

## 00136-RP-001 - Fresh Thai Cooling Statement



Revision	Changes / Notes Additions – Blue Highlight Deletions – Strikethrough	By	Checked	Date
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## Introduction

This document has been produced to inform Camden Council why the Fresh Thai restaurant refurbishment project requires cooling with respect to the cooling hierarchy referenced in the London Plan.

## Site Description

The project is the refurbishment of the basement and ground levels of an existing six storey mixed use building at 80—82 Southampton Row, London to provide a new restaurant.

The restaurant will comprise a main kitchen and seating area at ground floor level with an adjacent coffee bar area. At basement level will be provide dining and WC provision as well as an access corridor to the building courtyard.

Supply ventilation is being provided to all areas via supply only ventilation units, with mechanical extract covering the kitchen and main seating, plus a small inline extract for the coffee bar and private dining. Mechanical cooling provided via cassette type units with condenser units located in the courtyard.

Refer appendix A for further MEP details.



*Figure 1 Front of Building*



*Figure 2 Rear Courtyard looking at kitchen area windows*

The landlord has stipulated that no large ventilation plant may be located outside – only small air conditioning due to the proximity to residential parts.

## **Cooling Hierarchy**

The cooling hierarchy is described in the Camden Planning Guidance document ‘Energy efficiency and adaptation’.

Against each point we have provided statements in the context of the project to demonstrate why cooling is necessary for the project:

*All developments should follow the cooling hierarchy outlined below, to reduce the risk of overheating and subsequent reliance on active cooling:*

### *1. Minimise internal heat generation through energy efficient design, considering the following:*

*• Layout and uses: locate any spaces that need to be kept cool or that generate heat on cooler sides of developments.*

Layout is inflexible as can be see from the plans – it is not possible to change the layout and retain a functional restaurant space due to the constraints of the existing building.

*• Reducing heat gains e.g. including low energy lighting.*

All lighting is low energy LED, and that is the primary avenue for gain reduction as there is no other avenue to reduce equipment heat gains.

*• Seal/ insulate heat generating processes.*

The air conditioning plant provides both heating and cooling. There is no other heat generation other than a gas fire water heater for domestic hot water.

- *Reduce the distance heat needs to travel and insulate pipework.*

Noted and pipework distances are optimised to the constraints of the existing building.

- *Design layouts to promote natural ventilation e.g. shallow floor plans and high floor to ceiling heights.*

Not practical due to existing building and there are constraints on available louvre space to facilitate sufficient ventilation for the occupancy figures (figures on drawings as per Appendix A).

- *Consider evaporation cooling which cools air through the evaporation of water.*

Not practical for this site because of limited space for the plant due to the restriction from the landlord on locating plant other than small air conditioning internally. Additional evaporative cooling plant does not fit.

- *Consider 'free cooling' or 'night cooling', which uses the cooling capacity of ambient air to directly cool the space.*

Free cooling is provided to the kitchen space by means of the supply ventilation plant.

## 2. *Reduce the amount of heat entering a building in summer:*

- *Consider the angle of the sun and optimum daylight and solar gain balance.*

Not applicable as this is an existing site.

- *Orientate and recess windows and openings to avoid excessive solar gain.*

Not applicable as this is an existing site.

- *Consider low g-values and the proportion, size and location of windows.*

Not applicable as this is an existing site.

- *Make use of shadowing from other buildings.*

Not applicable as this is an existing site.

- *Include adequate insulation.*

Limited as this is an existing site.

- *Design in shading: e.g. include internal courtyards, large shade-providing trees and vegetation, balconies, louvers, internal or external blinds, and shutters.*

Not applicable as this is an existing site.

- *Make use of the albedo effect (use light coloured or reflective materials to reflect the sun's rays).*

Not applicable as this is an existing site and façade works are restricted.

- *Include green infrastructure e.g. green wall, green/blue roofs and landscaping, to regulate temperatures.*

Not applicable as this is an existing site.

### *3. Manage the heat within the building through exposed internal thermal mass and high ceilings*

Not applicable as this is an existing site.

### *4. Passive ventilation:*

- *Natural ventilation, openable windows, the 'stack effect' system.*

Not applicable as this is an existing site comprising basement and ground levels.

### *5. Mechanical ventilation:*

- *Ensuring the most efficient system possible.*

Refer datasheets of equipment as Appendix B.

- *Consider mechanical ventilation with heat recovery.*

Insufficient space internally for units and also limited louvre space as well as adequate separation between intake and exhaust louvres.

### *6. Active cooling:*

- *Ensuring they are the lowest carbon options.*

More efficient R32 refrigerant being utilised as per datasheet in Appendix B.

- *Ground Source Heat Pumps and Air Source Heat Pumps can be used in reverse to provide cooling to buildings.*

Existing site constraints preclude Ground Source Heat Pumps. In this case air source heat pumps are used

- *Water based cooling systems also reduce the need for air conditioning by running cold water through pipes in the floor and/or ceiling to cool the air.*

A system of floor or ceiling pipework is not possible in the floor buildup or in the ceiling as not practical for the site.

## **Conclusion**

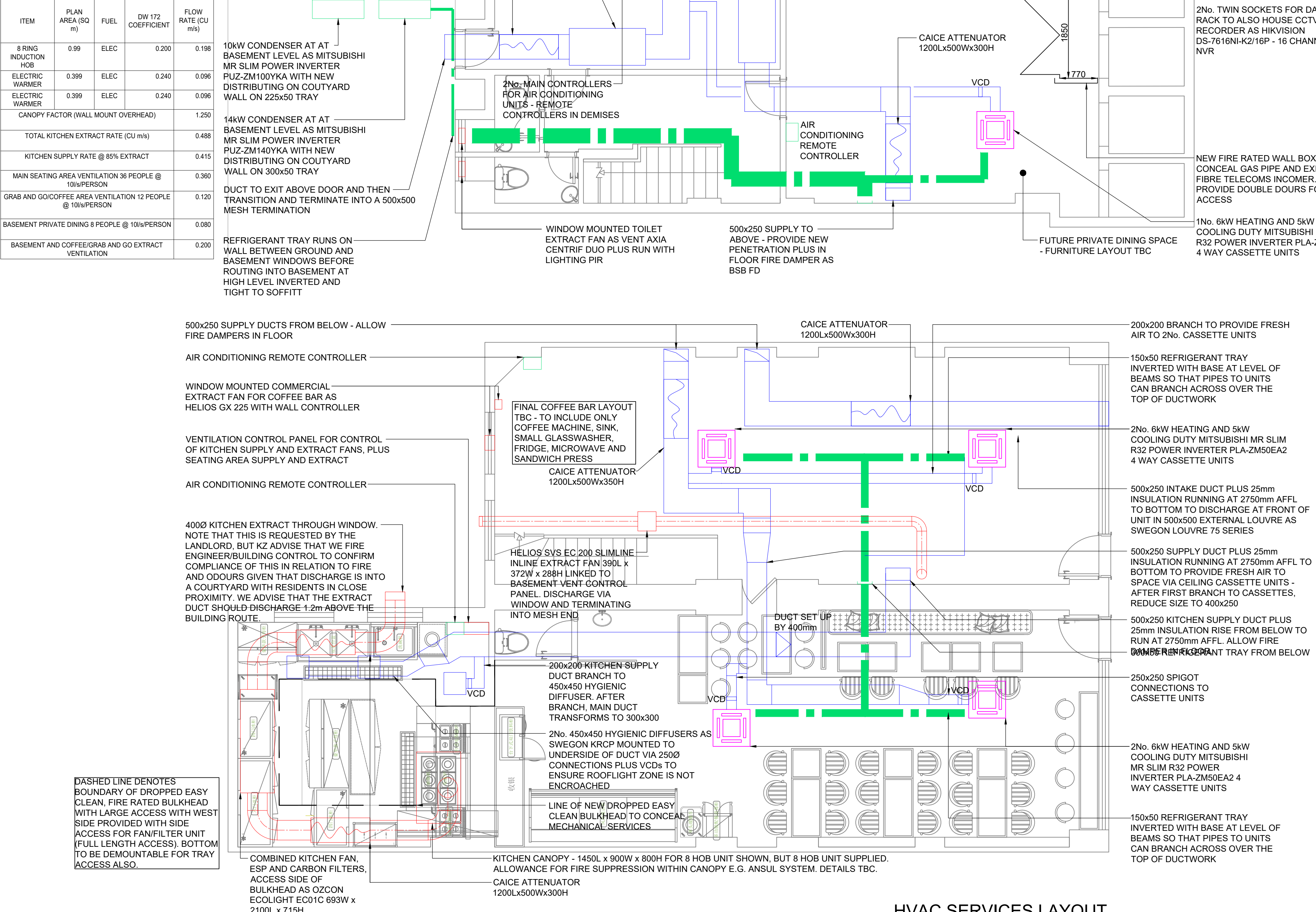
We advise that due to the nature of the project – primarily the constraints of operating within an existing building – and the limits this places upon the restaurant design, that the proposed air conditioning system is the only practicable solution to providing adequate comfort to the occupants.

