

ECOLOGY UNIT



WOLF INTERNATIONAL



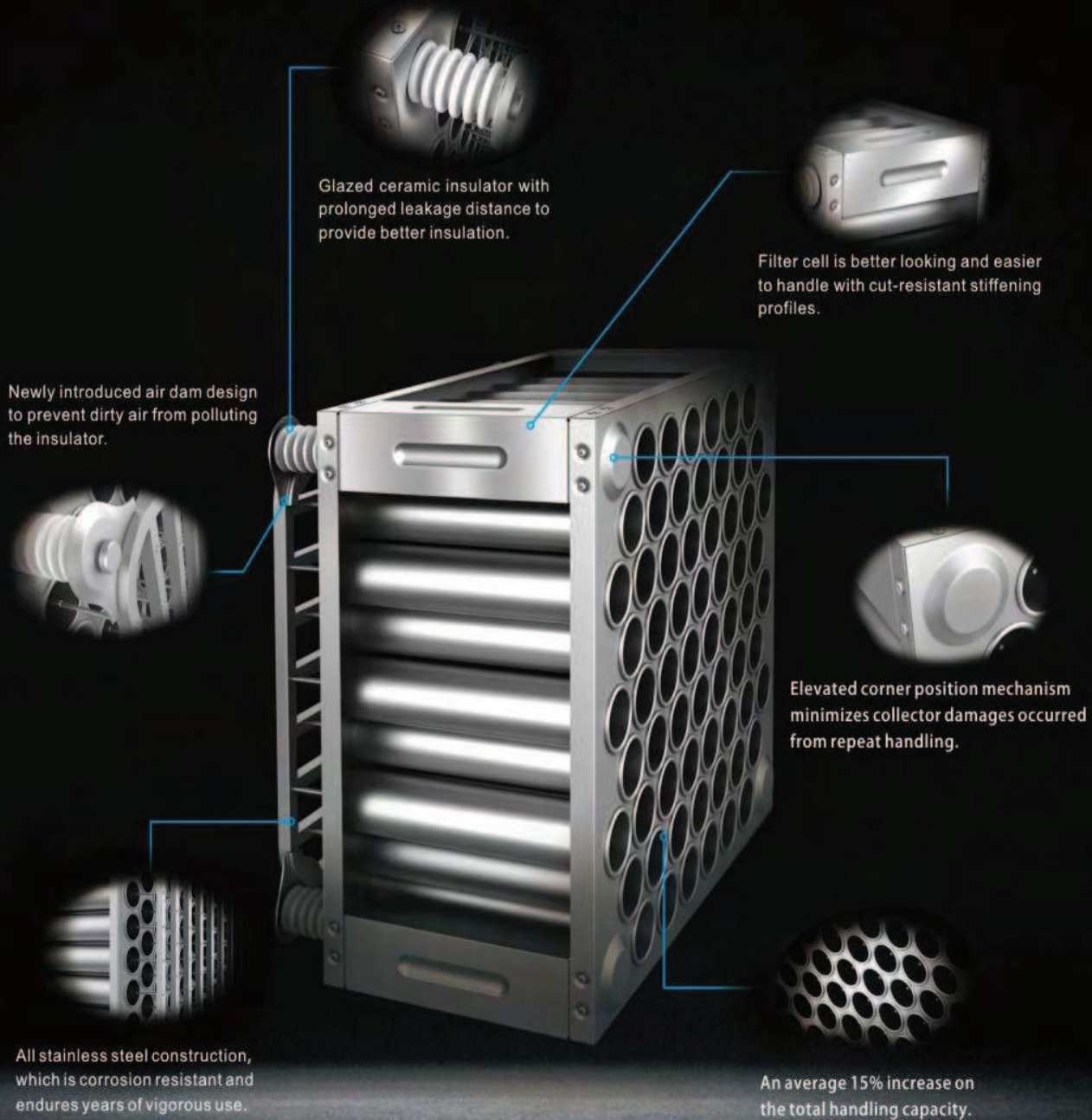
DESCRIPTION

KEY PARTS.....	Pg 03
ELECTROSTATIC PRECIPITATOR.....	Pg 05
ESP - OPERATING PROCEDURES.....	Pg 06
95% Q Series -ESP.....	Pg 07
98 % S Series -ESP.....	Pg 08
98% Hybrid Hood.....	Pg 09
AUTO CLEAN SYSTEM.....	Pg 11
UV ODOUR REMOVAL.....	Pg 12
ACTIVATED CARBON FILTER.....	Pg 14
ONLINE MONITORING.....	Pg 16
INSTALLATION GUIDE.....	Pg 18
PROJECTS.....	Pg 19



PATENTED CYLINDRICAL HONEYCOMB FILTER CELL

5th
Generation



Patented
Cell



Increased
Capacity



Highly
Efficient



Corrosion
Resistant



Increased
Leakage Distance

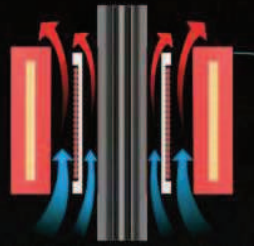


High Altitude
Friendly

KLEAN DIGITAL HV POWER PACK

3rd Generation

Imported high quality epoxy resin is processed with state-of-the-art vacuum techniques to ensure bubble-free encapsulation of the coils, while industrial-grade epoxy-philic insulation is applied between adjacent coils to prevent heat-induced failures.

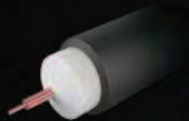


Effective Heat Dissipation Structure



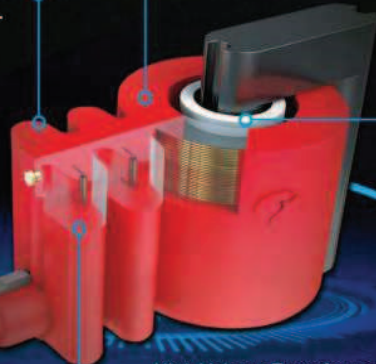
Super-fine winding conductors with excellent electrical properties are used.

Curved design increases the heat transfer area.



70kV cable is used to minimize possibilities of electrical breakdown.

Primary and secondary windings are arranged concentrically to reduce EMI which may cause heating and energy losses for other electrical appliances and degrade the performance of the circuits.



