250	500	1k	2k	4k	8k	Total
Inlet	dB(A)	57	77	78	81	80	77	72	67	86
Outlet	dB(A)	58	79	79	82	81	78	73	68	87
Surrounding	dB(A)	40	65	63	53	53	52	44	35	68
Sound pressure level at 3m (20m² Sabine)	dB(A)	-	-	-	-	-	-	-	-	61
Sound pressure level at 3m free field	dB(A)	-	-	-	-	-	-	-	-	47

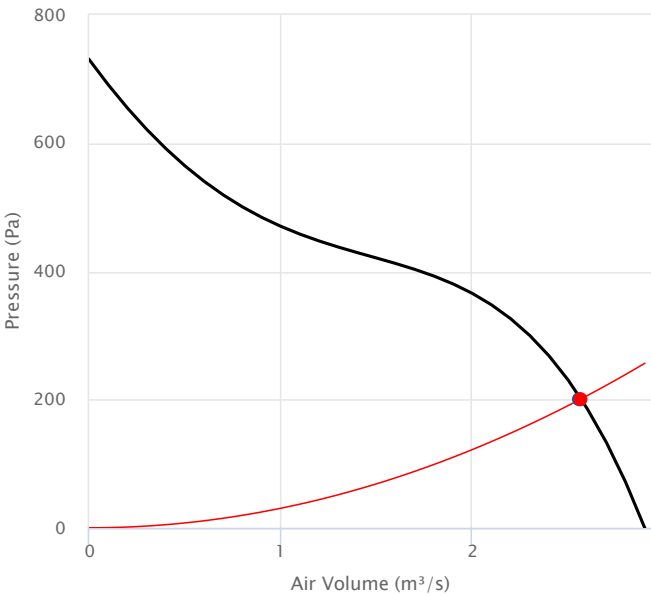
KITCHEN MAKE UP FAN

Product Information

In-Line Fans - Eco Mix Flow Fans (eMF)



Performance Chart



Technical Information

Requested Duty	2.561 m³/s @ 200 Pa
Actual Duty	2.566 m³/s @ 201 Pa
Stock Reference	EMF56034
Product Type	In-Line Fans
Product Range	In-Line Fans
Casing	
Airstream Temperature	-25 - 80°C
Specific Fan Power	0.5
dBA	55 dBA @ 3m
eDemand inverter controlled to requested duty point	
Specific Fan Power	0.5
dBA	55 @ 3m
Warranty	

Electrical Information

Motor Rating	1360
Selection Power	0.00
Supply Voltage	380-415V/3/50Hz
Full Load Current	2.80 A
Starting Current	7.00 A
Starting Method	D.O.L.
Motor Poles	4
Insulation	
IP Rating	IP54
S.T.O.P. Protection	
Speed Controllable	Yes
Integral Controller	

Sound Information at Duty Point

	63	125	250	500	1k	2k	4k	8k	Total	dB(A) @ 3m
Inlet	0	72	74	78	80	78	75	63	85	64
Outlet	0	74	84	83	82	80	76	65	89	66
Breakout	0	59	67	74	71	68	63	51	77	55

Sound Power Level Spectra dB (re 10⁻¹² Watts)

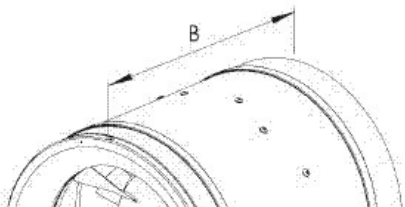
For ducted units, sound power is given as In Duct with end reflections added.

Stated dB(A) levels at 3m with spherical propagation at a reference level of 2 x 10⁻¹² Pa

Optional Accessories

Part No	Description
444173	eDemand 3 phase inverter
VM560	EMF Fast Clamp 560mm

Drawing



SEATING AREA EXTRACT FAN

MUB/T Insulated duct fans

Powerful and efficient exhaust fans for medium temperatures up to 120°C



- For kitchen and industrial environments
- Up to 120°C medium temperature, continuous operation
- Drip pan and drain plug included
- Acoustic and thermal insulation 30 mm
- Flexible airflow direction
- Indoor and outdoor installation
- Modular system of accessories
- Available with AC and EC motors for 50 and 60Hz

[Find more details in our online catalogue](#)

Application

The MUB/T fans are specially designed to **extract** air from **kitchen environments** or **industrial applications**, where **motor** must be placed **outside of air stream**. **Drip pan** with **drain plug** on bottom (except MUB/T 100 630D4-K2-L) are constructed for **collecting** a draining **dust, oil, water**.