## **Appendix A – MEP Drawings**

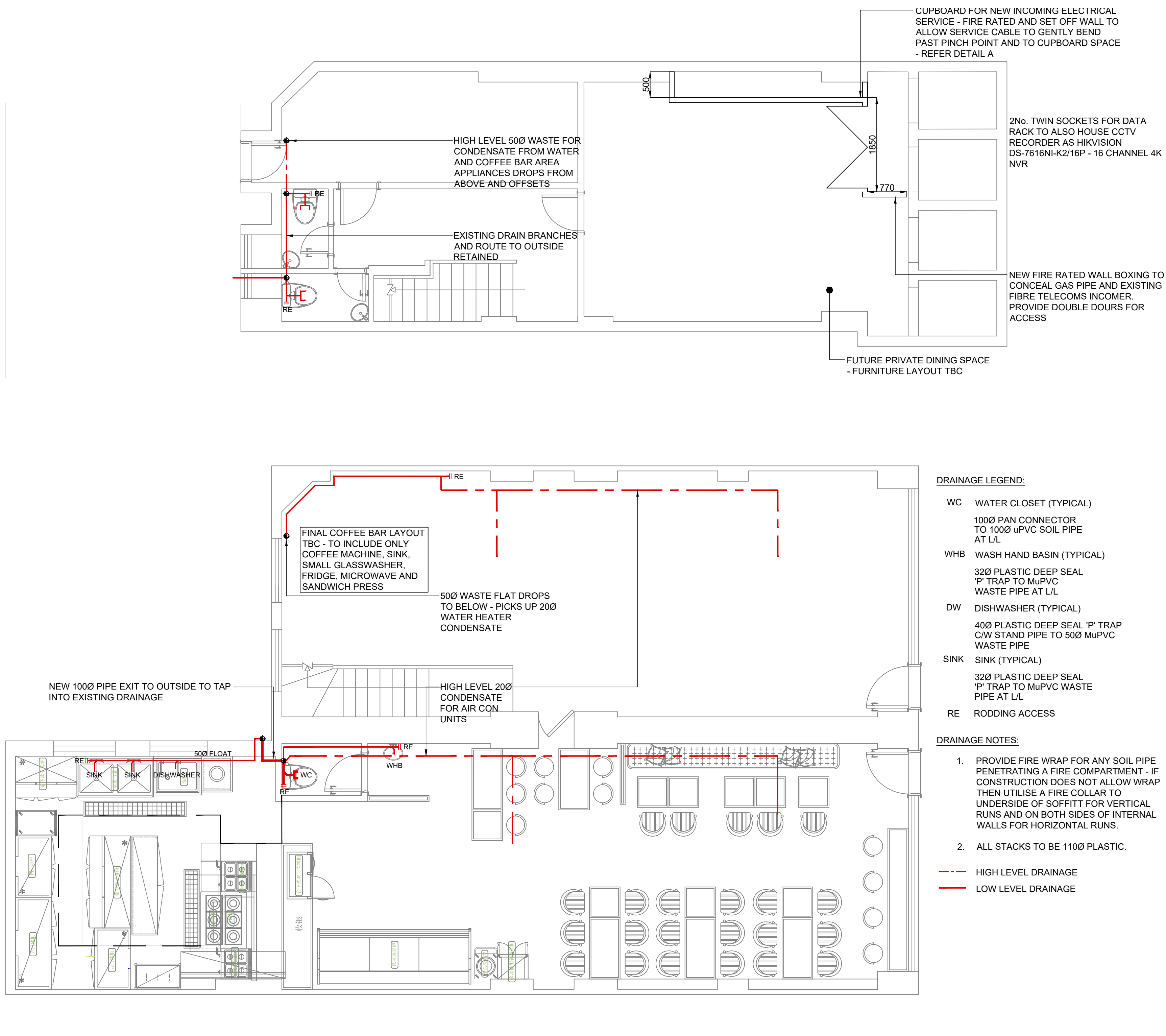
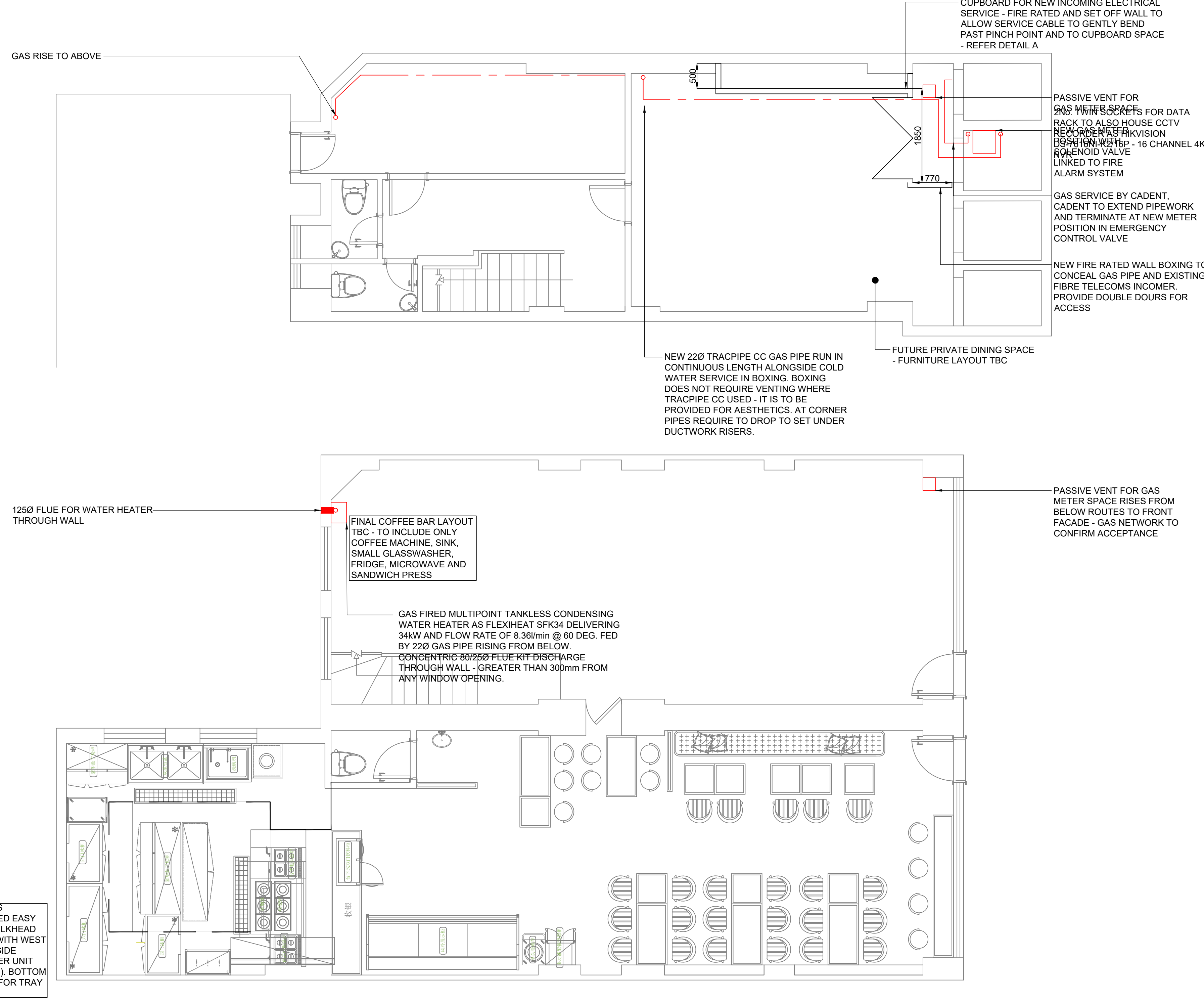
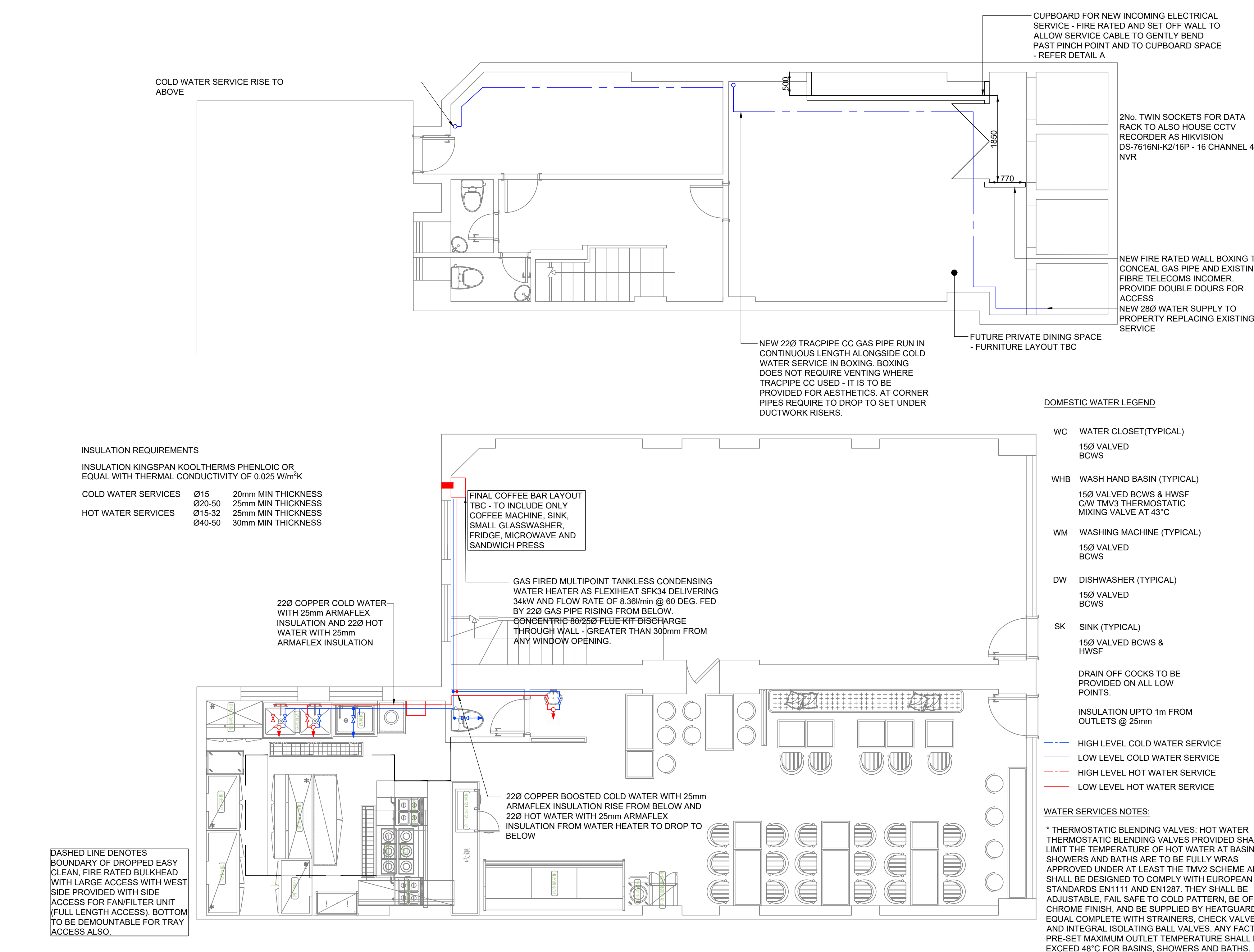