High Voltage Transformer

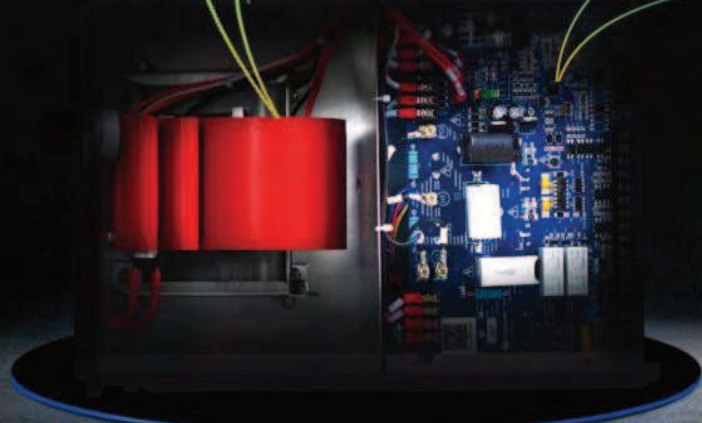
Double protection at HV cable exit.

Multiple winding configuration coupled with diode bridge rectification, the ideal topology for high voltage application.



MCU Inside

Real world load conditions are sampled instantaneously using proprietary technology while PFM/PWM output waveform is adjusted accordingly to achieve constant current and limited voltage output. This way, stable closed-loop control for voltage and current output is implemented and all of this is done within 0.00001s, with STM32 MCU.



VFD Power Output Capability



Soft Start-Up



Constant Current Limited Voltage Output



Arc Extinction



Short Circuit Protection



Open Circuit Protection



Transformer Overheat Protection



Overload Protection

ELECTROSTATIC PRECIPITATOR (ESP)

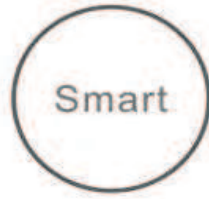


- 98%
Highly Efficient
- Patented Cell
- Smart Power Pack
- Digital Controller
- A36
Status Visualization
- IP55 Electrical Enclosure
- Triple Safeguard
- Outdoor Friendly
- Optional kCloud Service



ESP - OPERATING PROCEDURES

Specially Designed for Commercial Cooking Establishments



Hard-core Safety Features

Primary electrical isolation, access door interlock, keylocking latch, IP55 Electrical Enclosure, the list goes on.

Electrical Safety Guaranteed

Best-selling filters are UL listed and CE certified. All filters are configured with multiple protection schemes.

Eliminates up to 98% of Smoke Particles

Smokeless emission at street level, lowered cooking odor, reduced grease build-up in the duct, minimal smoke pollution to the neighbourhood, you name it.

User-Friendly Interface

Real-time status readings, intuitive diagnostics and controls, selective operating modes, BMS connectivity, remote control capability, etc are made available.

Optional Auto-Clean Function

Improved filtration efficiency, and significant savings in labor and money in a long run.

Bidirectional Airflow Direction

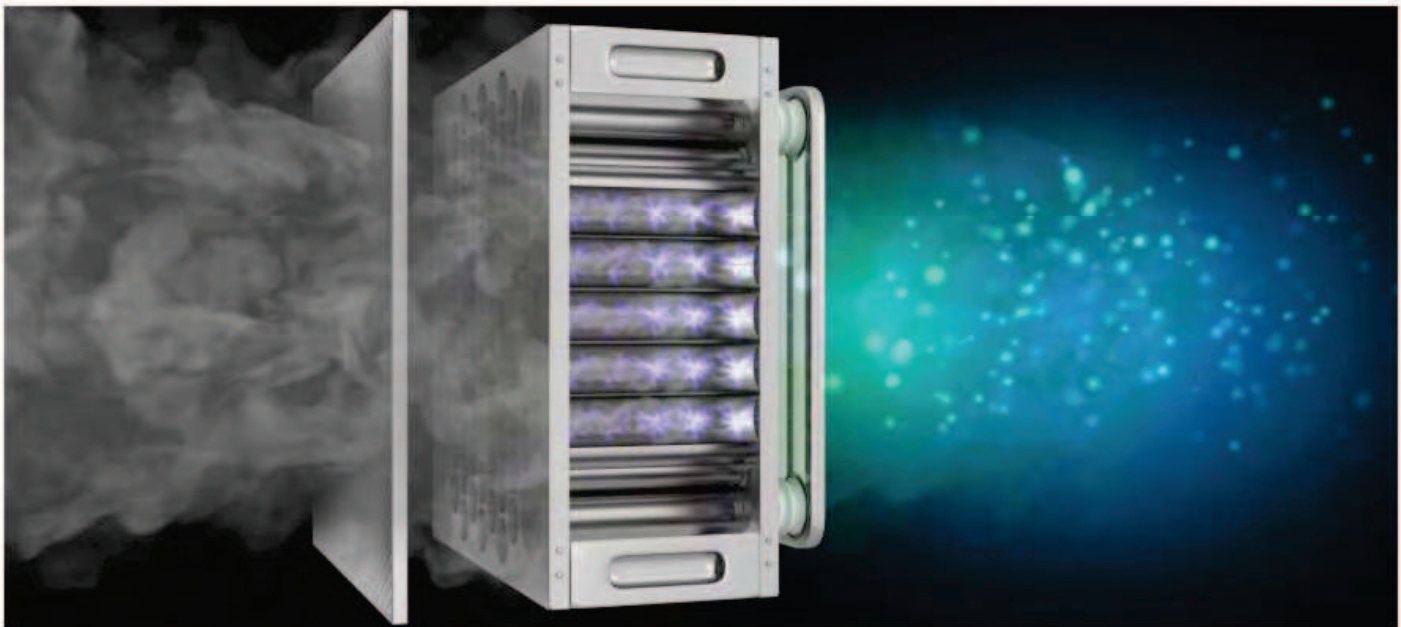
A hassle-free alternative to traditional filters with fixed airflow direction.

Versatile Handling Capacity

Single filter handling capacity ranges from 2000 to 72000 m3/h and above, i.e. it can be configured to accommodate almost any air flow.

"Pick and Mix" Solution

Stackable filter structure and modular selection of add-on features enable contractors to create bespoke integrated solutions.