By MUB/T and MUB/T-S fans an easy **maintenance** is provided through **service door** with handle.

Flexibility

Depending on the type, MUB/T fans are designed for **straight through** or **90°** airflow. The **air direction** can be easily **changed** on site. The construction of the casing and thermal insulation permits **outdoor** and **indoor** use.

Performance

High performance aluminium impeller together with **high efficient** motors are designed to ensure high-level performance to **minimize power consumption** and **maximize efficiency**.

Modularity

Thanks to variety types of **accessories** as flexible connections, dampers, roof, base frame, etc. it is easy to design any ventilation system according to your demand.

By using special **modular systems**, where some accessories as **heaters, coolers, silencers, filters** or **carbon filters** are built-in in the **same type of casing**, you can even design a simple supply or exhaust **air handing unit**.

Certifications



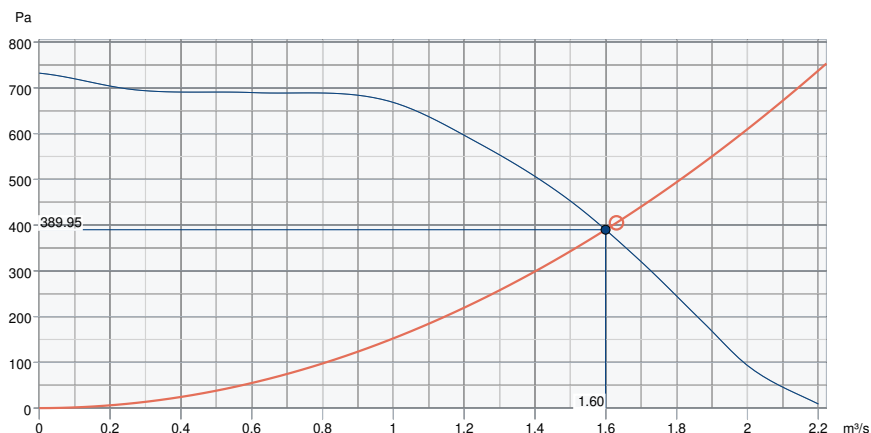
Green Ventilation

Performance

 Working point adjusted to closest valid point.

Performance curve

SEATING AREA EXTRACT FAN



Hydraulic data

Required air flow	1.63 m³/s
Required static pressure	405 Pa
Working air flow	1.60 m³/s
Working static pressure	390 Pa
Air density	1.204 kg/m³
Power	1,412.2 W
Fan control - RPM	1,465 rpm
Current	2.99 A
SFP	0.883 kW/m³/s
Control voltage	400.0 V
Supply voltage	400 V

Sound power level		63	125	250	500	1k	2k	4k	8k	Total
Inlet	dB(A)	48	72	72	77	77	74	72	63	83
Outlet	dB(A)	50	74	73	78	79	76	74	65	84
Surrounding	dB(A)	27	54	48	47	48	48	40	28	57
Sound pressure level at 3m (20m² Sabine)	dB(A)	-	-	-	-	-	-	-	-	50
Sound pressure level at 3m free field	dB(A)	-	-	-	-	-	-	-	-	36