ITEM	PLAN AREA (SQ m)	FUEL	DW 172 COEFFICIENT	FLOW RATE (CU m)
8 RING INDUSTRIAL HOB	0.99	ELEC	0.000	0.188
ELECTRIC WARMER	0.399	ELEC	0.240	0.096
ELECTRIC WARMER	0.399	ELEC	0.240	0.096
CANOPY FACTOR (WALL MOUNT OVERHEAD)				
TOTAL KITCHEN EXTRACT RATE (CU m/s)				1.225
KITCHEN SUPPLY RATE @ 60% EXTRACT				0.415
MAIN SEATING AREA VENTILATION 36 PEOPLE @ 10%PERSON				0.360
GRAB AND GO COFFEE AREA VENTILATION 12 PEOPLE @ 10%PERSON				0.120
BASEMENT PRIVATE DINING 8 PEOPLE @ 10%PERSON				0.080
BASEMENT AND COFFEE/GRAB AND GO EXTRACT VENTILATION				0.200

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## HVAC SERVICES LAYOUT



2. DO NOT SCALE THIS DRAWING. ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE STATED.
3. ALL DIMENSIONS ARE TO BE READ IN CONJUNCTION WITH ALL RELEVANT DOCUMENTATION FROM THE PROJECT ARCHITECT, STRUCTURAL ENGINEER, AND ANY OTHER 3RD PARTY AS WELL AS THE MEP DESIGN PACKAGE.
4. ALL ITEMS OF EQUIPMENT SHALL BE AS SPECIFIED BY THE MANUFACTURERS' RECOMMENDATIONS.
5. DIMENSIONS AND LAYOUTS DETAILED ON THIS DRAWING ARE SUBJECT TO SITE DIMENSION CHECKS AND/OR VISUAL VERIFICATION OF ELEMENTS TO BE AS INTERIOR DESIGNER/ARCHITECT'S DRAWINGS.
6. THERE IS NO WARRANTY OR IMPACT ON PERFORMANCE OR COMPLIANCE AS A RESULT, LIAISE WITH THE MANUFACTURER TO RESOLVE ANY DISCREPANCY.
7. ALL PENETRATIONS THROUGH STRUCTURE MUST BE PROPERLY SEALED TO MAINTAIN ACOUSTIC, AIR TIGHTNESS, FIRE AND WEATHER TIGHTNESS AS RELEVANT.
8. THIS DRAWING IS NOT TO BE APPROVED BY THE ARCHITECT AND BE APPROPRIATELY CERTIFICATED FOR THE USE OF ANY FABRIC ITEM E.G. ROOF COVERINGS.
9. ALL SERVICES SHALL BE FIXED IN ACCORDANCE WITH THE STANDARDS, IN PARTICULAR CABLE TIES OR CONTAINMENT SUPPORTS.
10. THIS DRAWING IS NOT TO BE VIEWED/PRINTED IN COLOUR.

- DRAINAGE LEGEND:**

- |      |   |
|------|---|
| WC   | WATER CLOSET (TYPICAL)<br>1000 PAN CONNECTOR<br>TO 1000 uPVC SOIL PIPE<br>AT L/L            |
| WHB  | WASH HAND BASIN (TYPICAL)<br>320 PLASTIC DEEP SEAL<br>P' TRAP TO MuPVC<br>WASTE PIPE AT L/L |
| DW   | DISHWASHER (TYPICAL)<br>400 PLASTIC DEEP SEAL P'<br>C/W STAND PIPE TO 500 MuP<br>WASTE PIPE |
| SINK | SINK (TYPICAL)<br>320 PLASTIC DEEP SEAL<br>P' TRAP TO MuPVC WASTE<br>PIPE AT L/L            |
| RE   | RODDING ACCESS  |

- DRAINAGE NOTES:

1. PROVIDE FIRE WRAP FOR ANY SOIL PIPE PENETRATING A FIRE COMPARTMENT - IF CONSTRUCTION DOES NOT ALLOW WRAP THEN UTILISE A FIRE COLLAR TO UNDERSIDE OF SOFFIT FOR VERTICAL RUNS AND ON BOTH SIDES OF INTERNAL WALLS FOR HORIZONTAL RUNS.
  2. ALL STACKS TO BE 110Ø PLASTIC.
- HIGH LEVEL DRAINAGE  
 --- LOW LEVEL DRAINAGE