ELECTROSTATIC PRECIPITATOR (ESP)



95% Filtration Efficiency at Rated Airflow under Lab Conditions

Maximum Filtration Efficiency
95% Q Series

Model	Rated Airflow (m ³ /h)	Dimension L×W×H (mm)	Flange Size (mm)	Drain Diameter (inch)	Power (w)	Weight (kg)
BS-216Q-2K	2000	735×765×773	398.5×532	1	650	72.5
BS-216Q-3K	3000	735×863×886	496.5×645	1	677	100
BS-216Q-4K	4000	735×924×943	557.5×701.5	1	800	107.2
BS-216Q-6K	6000	735×1447×886	1073×637	1	860	140.4
BS-216Q-8K	8000	735×1568×943	1194×694	1	959	153.8
BS-216Q-10K	10000	735×2030×886	1654×635	1	981	195
BS-216Q-12K	12000	735×1447×1631	1073×1382	1	1860	246.25
BS-216Q-16K	16000	735×1568×1745	1194×1495.5	1	1890	299.2
BS-216Q-20K	20000	735×2030×1631	1654×1380	1	1973	352.8
BS-216Q-24K	24000	735×2213×1745	1837×1493.5	1	1998	388.2
BS-216Q-28K	28000	735×2030×2376	1654×2125	1	2698	522.9
BS-216Q-32K	32000	1470×1568×1745	1194×1495.5	1	3400	598.4
BS-216Q-36K	36000	735×2213×2546	1837×2295	1	2464	576
BS-216Q-48K	48000	1470×2213×1745	1837×1493.5	1	3152	776.4
BS-216Q-54K	54000	1470×2030×2376	1654×2125	1	4596	1045.8
BS-216Q-72K	72000	1470×2213×2546	1837×2295	1	4728	1152



BS-216Q-2K



BS-216Q-3K
BS-216Q-4K



BS-216Q-6K
BS-216Q-8K
BS-216Q-10K



BS-216Q-12K
BS-216Q-16K



BS-216Q-20K
BS-216Q-24K



BS-216Q-28K
BS-216Q-36K



BS-216Q-32K



BS-216Q-48K



BS-216Q-54K
BS-216Q-72K

Note: Specifications are listed for reference purposes only and are subject to change without prior notice.



ELECTROSTATIC PRECIPITATOR (ESP)

98% Filtration Efficiency at Rated Airflow under Lab Conditions

Model	Rated Airflow (m ³ /h)	Dimension L×W×H (mm)	Flange Size (mm)	Drain Diameter (Inch)	Power (w)	Weight (kg)
BS-216Q-3000S	3000	907×857×870	530×589.5	1.5	730	99
BS-216Q-4000S	4000	907×899×945	572×664.5	1.5	755	113
BS-216Q-6000S	6000	907×929×1105	602×824.5	1.5	986	136
BS-216Q-8000S	8000	907×1541×935	1186×664.5	1.5	1036	220
BS-216Q-12000S	12000	907×1597×1095	1242×842.5	1.5	1981	260
BS-216Q-16000S	16000	907×1541×1735	1186×1465	1.5	2123	380
BS-216Q-16000SA	16000	1814×1541×935	1186×664.5	1.5	2123	380
BS-216Q-24000S	24000	907×1597×2055	1242×1784.5	1.5	3896	520
BS-216Q-24000SA	24000	1814×1597×1095	1242×824.5	1.5	3896	520

98%
S Series
Maximum Filtration Efficiency



BS-216Q-3000S



BS-216Q-4000S



BS-216Q-6000S



BS-216Q-8000S



BS-216Q-12000S



BS-216Q-16000S



BS-216Q-16000SA



BS-216Q-24000S



BS-216Q-24000SA

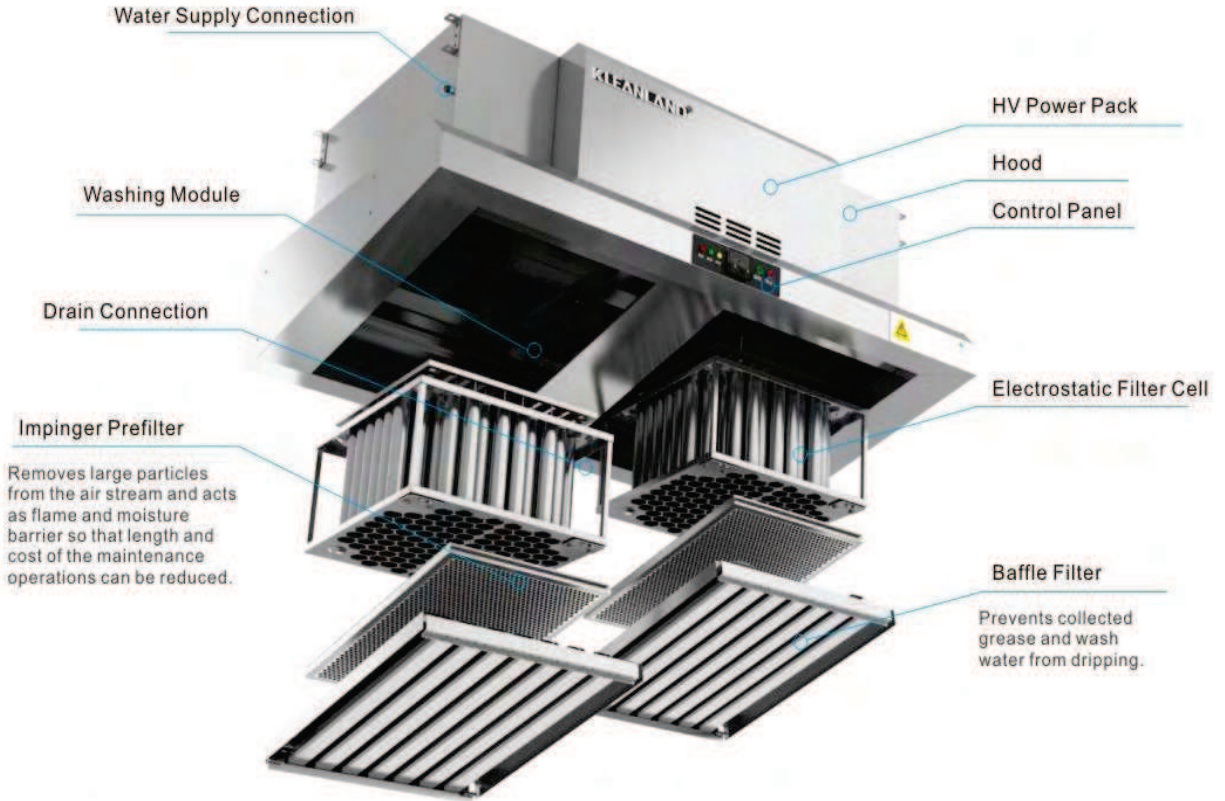
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ELECTROSTATIC PRECIPITATOR (ESP)