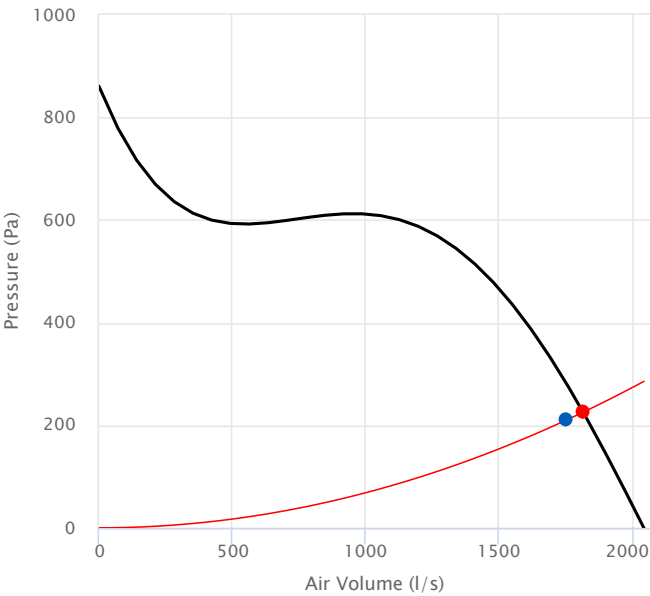
SEATING AREA SUPPLY FAN

Product Information

In-Line Fans - Eco Mix Flow Fans (eMF)



Performance Chart



Technical Information

Requested Duty	1750 l/s @ 210 Pa
Actual Duty	1812 l/s @ 225 Pa
Stock Reference	EMF45034
Product Type	In-Line Fans
Product Range	In-Line Fans
Casing	
Airstream Temperature	-25 - 80°C
Specific Fan Power	0.7
dBA	52 dBA @ 3m
eDemand inverter controlled to requested duty point	
Specific Fan Power	0.6
dBA	51.2 @ 3m
Warranty	

Electrical Information

Motor Rating	1200
Selection Power	0.00
Supply Voltage	
Full Load Current	4.40 A
Starting Current	11.00 A
Starting Method	Inverter
Motor Poles	4
Insulation	
IP Rating	IP54
S.T.O.P. Protection	
Speed Controllable	Yes
Integral Controller	

Sound Information at Duty Point

	63	125	250	500	1k	2k	4k	8k	Total	dB(A) @ 3m
Inlet	0	72	84	81	79	78	77	69	88	65
Outlet	0	74	87	88	84	81	79	71	92	69
Breakout	0	65	69	72	68	63	62	52	76	52

Sound Power Level Spectra dB (re 10⁻¹² Watts)

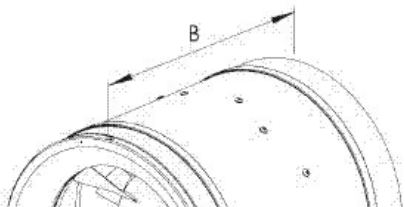
For ducted units, sound power is given as In Duct with end reflections added.

Stated dB(A) levels at 3m with spherical propagation at a reference level of 2 x 10^{-1 2} Pa

Optional Accessories

Part No	Description
444177	eDemand 1 phase in 3 phase out Inverter
VM450	EMF Fast Clamp 450mm

Drawing



Baffle Type Grease Filters for Kitchen Extracts and Canopies

Applications

The Airclean Baffle Type Grease Filter is designed for use in commercial kitchens to remove airborne grease prior to entering the extraction system.

It is recognised that there is an increasing need to maintain and improve hygiene standards in kitchens and to reduce the fire hazards above the heat source.

The Airclean Baffle Type Grease Filter reduces fire hazard with their unique design concept of non-grease loading (negligible grease accumulation), and interlocking baffle walls which restrict the passage of flames into the ductwork.

The Baffle Type Grease Filter's smooth surface enables deposited grease to run off via the drainage holes, to grease collecting trays in the canopy or grease filter housing, where it can be easily disposed of. Efficient grease removal by Baffle Type Grease Filters minimises grease build-up in the kitchen extract ductwork system and ensures that duct cleaning requirements are kept to a minimum.

Description

Airclean Baffle Type Grease Filters are manufactured in either Aluminium or Stainless Steel (Mirrored Finish Stainless Steel Grade 430, or Dull Polished Finish Stainless Steel Grade 304).

Housed in a channel framework, a series of vertical air baffles are strategically aligned to change the direction of the grease-laden air. This action causes the deposition of the grease quickly, without re-entrainment onto the baffles, whilst the grease-free air passes through the filter. The Baffle Type Grease Filter's smooth surface enables deposited grease to run off via the drainage holes into collecting trays within the housing, minimising grease build-up.

Baffle type Grease Filters each have layflat handles to facilitate easy removal from the kitchen canopy or grease filter housing.