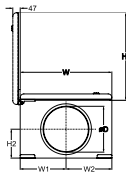
## **Appendix B – Equipment Datasheets**

# VEKA INT EKO

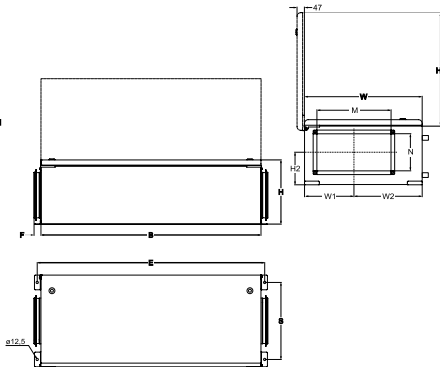


<b>Application</b>	Food production, Industrial premises, Warehouses, Sport facilities.
<b>Description</b>	<p>VEKA INT EKO is a range of high-quality air supply units for premises with no need for recuperation. VEKA INT EKO units exceed ErP 2016 requirements and, together with other cost-saving solutions, provide the highest savings in their class.</p> <p>VEKA INT EKO units are light and can be mounted in all positions in the narrowest places. Units are suitable for various climate zones: each model has several electrical heater options and 1000+ models have water heater options.</p> <p>Air dampers are integrated to automatically shut down the air supply to the premises.</p>
<b>Controls</b>	<ul style="list-style-type: none"><li>› Stouch</li><li>› Flex</li></ul>
<b>The main features</b>	<ul style="list-style-type: none"><li>› 6 Models with different electrical heaters and water heaters. 25 options in total!</li><li>› 6 mounting positions and service friendly.</li><li>› Low height for installation under ceilings.</li><li>› Modern automatic control. Integration with building management systems.</li><li>› Cost-efficient solutions: high airtightness, efficient fans and filters.</li></ul>
<b>Construction</b>	<ul style="list-style-type: none"><li>› Powder-coated galvanized steel casing;</li><li>› Acoustic and thermal insulation of external walls - 30 mm.</li><li>› EC fan;</li><li>› Integrated air damper with actuator.</li><li>› Optional pressure switch for filter pollution.</li><li>› Optional filters: G4, M5 or F7.</li></ul>

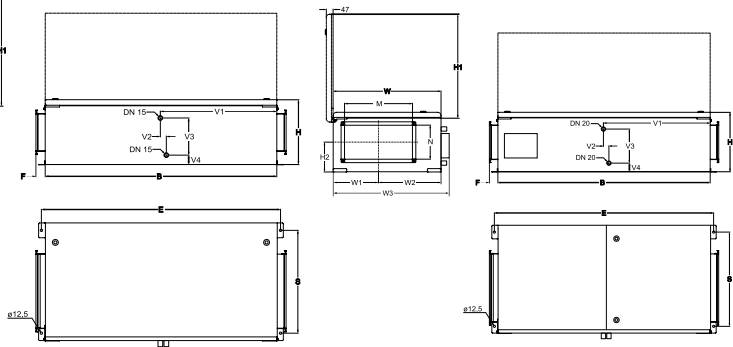
VEKA INT 400 EKO  
VEKA INT 700 EKO



VEKA INT 1000 EKO  
VEKA INT 2000 EKO  
VEKA INT W 1000 EKO  
VEKA INT W 2000 EKO



VEKA INT 3000 - 4000 EKO  
VEKA INT W 3000 - 4000 EKO






Unit	Dimensions [mm]																	
	W	W1	W2	W3	B	H	H1	H2	E	S	M	N	V1	V2	V3	V4	F	ØD
VEKA INT 400 EKO	450	225	225	-	1130	325	427	157	1171	370	-	-	-	-	-	-	30	200
VEKA INT 700 EKO	500	250	250	-	1200	350	477	157	1241	420	-	-	-	-	-	-	40	250
VEKA INT 1000 EKO	635	267	368	-	1250	350	612	174	1291	555	400	200	-	-	-	-	50	-
VEKA INT 2000 EKO	750	316	434	-	1550	460	727	249	1591	670	500	250	-	-	-	-	50	-
VEKA INT 3000 EKO	950	417	533	1065	1700	550	826	268	1526	992	700	400	-	-	-	-	50	-
VEKA INT 4000 EKO	950	417	533	1065	1700	550	826	268	1526	992	700	400	-	-	-	-	50	-
VEKA INT W 1000 EKO	635	267	368	-	1250	350	612	174	1291	555	400	200	618	43	190	71	50	-
VEKA INT W 2000 EKO	750	316	434	-	1550	460	727	249	1591	670	500	250	740	42	297	73	50	-
VEKA INT W 3000 EKO	950	417	533	1065	1700	550	826	268	1526	992	700	400	845	38	360	78	50	-
VEKA INT W 4000 EKO	950	417	533	1065	1700	550	826	268	1526	992	700	400	845	38	360	78	50	-

Unit	Optional accessories									
	Stouch Flex	S-1141 S-RC02-F2 S-KFF-U	SKS	AKS AP	SSB Heating	SSB Cooling	RMG 80/60°C	RMG 60/40°C	VVP/VXP 80/60°C	VVP/VXP 60/40°C
VEKA INT400 EKO	+	+	-	200	-	81	-	-	-	-
VEKA INT 700 EKO	+	+	-	250	-	81	-	-	-	-
VEKA INT 1000 EKO	+	+	400x200	-	-	81	-	-	-	-
VEKA INT 2000 EKO	+	+	500x250	-	-	81	-	-	-	-
VEKA INT 3000 EKO	+	+	700x400	-	-	81	-	-	-	-
VEKA INT 4000 EKO	+	+	700x400	-	-	81	-	-	-	-
VEKA INT W 1000 EKO	+	+	400x200	-	61	81	3-1,6-4	3-1,0-4	45.10-1,6	45.10-1,0
VEKA INT W 2000 EKO	+	+	500x250	-	61	81	3-2,5-4	3-2,5-4	45.10-2,5	45.10-2,5
VEKA INT W 3000 EKO	+	+	700x400	-	61	81	+	+	+	+
VEKA INT W 4000 EKO	+	+	700x400	-	61	81	+	+	+	+

SSB 61-control signal 0...10V DC

## Accessories

Control panel  <b>FLEX</b> p. 177	Sensor controller  <b>Stouch</b> p. 176	Pressure transmitter  <b>S-1141</b> p. 179	CO2 sensors  <b>S-RC02-F2</b> p. 180	Duct humidity sensor  <b>S-KFF-U</b> p. 181	
Rectangular duct silencer  <b>SKS</b> p. 215	Circular duct silencer  <b>AKS</b> p. 216	Mounting clamp  <b>AP</b> p. 219	Thermic water valve actuator  <b>SSB</b> p. 195	Mixing point  <b>RMG</b> p. 196	2 and 3 - way valves  <b>VVP/VXP</b> p. 197

# PLA-ZM R32 Power Inverter Heat Pump

## 4-Way Blow Ceiling Cassette System

### Product Specifications



Mr.SLM.

R32

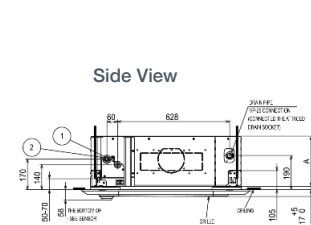
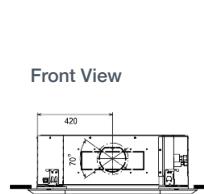
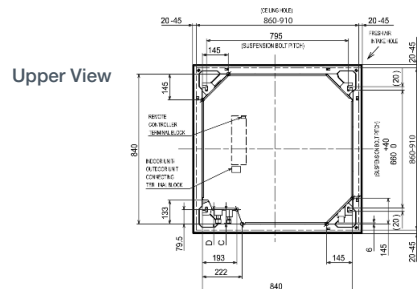
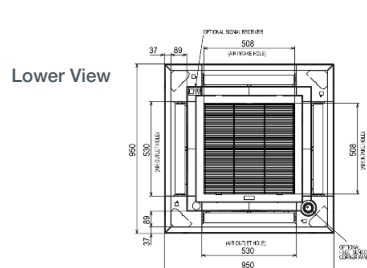
POWER INVERTER