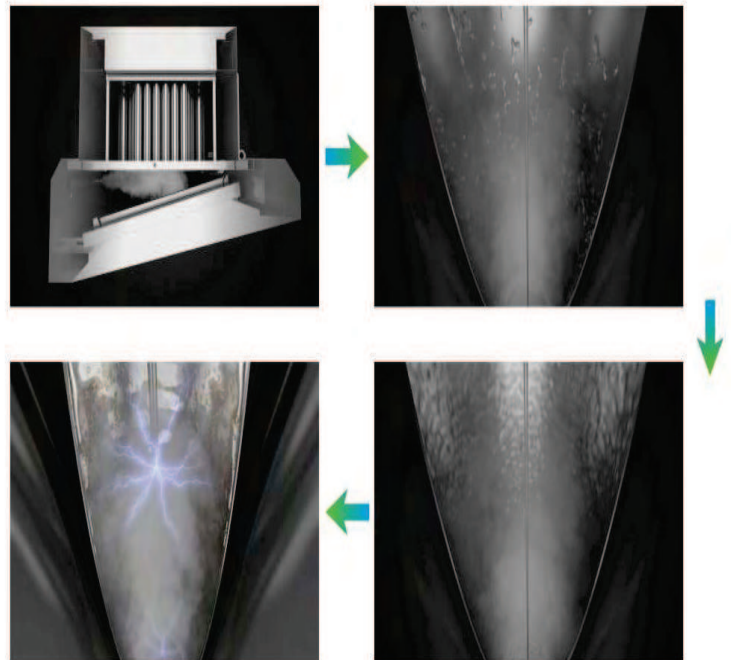
98% Filtration Efficiency at Rated Airflow under Lab Conditions

Maximum Filtration Efficiency
98% Hybrid Hood



Optional Digital Display Control Panel

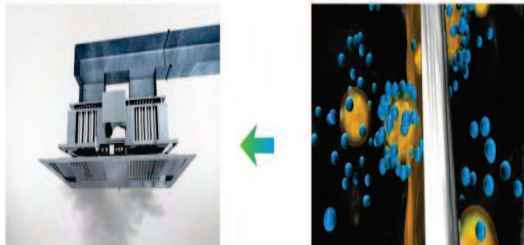
Water Wash System



Operating Principles



Smoke Extracted Through Hybrid Electrostatic Hood Electrons Released In Filter Cell Under High-voltage



Cleaned Air Gets Discharged Through Vents Smoke Particles Charged with Electrons and Get Trapped

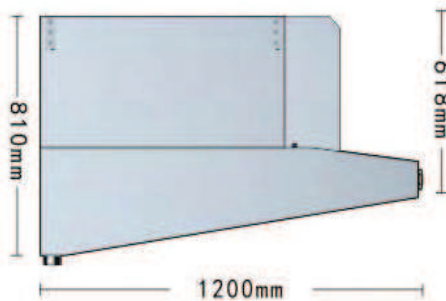
Filtration of the grease particles is enhanced due to the cooling effect of the fine water mist. Water mist is drawn into the filter cells and form a thin film on the collection walls so that collected grease particles drain easier and consequently reduce the frequency of manual cell cleanings. Tests show that filter cell cleaning intervals can be extended by 3 times.



ELECTROSTATIC PRECIPITATOR (ESP)

98% Filtration Efficiency at Rated Airflow under Lab Conditions

Model	Dimension LxWxH(mm)	Exhaust Size (mm)	Rated Airflow (m ³ /h)	Weight (kg)	Power (w)	Pressure Drop (Pa)	Configuration	Construction
BS-266-20G	2000x1200x810	300x450	4000	250	676	170	Water Wash System SUS Grade 304 Impinger Prefilter (Optional Exhaust Fan)	Galvanized Filter Cells Stainless Steel Housing (Grade 201/304)
BS-266-20	2000x1200x810	300x450	4000	250	676	(Optional Exhaust Fan)		
BS-266-12G	1200x1200x810	300x450	2000	170	673	Water Wash System SUS Grade 304 Impinger Prefilter (Optional Exhaust Fan)		
BS-266-12	1200x1200x810	300x450	2000	170	673	(Optional Exhaust Fan)		



A 2-in-1 Hybrid Hood in the kitchen Brings Down Overall Costs

Basically, this is an electrostatic air filter in the shape of an exhaust hood, which effectively removes the need for extra spending in a conventional exhaust hood and its installation. Minimum height for installation: 2.6m.

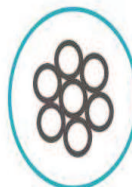


Filter Cleaning's Made Easier and Costs are Reduced

With the SUS impinger to serve as prefilter as well as flame barrier, and the water wash system to facilitate drainage, the filtration efficiency is kept to its maximum level for as long as possible, while filter cell's cleaning costs are brought down to the lowest possible level at the same time.

Maximum Filtration Performance And Fire Safety

KLEAN hybrid hood eliminates up to 98% grease and smoke particles and allows street level discharge for the exhaust ductwork. Fire safety of the entire exhaust ductwork is greatly improved due to the absence of grease buildup from the very beginning of the ventilation system.