Size		Flow Rate		Part Numbers	
OT Inches	Actual mm	m ³ /s based on FV 1.5m/s	Pressure Drop Pa	ST STEEL ECO 2" (47mm) Grade 430 St/St	ST STEEL HD 2" (47mm) Grade 304 St/St
16 x 16	394 x 394	0.25	125	1321119	1320119
20 x 10	495 x 242	0.19	125	1321120	1320120
20 x 16	495 x 394	0.31	125	1321121	1320121
20 x 20	495 x 495	0.39	125	1321122	1320122
18 x 18	445 x 445	0.31	125	1321123	1320123
24 x 24	597 x 597	0.54	125	1321124	1320124

FOR NON-STANDARD SIZES CONTACT THE SALES TEAM

Notes

- * Actual sized filters will be manufactured as ordered +/- 3mm
- * Handles and Drain Holes come as standard
- * Handles are located on the shortest side of the grease filter as standard.

ELECTROSTATIC PRECIPITATOR **Kitchen Grease and Smoke Particle Removal**

Applications

The Airclean **Electrostatic Precipitator (ESP)** can be used in kitchen extract systems or industrial applications for the efficient removal of grease, smoke, and airbourne oil / coolant mist.

ESP's can be either duct mounted or free hanging for the recirculation of air.

A single pass ESP will achieve a grease and smoke removal efficiency of 95%. Where efficiency is critical (eg. Low level kitchen extract) a double pass ESP is recommended to achieve a 99% efficiency.

Description

The Airclean **Electrostatic Precipitator** is manufactured from 1.5mm Galvanised Steel and finished with an Epoxy Powder Coat. The two metal washable filters within the ESP are manufactured with an aluminium frame and an aluminium knitted mesh filter pad.

The Ioniser and Collector in the unit are combined in a single aluminium cell, which can be removed to be cleaned and replaced as required by the operator.

Technical

Power: 220V, 50Hz, Single Phase

Controls: Auto Cut Off Switch When Door is Open. Fault Indicator and Operation Lights.

Maximum recommended face velocity: 2.5m/s

Maximum operating temperature: 60°C

For high grease / oil applications drainage is required. A minimum of 150mm below the unit should be allowed for a suitable drainage system to be installed.

To treat airflows larger than those stated multiple units are used together in parallel. An ESP joining kit is required to connect drains and flanges for ducting.

Units are to be mounted horizontally only, with access one side only. ESP's can be handed with airflow left to right, or right to left.



ELECTROSTATIC PRECIPITATORS

Dimensions			Style	Weight	Flow Rate	P.D.	Part Numbers
H	W	D			m ³ /s	Pa	
540	694	620	1Hx1W	55kg	Up to 0.69	80	1912125
540	1243	620	1Hx2W	80kg	0.69 – 1.36	80	1912126
540	1790	620	1Hx3W	120kg	1.36 – 2.08	80	1912127
Spare ESP Cell 1Hx2W ESP S/No. Required							1912118
Spare ESP Cell 1Hx3W ESP S/No. Required							1912119
ESP Joining Kit for one join (Incl. Bolts, Sealant, Blanking Strips)							1912120
Cleaning Tank for ESP Cell (Non Heated)							1912113
Series 500 Cleaning Agent							1380500

Ozone Odour Control System for the reduction and elimination of odour from commercial kitchens

- Ozone Injection system for the control of nuisance odours from kitchen extract systems
- Can operate on airflows from 0.8m³/s to 8m³/s
- 1.5 to 2 second dwell time required in ductwork system
- Simple to install, and can be retrofitted
- Optional monitor to control ozone discharge levels to within safe limits.
- Ability to add additional ozone injectors in the future.
- Low maintenance



Applications

The Ozone Odour Control System can neutralise nuisance odours which emit from cooking in commercial kitchen extract systems with airflows ranging from 0.8m³/s to 8m³/s.

A number of Ozone Injectors will be required depending on the airflow volume, contact time, and style of cooking from the kitchen. Ozone injectors should be positioned alongside the canopy plenum or kitchen extract duct run on the negative air pressure side, at the earliest possible point to ensure the maximum contact time (minimum of 1.5 seconds from point of injection).