PLA-ZM - INDOOR UNITS		PLA-ZM35EA	PLA-ZM50EA	PLA-ZM60EA	PLA-ZM71EA	PLA-ZM100EA	PLA-ZM100EA	PLA-ZM125EA	PLA-ZM125EA	PLA-ZM140EA	PLA-ZM140EA
CAPACITY (kW)	Heating (nominal)	4.1 (1.6-5.2)	6.0 (2.5-7.3)	7.0 (2.8-8.2)	8.0 (3.5-10.2)	11.2 (4.5-14.0)	11.2 (4.5-14.0)	14.0 (5.0-16.0)	14.0 (5.0-16.0)	16.0 (5.7-18.0)	16.0 (5.7-18.0)
	Cooling (nominal)	3.6 (1.6-4.5)	5.0 (2.3-5.6)	6.1 (2.7-6.5)	7.1 (3.3-8.1)	9.5 (4.9-11.4)	9.5 (4.9-11.4)	12.5 (5.5-14.0)	12.5 (5.5-14.0)	13.4 (6.2-15.0)	13.4 (6.2-15.0)
	Heating (UK)	3.5 (1.35-4.4)	5.1 (2.15-6.2)	6.0 (2.38-6.97)	6.8 (3.0-8.65)	9.5 (3.85-11.9)	9.5 (3.85-11.9)	11.9 (4.25-13.6)	11.9 (4.25-13.6)	13.6 (4.85-15.3)	13.6 (4.85-15.3)
	Cooling (UK)	3.3 (1.45-4.15)	4.6 (2.1-5.15)	5.6 (2.48-5.98)	6.55 (3.05-7.45)	9.2 (4.5-10.5)	9.2 (4.5-10.5)	11.5 (5.05-12.9)	11.5 (5.05-12.9)	12.9 (5.7-14.1)	12.9 (5.7-14.1)
SHF (nominal)		0.95	0.85	0.77	0.72	0.77	0.77	0.70	0.70	0.70	0.70
COP / EER (nominal)		5.00 / 5.10	4.40 / 4.52	4.10 / 4.20	4.40 / 4.30	4.30 / 4.60	4.30 / 4.60	3.81 / 3.70	3.81 / 3.70	3.71 / 3.60	3.71 / 3.60
SCOP / SEER (BS EN14825)		4.70 / 7.50	4.90 / 7.60	4.60 / 7.20	4.80 / 7.60	4.80 / 7.70	4.80 / 7.70	4.70 / 7.40	4.70 / 7.40	4.60 / 7.00	4.60 / 6.90
ERP ENERGY EFFICIENCY CLASS	Heating/Cooling	A++ / A++	A++ / A++	A++ / A++	A++ / A++	A++ / A++	A++ / A++	A++ / A++	A++ / A++	A++ / A++	A++ / A++
AIRFLOW (l/s)	Lo-Mi-Mi2-Hi	183-217-250-267	200-233-267-300	200-233-267-300	283-317-350-383	317-367-417-467	317-367-417-467	350-400-433-483	350-400-433-483	400-433-483-533	400-433-483-533
PIPE SIZE MM (in)	Gas/Liquid	12.7 (1/2") / 6.35 (1/4")	12.7 (1/2") / 6.35 (1/4")	15.88 (5/8") / 9.52 (3/8")	15.88 (5/8") / 9.52 (3/8")	15.88 (5/8") / 9.52 (3/8")	15.88 (5/8") / 9.52 (3/8")	15.88 (5/8") / 9.52 (3/8")	15.88 (5/8") / 9.52 (3/8")	15.88 (5/8") / 9.52 (3/8")	15.88 (5/8") / 9.52 (3/8")
SOUND PRESSURE LEVEL (dBA)	Lo-Mi-Mi2-Hi	26-28-29-31	27-29-31-32	27-29-31-32	28-30-33-36	31-34-37-40	31-34-37-40	33-36-39-41	33-36-39-41	36-39-42-44	36-39-42-44
SOUND POWER LEVEL (dBA)		51	54	54	57	61	61	62	62	65	65
DIMENSIONS (mm)	Width x Depth x Height (Grille)	840 (950) x 840 (950) x 258 (40)	840 (950) x 840 (950) x 258 (40)	840 (950) x 840 (950) x 258 (40)	840 (950) x 840 (950) x 298 (40)	840 (950) x 840 (950) x 298 (40)	840 (950) x 840 (950) x 298 (40)	840 (950) x 840 (950) x 298 (40)	840 (950) x 840 (950) x 298 (40)	840 (950) x 840 (950) x 298 (40)	840 (950) x 840 (950) x 298 (40)
WEIGHT (kg)	Unit / Grille	21 / 5	21 / 5	21 / 5	24 / 5	26 / 5	26 / 5	26 / 5	26 / 5	26 / 5	26 / 5
ELECTRICAL SUPPLY		Fed by Outdoor Unit	Fed by Outdoor Unit	Fed by Outdoor Unit	Fed by Outdoor Unit	Fed by Outdoor Unit	Fed by Outdoor Unit	Fed by Outdoor Unit	Fed by Outdoor Unit	Fed by Outdoor Unit	Fed by Outdoor Unit
FUSE RATING (BS88) - HRC (A)		6	6	6	6	6	6	6	6	6	6
INTERCONNECTING CABLE NO. CORES		4	4	4	4	4	4	4	4	4	4
GRILLE REFERENCE		PLP-6EA	PLP-6EA	PLP-6EA	PLP-6EA	PLP-6EA	PLP-6EA	PLP-6EA	PLP-6EA	PLP-6EA	PLP-6EA
WIRED REMOTE CONTROLLER REFERENCE		PAR-33MAA	PAR-33MAA	PAR-33MAA	PAR-33MAA	PAR-33MAA	PAR-33MAA	PAR-33MAA	PAR-33MAA	PAR-33MAA	PAR-33MAA
WIRELESS REMOTE CONTROLLER REFERENCE		PAR-SL100A-E	PAR-SL100A-E	PAR-SL100A-E	PAR-SL100A-E	PAR-SL100A-E	PAR-SL100A-E	PAR-SL100A-E	PAR-SL100A-E	PAR-SL100A-E	PAR-SL100A-E

PUZ-ZM - OUTDOOR UNITS		PUZ-ZM35VKA	PUZ-ZM50VKA	PUZ-ZM60VHA	PUZ-ZM71VHA	PUZ-ZM100VKA	PUZ-ZM100YKA <sup>(3)</sup>	PUZ-ZM125VKA	PUZ-ZM125YKA <sup>(3)</sup>	PUZ-ZM140VKA	PUZ-ZM140YKA <sup>(3)</sup>
SOUND PRESSURE LEVEL (dBA)	Heating/Cooling	46 / 44	46 / 44	49 / 47	49 / 47	51 / 49	51 / 49	52 / 50	52 / 50	52 / 50	52 / 50
	Cooling	65	65	67	67	69	69	70	70	70	70
WEIGHT (kg)		46	46	70	70	116	123	116	125	118	131
DIMENSIONS (mm)	Width x Depth x Height	809 x 300 x 630	809 x 300 x 630	950 x 330 + 25 x 943	950 x 330 + 25 x 943	1050 x 330 + 40 x 1338	1050 x 330 + 40 x 1338	1050 x 330 + 40 x 1338	1050 x 330 + 40 x 1338	1050 x 330 + 40 x 1338	1050 x 330 + 40 x 1338
ELECTRICAL SUPPLY		220-240v, 50Hz	220-240v, 50Hz	220-240v, 50Hz	220-240v, 50Hz	220-240v, 50Hz	380-415v, 50Hz	220-240v, 50Hz	380-415v, 50Hz	220-240v, 50Hz	380-415v, 50Hz
PHASE		Single	Single	Single	Single	Single	Three	Single	Three	Single	Three
SYSTEM POWER INPUT (kW)	Heating/Cooling (nominal)	0.820 / 0.705	1.363 / 1.106	1.707 / 1.452	1.818 / 1.651	2.604 / 2.065	2.604 / 2.065	3.674 / 3.378	3.674 / 3.378	4.312 / 3.772	4.312 / 3.772
	Heating/Cooling (UK)	0.73 / 0.59	1.21 / 0.94	1.43 / 1.15	1.61 / 1.39	2.09 / 1.77	2.09 / 1.77	3.27 / 2.87	3.27 / 2.87	3.83 / 3.15	3.83 / 3.15
STARTING CURRENT (A)		5.0	5.0	6.0	6.0	13.0	6.0	13.0	6.0	13.0	6.0
SYSTEM RUNNING CURRENT (A)	Heating/Cooling [MAX]	3.89 / 3.51 [13.2]	6.05 / 5.00 [13.2]	7.39 / 6.31 [19.2]	7.79 / 7.06 [19.3]	11.25 / 8.97 [27.0]	3.75 / 2.96 [8.5]	15.77 / 14.53 [27.0]	5.32 / 4.89 [10.0]	18.41 / 15.88 [28.7]	6.23 / 5.37 [13.7]
FUSE RATING (BS88) - HRC (A)		16	16	25	25	32	16	32	16	40	16
MAINS CABLE NO. CORES		3	3	3	3	3	5	3	5	3	5
MAX PIPE LENGTH (m)		50	50	55	55	100	100	100	100	100	100
MAX HEIGHT DIFFERENCE (m)		30	30	30	30	30	30	30	30	30	30
CHARGE REFRIGERANT (kg) / CO <sub>2</sub> EQUIVALENT (t)	R32 (GWP 675) - 30m	2.0 / 1.35	2.00 / 1.35	2.80 / 1.89	2.80 / 1.89	4.00 / 2.70	4.00 / 2.70	4.00 / 2.70	4.00 / 2.70	4.00 / 2.70	4.00 / 2.70
MAX ADDITIONAL REFRIGERANT (kg) / CO <sub>2</sub> EQUIVALENT (t)	R32 (GWP 675)	0.30 / 0.20	0.30 / 0.20	0.80 / 0.54	0.80 / 0.54	2.80 / 1.89	2.80 / 1.89	2.80 / 1.89	2.80 / 1.89	2.80 / 1.89	2.80 / 1.89