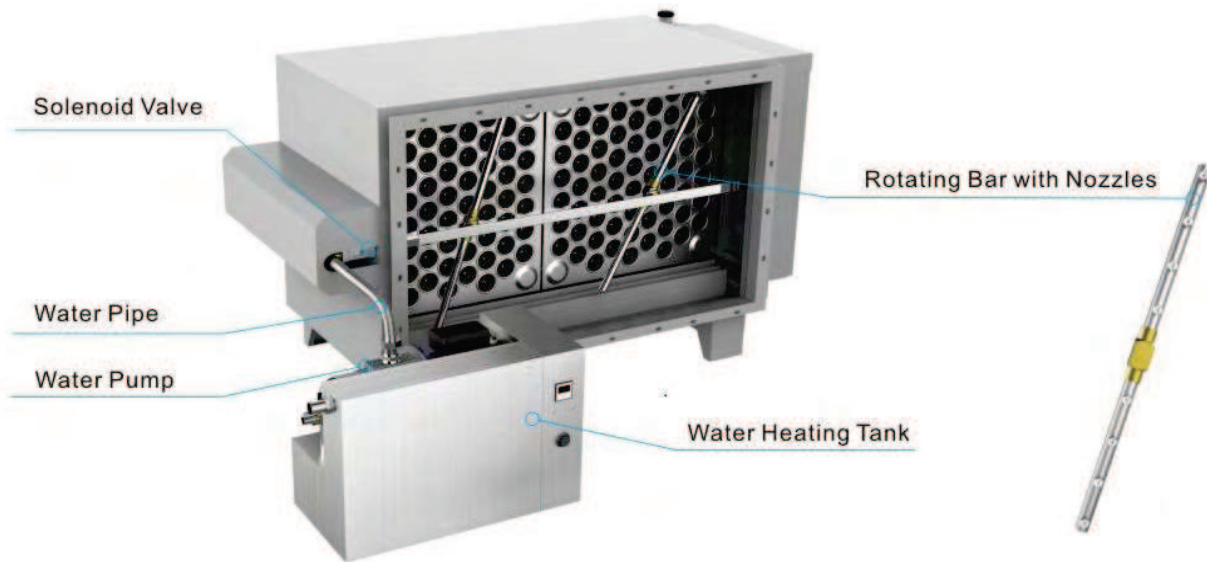


Allows Complaint-free Operations in Densely-Populated Locations

In addition to the compact size with increased performance, its decent effect on odour removal further makes it tailor-made for commercial kitchens operating in dense urban locations.



Note: Specifications are listed for reference purposes only and are subject to change without prior notice.



Surveys show that more than 85% of the ESP's for kitchen application failed to be cleaned timely and effectively, this leads to excessive grease build-up inside the filter cells and soon will impair filter efficiency or even cause fire.

This affect can be minimised with KLEAN auto cleaning system, a fully automated programmable process to ensure that filter cells remain relatively clean so that the ESP will keep working at optimum efficiency over a longer period of time. There will also be significant savings with labor cost.

Specifications(Water Heating Tank)

Model	BS-20L
Size (L*W*H)	600*300*400mm
Weight	30kg
Capacity	20L
Power	1-Phase/220V 50HZ 3-Phase/380V 50HZ
Power of heater	3000w/ 12000w
Power of pump	750w
Heating up time	30min / 12min (20-70°C, Up50°C)

Note: Specifications are listed for reference purposes only and are subject to change without prior notice.



Auto-Clean System for ESP (Q Series)



Klean auto cleaning system enables Klean ESP to operate maintenance-free for a long period of time, thus saving you the time, money and trouble of frequent manual cleaning.



Intelligent temperature control enables you to save time and power consumption spent on auto-cleaning.

PLC based intelligent control, enables the user to set the auto-cleaning timing at off-work hours, thus no interruption to the business operation will be incurred.

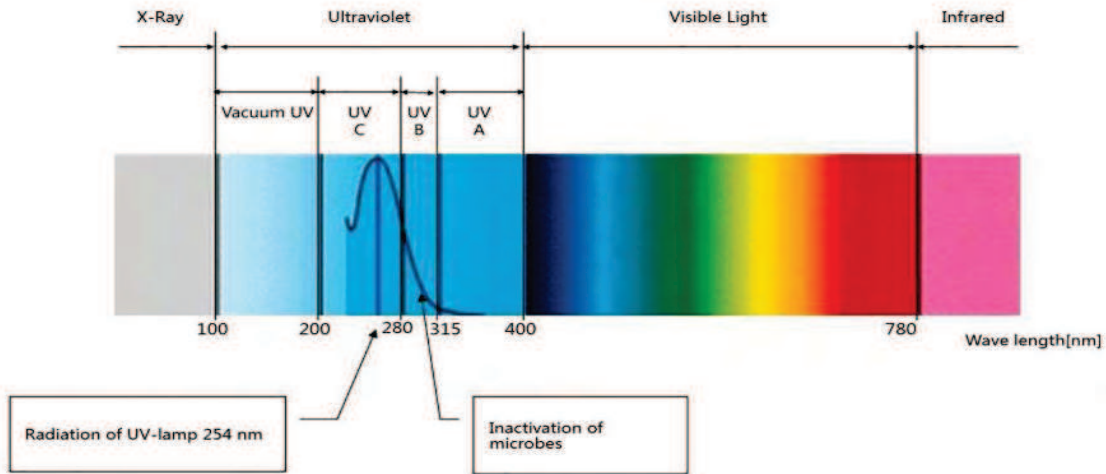


Rotatable nozzle bars with asymmetrical design, ensuring there's no dead spot while spraying.





UV ODOUR REMOVAL



Operating Principles

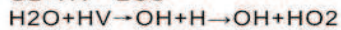
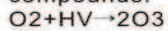
To treat odours released during common cooking processes in commercial kitchens, UV lamps emitting light at both 254nm and 185nm wavelengths are utilized.

These two light sources work simultaneously to oxidise the organic compounds that are the source of the odour, results being: direct breakdown of molecular structure of complex odour molecules when exposed to the radiation of the 254nm light range, and oxidization of airborne cooking odours by the highly reactive ozone that's generated by 185nm light range.

When installed in conjunction with KLEAN ESP unit, the UV Odour Eliminator should be located down stream of the ESP unit. Also, a minimum 2 seconds of dwell time is recommended within the duct to allow the ozone to work effectively upon the odour molecules.