An Ozone Injector Control Box should be located next to the injectors to indicate the correct operation of each injector and Control Ozone discharge when used in conjunction with a Controlled Ozone Sensor Module.

The injectors will generate ozone when a negative pressure in the duct is detected by the control Box.

Controlled Ozone Monitor

Whilst ozone is a useful tool to reduce odours, it is hazardous to health in excess concentration / quantity, and unsafe discharge must be considered with each installation.

An optional Controlled Ozone Monitoring Module is available which uses an on board ozone sensor to detect the ozone level at the point of discharge. The Controlled Ozone Monitoring Module feeds back excess readings to the Injector Control Box, and will reduce ozone input, until the discharge reaches a safe ozone discharge level.

Injectors should be interlocked with the kitchen extract ventilation system.

Description

Ozone Injectors and Control Box

The Ozone Odour Control System comprises of a series of Ozone Injectors which are linked to a Control Box. The Ozone Injector Control Box can operate between one to four injectors, with each injector capable of injecting up to 20 grams of ozone in 10 gram increments. The Ozone Injector Control Box contains a series of lights which indicate the ozone level being injected.

Ozone Injectors are to be mounted on the negative pressure side of the kitchen extract (typically before the fan) allowing for ozone to be injected into the air stream by the natural draw of the system pressure. Negative pressure is detected and monitored from a pressure tube between the Control Box and the kitchen extract duct work.

Component	Dimensions	Details
Ozone Injector	150 x 150 x 330 mm	Stainless Steel Case 2x 10 Gram per Hour Gaseous Ozone Reactors 1x Power on Indicator Lamp 1x Ozone Production Lamp Single Phase, 240V
Ozone Injector Control Panel (1 supplied with every system)	155 x 200 x 95 mm	LED Indicator Lamps Electronic Air Pressure Sensor 4x 5 pin Monitor Output Sockets 1x 5 Pin BMS Output Socket 1x 5 Pin Data Logger Output Socket

Optional Ozone Monitor for Controlled Ozone

An optional Ozone monitor can be added to the end of the duct just before the discharge point to measure and control ozone output levels.

The Ozone Monitor and Injector Control Box are linked together by a supplied communication cable. The Ozone Injector Control Box uses sensor readings from the Ozone Monitor to then automatically lower or raise the ozone injectors output in 10 gram intervals until the Ozone monitor registers the correct ozone levels.

Component	Dimensions	Details
Ozone Monitor	150 x 150 x 330 mm	1x Power on Indicator Lamp 1x Monitoring Indicator Lamp 1x Dwell Indicator Lamp Includes long fly lead for connection back to Ozone Injector Control Panel (Length TBA on Order)

Part Number	Air Volume	Number of Injectors	Required Dwell Time (Seconds)	Ozone Delivery
1913221	1 - 2 m³/s	1 Injector*	1.5 - 2s	10 - 20g
1913222	2 - 4 m³/s	2 Injectors*	1.5 - 2s	30 - 40g
1913223	4 - 6 m³/s	3 Injectors*	1.5 - 2s	50 - 60g
1913224	6 - 8 m³/s	4 Injectors*	1.5 - 2s	70 - 80g

*1x Injector Control Box is included and required to control up to 4No. Injectors

A minimum contact / dwell time from the point of injection must be a minimum of 1.5 seconds for effective odour control.

Part Number	Description	Size
1913229	Controlled Ozone Monitor (Optional)	155 x 200 x 95 mm

ATTEUNATOR SELECTION



Kitchen Extract

800x800x 1250mm

63	125	250	500	1000	2000	4000	8000	HZ
7	15	24	39	45	40	23	17	dB

Seating Area Extract

700 x 700 x 650mm

63	125	250	500	1000	2000	4000	8000	HZ
4	9	15	22	28	24	16	13	dB

Make Up Air Fan

800 x 800 x 650mm – 2 nos

63	125	250	500	1000	2000	4000	8000	HZ
4	10	15	23	27	27	15	10	dB

Fresh Air Fan (Seating)

700X700X1250mm – 2 nos

63	125	250	500	1000	2000	4000	8000	HZ
5	12	23	36	41	36	23	18	dB

PHOTOS



Elevation and Discharge Location



SIDE VIEW

Information Provided by