3 Three Phase

## Product Dimensions PLA-ZM35-140EA



PLA-ZM-EA**35/50/60/71/100/125/140					
ZM	①	②	A	B	C D
35/50	REFRIGERANT PIPE Ø 6.35 FLARED CONNECTION 14F	REFRIGERANT PIPE Ø 12.7 FLARED CONNECTION 12F	241	258	76 76.5
60	FLARED CONNECTION 38F REFRIGERANT PIPE Ø 9.52	REFRIGERANT PIPE Ø 15.88 FLARED CONNECTION 58F			76.5 79.5
71			281	296	
100-140					

# PUZ-ZM R32 Power Inverter Heat Pump

## Outdoor Unit

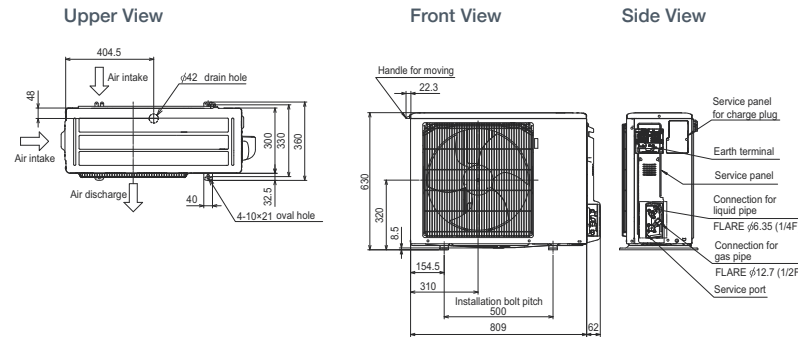
### Product Specifications

Mr. SLM

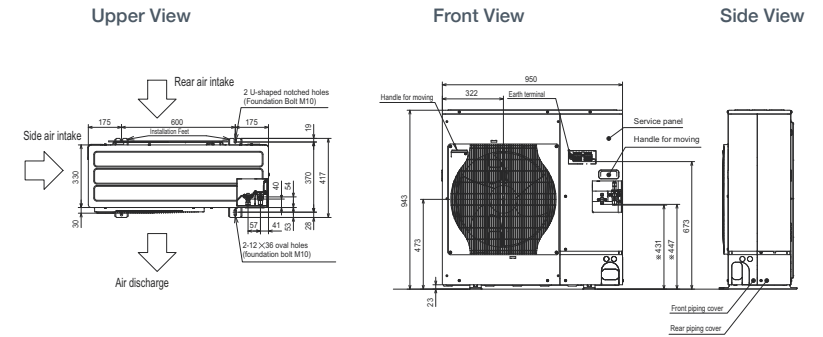
R32 POWER INVERTER



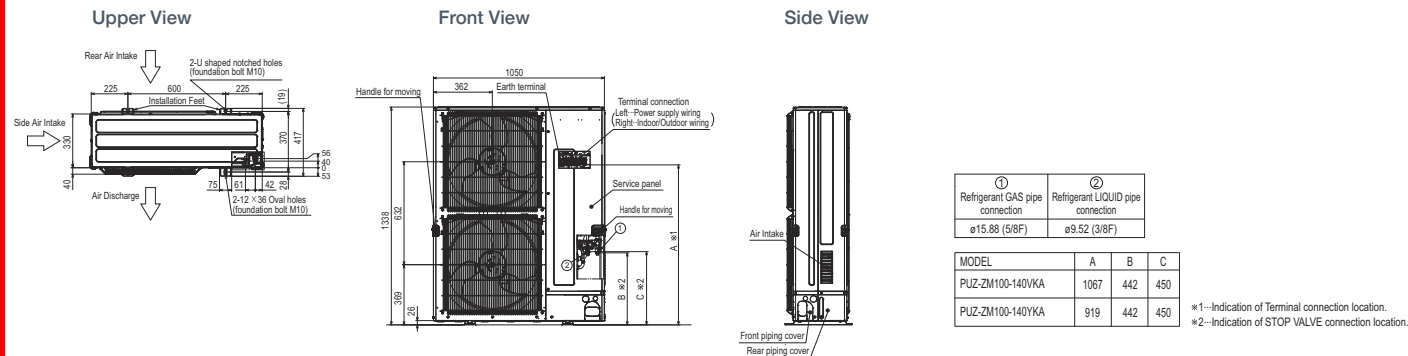
#### Product Dimensions PUZ-ZM35/50VKA



#### Product Dimensions PUZ-ZM60/71VHA



#### Product Dimensions PUZ-ZM100/125/140VKA, PUZ-ZM100/125/140YKA



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**Note:** The fuse rating is for guidance only. Please refer to the relevant databook for detailed specification. It is the responsibility of a qualified electrician/electrical engineer to select the correct cable size and fuse rating based on current regulation and site specific conditions. Mitsubishi Electric's air conditioning equipment and heat pump systems contain a fluorinated greenhouse gas, R410A (GWP:2088), R32 (GWP:675), R407C (GWP:1774) or R134a (GWP:1430). \*These GWP values are based on Regulation (EU) No 517/2014 from IPCC 4th edition. In case of Regulation (EU) No.626/2011 from IPCC 3rd edition, these are as follows. R410A (GWP:1975), R32 (GWP: 550), R407C (GWP:1650) or R134a (GWP:1300).



Effective as of October 2017 SAP No. 317318



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# ECOLIGHT



**OZCON**  
environmental solutions



## HIGHLIGHTS

1

**COMPACT  
SIZE**

2

**ELECTRONIC FILTER  
FEL SYSTEM STANDARD**

3

**ELECTRONIC  
ENGINE STANDARD**

4

**NEW PREFILTRATION  
WITH 3 WASHABLE STAGE**

5

**GRANULAR COCONUT/BAMBOO  
ACTIVATED CARBON**

6

**GUARANTEED HYGIENIC  
AND ANTIBACTERIAL EFFECT**



Ozcon offers the new range of exhaust filtration units for kitchens with **compact size**, especially suitable for installation in small kitchens in historic centers: **ECOLIGHT**.

The **FEL System filter** installed as standard has been specifically designed for the removal of pollutants such as oil mist and vapors thanks to pointed collection blades that allow the capture and drop down high quantities of oily pollutant downwards.

**Energy Saving** is guaranteed as energy consumption is 3 times lower than that of a mechanical filter with equal filtration efficiency: this is mainly due to the **low pressure drops** almost constant over time, 62 Pa even when the filter is completely dirty.

The low energy consumption of the **ECOLIGHT** units is also guaranteed by the use of an **electronic motor** instead of a belt motor.