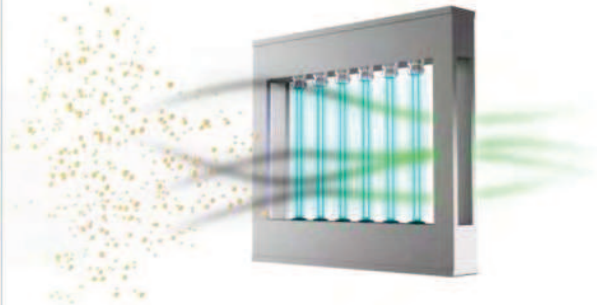
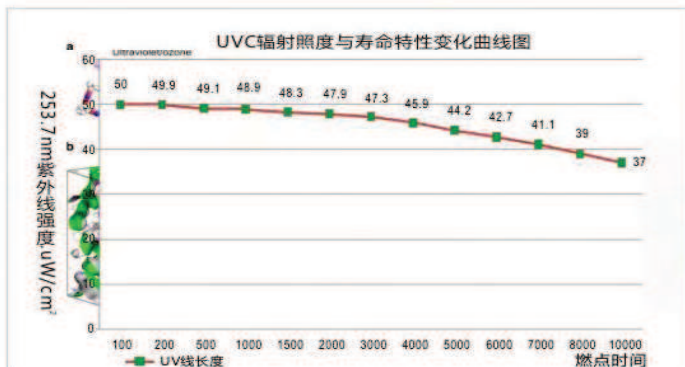
Photolysis

Absorption of UV light (254nm light range) causes the covalence bonds within the complex odour molecules to break down, permanently altering the molecular structure of the compounds and transforming them into smaller harmless compounds.

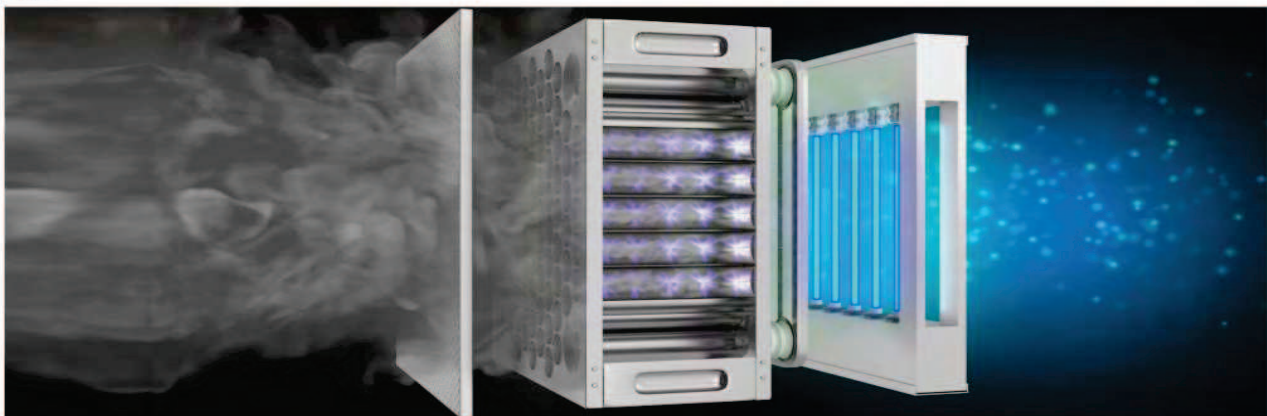


Ozonolysis

185 nm photons are absorbed by oxygen molecules in the ambient air, creating ozone, which is a highly reactive oxidant and acts to oxidise carbon based smell molecules and produces odourless inert CO₂, H₂O and some dust, thereby eliminating the smell.



When installed in conjunction with KLEAN ESP unit, the UV Odour Eliminator should be located down stream of the ESP unit.



UV ODOUR REMOVAL



High Quality Quartz Glass UV Lamps

High purity quartz tubes are processed with ultra-precision manufacturing skills, forming state-of-the-art UV lamps that are capable of:
 Providing UVC emission and ozone generation rate up to 10% higher than average lamps;
 Maintaining stable UVC emission over a wide range of temperatures;
 Running for up to 10000 hours at optimum capacity.



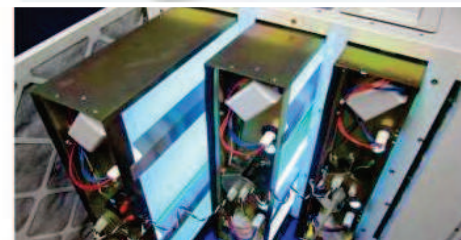
Electronic Ballast

Lifetime: up to 10 years;
 Programmed to preheat the cathodes, which helps to prolong lamp life;
 Stronger output brings in improvements in UV radiation output.



Modular Unit Design, Adaptive to Various Loads

Stainless Steel UV Rack Frame;
 Can be sized and stacked according to the air flow volume;
 Can be retrofitted or upgraded in existing installations;
 Easy to install, upgrade and service.



Model	Dimension LxWxH (mm)	Flange Size (mm)	Power (w)	Weight (kg)	Suggested ESP Model
KL-4V	735x726x773	398.5x532	120	54.5	BS-216Q-2K
KL-6V	735x824x886	496.5x645	120	79	BS-216Q-3K
KL-8V	735x885x943	557.5x701.5	160	84.5	BS-216Q-4K
KL-12V	735x1408x886	1073x637	240	111	BS-216Q-6K
KL-16V	735x1529x943	1194x694	320	120.5	BS-216Q-8K
KL-18V	735x2015x886	1654x635	480	123.5	BS-216Q-10K
KL-36V	735x1408x1631	1073x1382	480	186	BS-216Q-12K
KL-42V	735x1529x1745	1194x1495.5	640	231	BS-216Q-16K
KL-56V	735x1991x1631	1654x1380	720	275	BS-216Q-20K
KL-70V	735x2174x1745	1837x1493.5	960	340.5	BS-216Q-24K



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ACTIVATED CARBON FILTER



V-Bank Carbon Filter

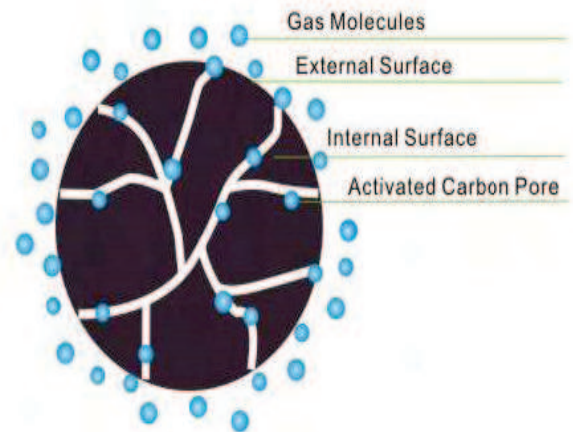


Honeycomb Activated Carbon

Encased Adsorption Material: High Grade Carbon Granules
Support Mesh: Plastic Honeycomb Grid

Advantages: Features high adsorption capabilities and decent aerodynamic performance. Can be used for general adsorption of malodorous gases such as toluene, xylene, benzenes, phenols, lipids, alcohols, aldehydes, and so on from the exhaust emissions.