They are equipped with a new **3-stage prefiltration** completely removable and **washable**.

The possibility of installing before the activated carbon the combination of an **ionization cell FI** and an **ozonation cell FX** provides a **hygienic and antibacterial effect** and at the same time reduces odors.

Ozcon uses active labyrinth carbons with low pressure drops and high performance. It consists in **granular coconut/bamboo carbon**.

The **ECOLIGHT** can be supplied to be wired or **fully wired** ready for use, **including an electrical control panel**.

The structures are presented in **self-supporting aluminum profiles**, with external 25 mm sandwich panels. Their body is made up of a **single block** that contains all the components inside it.

The **ECOLIGHT** units can be **installed on the wall**, on the **ceiling** or on the **floor** and are equipped with a folding, flag or removable door.

The installer will not have to provide any drainage system since the units are equipped with a **removable tray** designed tray to collect the oil captured by the electronic filter.



# HIGHLIGHTS



**DIMENSIONI  
COMPATTE**

**1**

**FILTRO ELETTRONICO  
FEL SYSTEM DI SERIE**

**2**

**MOTORE ELETTRONICO  
DI SERIE**

**3**

**NUOVA PREFILTRAZIONE  
A 3 STADI LAVABILE**

**4**

**CARBONE ATTIVO DI  
COCCO/BAMBU' GRANULARE**

**5**

**EFFETTO IGIENICO ED  
ANTIBATTERICO GARANTITO**

**6**

Ozcon presenta sul mercato la nuova gamma di unità filtranti per cucine con dimensioni compatte, adatta soprattutto all'installazione nelle piccole cucine dei centri storici: **ECOLIGHT**.

Il **filtro FEL System** installato di serie è stato progettato appositamente per l'abbattimento di inquinanti quali nebbie e vapori oleosi grazie a lame di captazione appuntite nella parte inferiore che permettono la cattura e lo scorrimento di elevate quantità di inquinante oleoso verso il basso.

L'**Energy Saving** è garantito in quanto i consumi energetici risultano essere 3 volte inferiori rispetto a quelli di un filtro meccanico con pari efficienza di filtrazione: questo soprattutto grazie alle **basse perdite di carico** pressoché costanti nel tempo, 62 Pa anche a filtro saturo.

Il basso consumo energetico delle unità **ECOLIGHT** è garantito anche dall'utilizzo di un **motore elettronico** anziché a trasmissione.

Sono dotate di nuova **prefiltrazione a 3 stadi** completamente smontabile e **lavabile**.

La possibilità di installare prima dei carboni attivi la combinazione di **cella ionizzante FI** e **cella ozonizzante FX** garantisce **effetto igienico ed antibatterico** e riduce allo stesso tempo gli odori.

Ozcon utilizza carboni attivi a labirinto con basse perdite di carico ed alte performance. Si tratta di **carbone di cocco/bambù granulare**.

Le **ECOLIGHT** possono essere fornite da cablare o **totalmente cablate** pronte per l'uso, **comprehensive di quadro elettrico di gestione**.

Le strutture si presentano in **profilati d'alluminio autoportanti**, con pannellature esterne a sandwich da 25 mm. Il corpo delle **ECOLIGHT** è costituito da un **blocco unico** che contiene tutti i componenti al suo interno.

Le unità **ECOLIGHT** possono essere **installate a muro**, a **soffitto** o a **pavimento** e sono dotate di porta apribile a ribalta, a bandiera o removibile.

L'installatore non dovrà prevedere alcun sistema di drenaggio dal momento che le unità sono provviste di una **vaschetta estraibile** predisposta per raccogliere l'olio catturato dal filtro elettronico.

# TECHNICAL FEATURES

As you can see from the table below, Ozcon provides different models based on:

- Airflow required
- Overall dimensions
- Components installed inside according to customer needs.

MODEL MODELLO	DIMENSIONS (MM) DIMENSIONI (MM)	AIRFLOW (m³/h) PORTATA D'ARIA (m³/h)	EXTERNAL STATIC PRESSURE (Pa) PRESSIONE STATICA (Pa)
ECO 0,5 A	458 x 1350 x 715	1500	400
ECO 0,5 B	458 x 1700 x 715	1500	400
ECO 0,5 C	458 x 2100 x 715	1500	400
ECO 0,5 D	458 x 2100 x 715	1500	400
ECO 0,5 E	458 x 1850 x 715	1500	400
ECO 0,5 F	458 x 1500 x 715	1500	400
ECO 1 A	693 x 1350 x 715	2500	500
ECO 1 B	693 x 1700 x 715	2500	500
ECO 1 C	693 x 2100 x 715	2500	500
ECO 1 D	693 x 2100 x 715	2500	500
ECO 1 E	693 x 1850 x 715	2500	500
ECO 1 F	693 x 1500 x 715	2500	500
ECO 2 A	1285 x 1350 x 715	5000	700
ECO 2 B	1285 x 1700 x 715	5000	700
ECO 2 C	1285 x 2100 x 715	5000	700
ECO 2 D	1285 x 2100 x 715	5000	700
ECO 2 E	1285 x 1850 x 715	5000	700
ECO 2 F	1285 x 1500 x 715	5000	700
ECO 3 A	1877 x 1500 x 715	7650	500
ECO 3 B	1877 x 1850 x 715	7650	500
ECO 3 C	1877 x 2100 x 715	7650	500
ECO 3 D	1877 x 2100 x 715	7650	500
ECO 3 E	1877 x 1850 x 715	7650	500
ECO 3 F	1877 x 1500 x 715	7650	500

**PF METAL:** Metal mesh prefilter  
**FEL:** Electrostatic filter FEL system  
**FAN:** Fan  
**LAB:** Labyrinth filter

**FI:** Ionization cell  
**FX:** Ozonation cell  
**CARBOPACK:** 2,5/5kg Active carbon filter  
**CARBOX:** Box with active carbon filters 26/52 kg

# CARATTERISTICHE TECNICHE

Come potete vedere dalla tabella sottostante, Ozcon fornisce diversi modelli in base a:

- Portata d'aria richiesta
- Dimensioni d'ingombro
- Componenti installati all'interno in base alle necessità del cliente.

FAN VENTILATORE	CHARACTERISTICS CARATTERISTICHE	MODEL MODELLO
7/7 TIG	PF METAL + 1FEL300 + FAN + CARBOPACK 2,5 KG	ECO 0,5 A
7/7 TIG	PF METAL + 1FEL300 + FAN + LAB + FI + FX + CARBOPACK 2,5 KG	ECO 0,5 B
7/7 TIG	PF METAL + 1FEL300 + FAN + LAB + FI + FX + CARBOX 26 KG	ECO 0,5 C
7/7 TIG	PF METAL + 1FEL300 + FAN + LAB + FI + CARBOX 26 KG	ECO 0,5 D
7/7 TIG	PF METAL + 1FEL300 + FAN + LAB + CARBOX 26 KG	ECO 0,5 E
7/7 TIG	PF METAL + 1FEL300 + LAB + FI + FX + CARBOX 26 KG	ECO 0,5 F
RAD 310	PF METAL + 1FEL600 + FAN + CARBOPACK 5 KG	ECO 1 A
RAD 310	PF METAL + 1FEL600 + FAN + LAB + FI + FX + CARBOPACK 5 KG	ECO 1 B
RAD 310	PF METAL + 1FEL600 + FAN + LAB + FI + FX + CARBOX 52 KG	ECO 1 C
RAD 310	PF METAL + 1FEL600 + FAN + LAB + FI + CARBOX 52 KG	ECO 1 D
RAD 310	PF METAL + 1FEL600 + FAN + LAB + CARBOX 52 KG	ECO 1 E
RAD 310	PF METAL + 1FEL600 + LAB + FI + FX + CARBOX 52KG	ECO 1 F
RAD310	2PF METAL + 2FEL600 + FAN + 2CARBOPACK 5 KG	ECO 2 A
RAD310	2PF METAL + 2FEL600 + FAN + 2LAB + 2FI + 2FX + 2CARBOPACK 5 KG	ECO 2 B
RAD310	2PF METAL + 2FEL600 + FAN + 2LAB + 2FI + 2FX + 2CARBOX 52 KG	ECO 2 C
RAD310	2PF METAL + 2FEL600 + FAN + LAB + 2FI + 2CARBOX 52 KG	ECO 2 D
RAD310	2PF METAL + 2FEL600 + FAN + 2LAB + 2CARBOX 52 KG	ECO 2 E
RAD310	2PF METAL + 2FEL600 + 2LAB + 2FI + 2FX + 2CARBOX 52KG	ECO 2 F
RAD400	3PF METAL + 3FEL600 + FAN + 3CARBOPACK 5 KG	ECO 3 A
RAD400	3PF METAL + 3FEL600 + FAN + 3LAB + 3FI + 3FX + 3CARBOPACK 5 KG	ECO 3 B
RAD400	3PF METAL + 3FEL600 + FAN + 3LAB + 3FI + 3FX + 3CARBOX 52 KG	ECO 3 C
RAD400	3PF METAL + 3FEL600 + FAN + 3LAB + 3FI + 3CARBOX 52 KG	ECO 3 D
RAD400	3PF METAL + 3FEL600 + FAN + 3LAB + 3CARBOX 52 KG	ECO 3 E
RAD400	3PF METAL + 3FEL600 + 3LAB + 3FI + 3FX + 3CARBOX 52KG	ECO 3 F