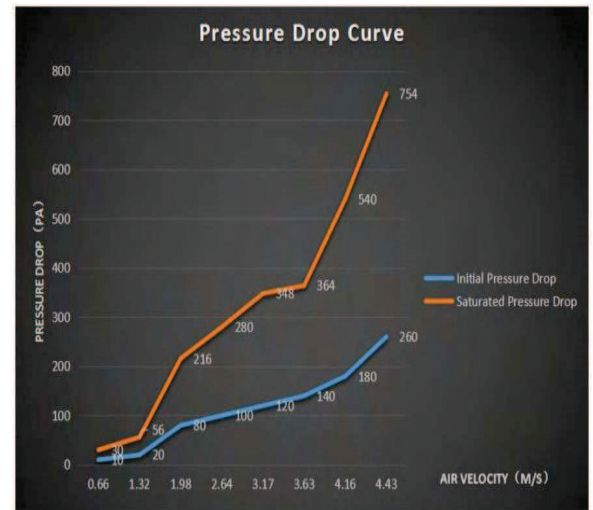
V-Shape Carbon Panel: Allows larger receiving surface and ease of installation and servicing.



ACTIVATED CARBON FILTER



Properties	Value
Relative Density	750
Form	Cylindrical
Material	Coal
Production Process	Carbonization
Diameter(mm)	1.5
Iodine Number (mg/g)	≥450
Specific Surface area(m ² /g)	500
Apparent Density(g/l)	650-750
Mechanical Strength(%)	≥92
Moisture content(%)	≤10
pH Value	6--9
Replacement Cycle	Every 1-3m



Model	Dimension L×W×H(mm)	Flange Size (mm)	Suggested ESP Model
KL-2C	735×606×773	398.5×532	BS-216Q-2K
KL-3C	735×704×886	496.5×645	BS-216Q-3K
KL-4C	735×765×943	557.5×701.5	BS-216Q-4K
KL-6C	735×1288×886	1073×637	BS-216Q-6K
KL-8C	735×1409×943	1194×694	BS-216Q-8K
KL-9C	735×1870×886	1654×635	BS-216Q-10K
KL-12AC	735×1288×1631	1073×1382	BS-216Q-12K
KL-16C	735×1409×1745	1194×1495.5	BS-216Q-16K
KL-20C	735×1871×1631	1654×1380	BS-216Q-20K
KL-24C	735×2054×1745	1837×1493.5	BS-216Q-24K



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Collaborative Remote Support is Made Possible for Smart Equipment Management

Optimal operation suggestions and maintenance alerts can be shared through the kCloud Platform by KLEAN's professionals behind the screen. When necessary, active onsite services can be initiated to handle complex issues in a more timely manner.

Realtime Monitoring

Information such as filter cell working status, power pack working status, fire control working status, exhaust air temperatures etc is made accessible in realtime on kCloud Platform.



Data Recording

A database of historical working conditions of the filter is established on the cloud server, providing references for future operations.



Remote Diagnostics

Comparative data analysis will be done automatically by the system, while professional analysis and diagnostics will be carried out by experts when data anomalies or filter failures occur. Service planning schedules or maintenance alerts will be further issued when necessary.



Information Sharing

Actual working status of the filter, experts' remote diagnostics, as well as maintenance alerts are shared with the clients in order to facilitate an early intervention on the users' side before a paid service visit should be arranged.