**PF METAL:** Prefiltro in maglia metallica

**FEL:** Filtro elettrostatico FEL system

**FAN:** Ventilatore

**LAB:** Filtro a labirinto

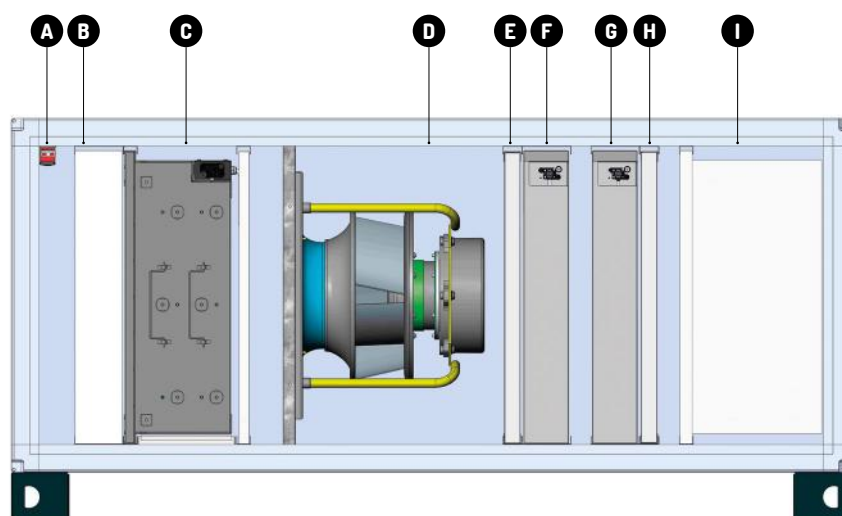
**FI:** Cella ionizzante

**FX:** Cella ozonizzante

**CARBOPACK:** Filtro a carbone attivo da 2,5/5kg

**CARBOX:** Box con filtri a carbone attivo 26/52 kg

# FILTRATION SECTIONS - SEZIONI FILTRANTI



**A**



**Safety microswitch**  
with separate actuator.

**Microinterruttore di sicurezza**  
con attuttore separato.

**B**



**Metal filter** made with galvanized wire mesh and galvanized frame, filter class EN 779 G2

**Filtro in maglia metallica** composto da rete metallica zincata e telaio zincato, classe filtro EN 779 G2

**C**



**Electrostatic precipitator** for oil and fat. FEL SYSTEM model, high efficiency performance with 230V electrical supply.

**Filtro elettrostatico** per oli modello FEL SYSTEM ad alta efficienza. 230V.

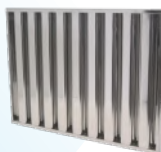
**D**



Electric **fan** with power control.

**Ventilatore** elettronico con controllo elettronico della potenza.

**E**



**Labyrinth filter** that guarantees the blockage of further possible drops of oil. It is placed before and after the ionization filter FI.

**Filtro a labirinto** che garantisce il blocco di ulteriori possibili gocce d'olio. Viene posto prima e dopo la cella ionizzante FI.

**F**



**Ionization cell FI** ensures better sterilization and reduction of odours.

La **cella ionizzante FI** garantisce una maggiore sterilizzazione e riduzione degli odori.

**G**



**Ozonation cell FX**, with plates that eliminates viruses and bacteria.

**Cella ozonizzante FX**, a piastre che è in grado di eliminare virus e batteri.

**H**



Inox Steel **Turbulator** to increase air, ions and ozone combination.

**Turbolatore** in acciaio inox per aumentare la miscelazione aria, ioni e ozono.

**I**



**Carbox:** Granular **activated carbon filters** with galvanized metal frame sheet. Labyrinth disposition. 26/52 kg.

**Carbox:** Filtri a carboni attivi granulari con telaio in lamiera zincata, disposti a labirinto. 26/52 kg.



**Carbopack:** plated active carbon mechanical filter. 2,5 / 5 kg.

**Carbopack:** filtro meccanico pleissetto a carbone attivo. 2,5 / 5 kg.

# ELECTROSTATIC FILTER FEL SYSTEM

The **FEL System electrostatic filter** has been specifically designed for the removal of pollutants such as fumes, oil mist and vapors. It is characterized by:

- ✓ **Pointed capture blades** in the lower part that allow the capture and the dropping of high quantities fumes, oil mist and vapors pollutant downwards.
- ✓ **Multi-polar connection** system and installation by simple sliding on a filter holder frame.
- ✓ **Standard ASHRAE dimensions** that allow the retrofit with classic pocket filters according to the EN 15805.
- ✓ **Low pressure drops** almost constant over time, 62 Pa even when the filter is completely dirty.
- ✓ **Thermal protection** that automatically blocks the filter functioning when temperatures are too high.
- ✓ **Energy Saving** guaranteed as energy consumption is 3 times lower than that of a mechanical filter with equal filtration efficiency.
- ✓ **FEL system electrostatic filters are certified according to UNI EN ISO 16890** which has replaced the old and obsolete EN 779: high filtration efficiency on 0.3-0.4 micron particles, comparable to classes E10, E11 according to EN 1822: 2009 and classes ePM1, ePM2.5, ePM10 according to EN ISO 16890.
- ✓ **No disposal and replacement costs.** In fact, the filter can be completely **regenerated by washing** with a specific detergent, without removing the **built-in electronics** as it is **resin-coated** and therefore **waterproof**.

## FILTRO ELETTRONICO FEL SYSTEM

Il **filtro elettronico FEL System** è stato progettato appositamente per l'abbattimento di inquinanti quali fumi, nebbie e vapori oleosi. Esso è caratterizzato da:

- ✓ **Lame di captazione appuntite** nella parte inferiore che permettono la cattura e lo scorrimento di elevate quantità di inquinanti quali fumi, nebbie e vapori oleosi verso il basso.
- ✓ **Sistema di connessione multipolare** ed installazione per semplice scorrimento su telaio portafiltro.
- ✓ **Dimensioni standard ASHRAE** che permettono il retrofit con i classici filtri a tasche seconde EN 15805.
- ✓ **Basse perdite di carico** pressoché costanti nel tempo, 62 Pa anche a filtro saturo.
- ✓ **Protezione termica** che blocca automaticamente il funzionamento del filtro al raggiungimento di temperature troppo elevate.
- ✓ **Energy Saving** garantito in quanto i consumi energetici risultano essere 3 volte inferiori rispetto a quelli di un filtro meccanico con pari efficienza di filtrazione.
- ✓ **I filtri elettrostatici FEL system sono certificati secondo la UNI EN ISO 16890** che ha sostituito la vecchia ed obsoleta EN 779: elevata efficienza di filtrazione su particelle 0,3-0,4 micron, paragonabile alle classi E10, E11 secondo la normativa EN 1822:2009 e alle classi ePM<sub>1</sub>, ePM<sub>2.5</sub>, ePM<sub>10</sub> secondo la EN ISO 16890.
- ✓ **Assenza totale di costi di smaltimento e sostituzione.** Il filtro, infatti, è **completamente rigenerabile tramite lavaggio** con apposito detergente, senza rimuovere l'**elettronica incorporata** in quanto **resinata** e dunque **waterproof**.