Engineering Solution

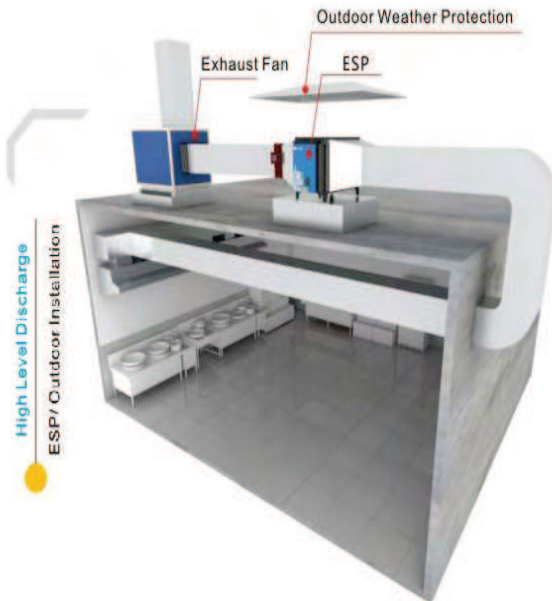
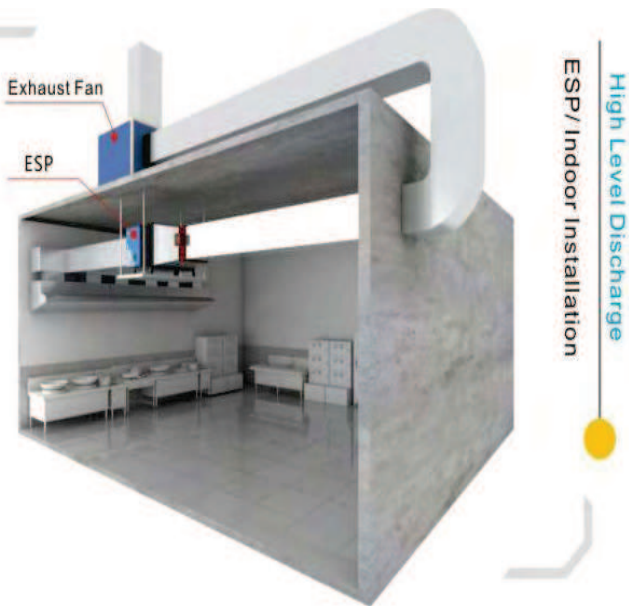
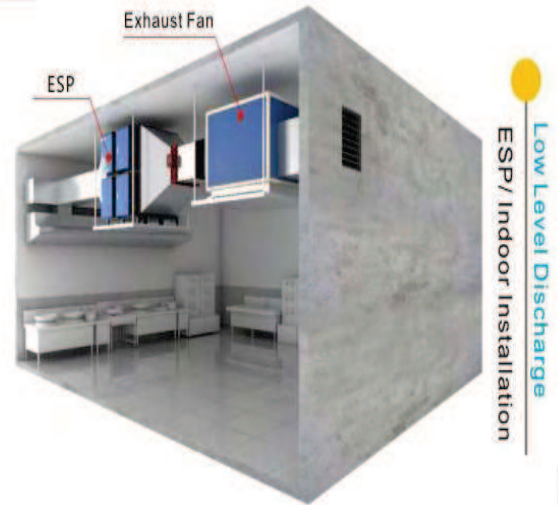
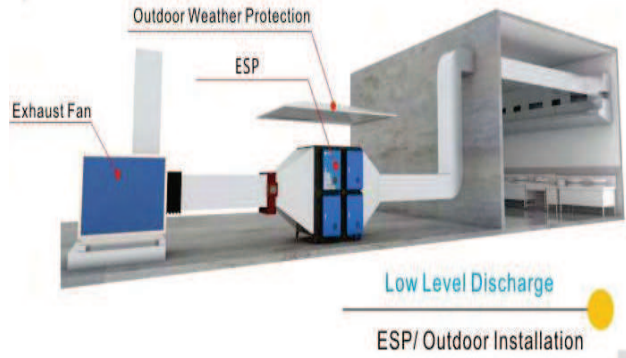
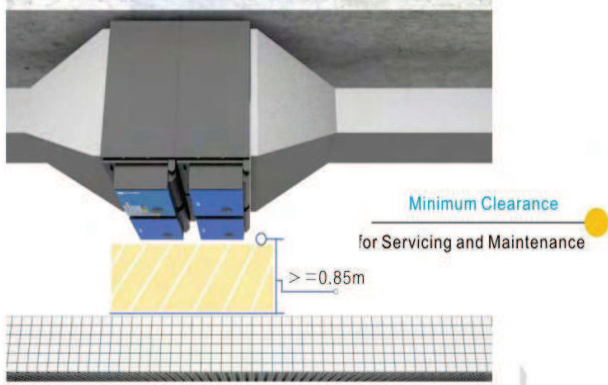
Optimal operation suggestions and tailor-made engineering solutions can be provided by our expert panel, provided there's long-term operation data available for analysis and comparison.

Active Service

Active services can be initiated in a more timely manner to handle complex issues on-the-site, thanks to KLEAN's vast service network.



INSTALLATION GUIDE





Shatar Abbas Ezdan Mall, Qatar

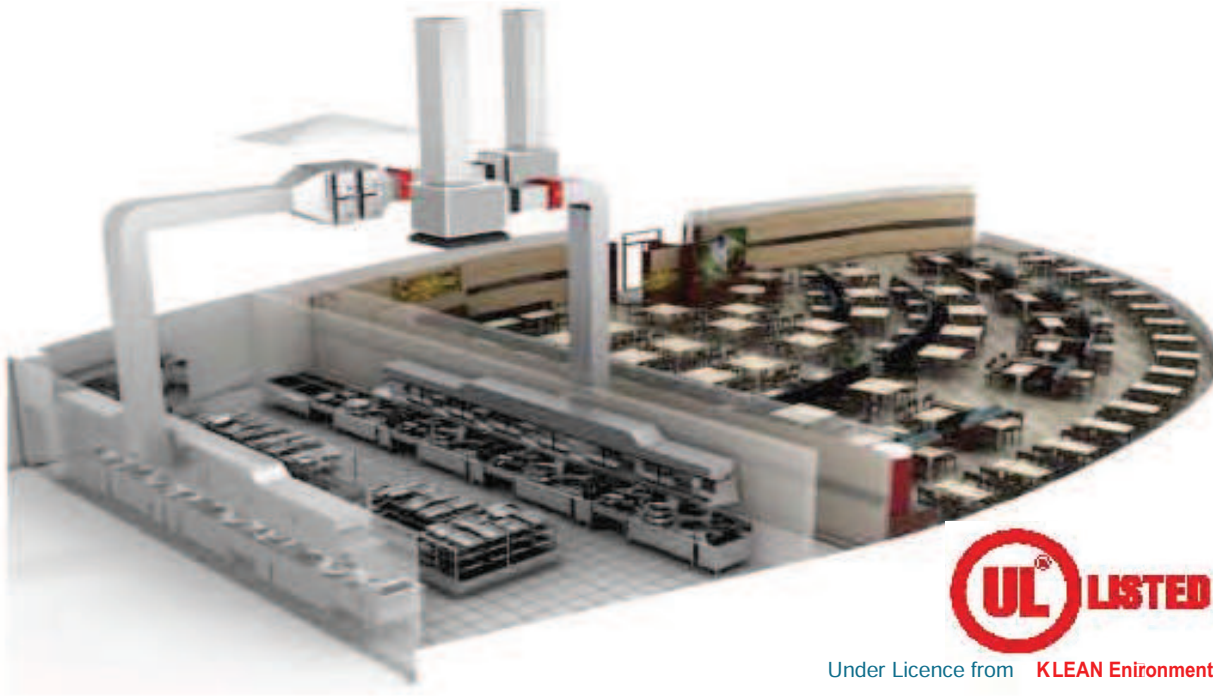


LIWAN Residential Tower, Dubai, UAE



shopping mall CKV-Abu Dhabi, UAE





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Main Office :

WOLFrost International LLP

India & Far East

Regional Sales & After Sales Service Contact :

WOLF International - SAIF ZONE

Middle East & North Africa

for more information VISIT
www.wolfmep.com

Contact :
info@wolfmep.com