

**CEDA Standard Document**

Recommended standard for kitchen ventilation

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CEDA recommends that all members should seek to achieve a consistent high standard in terms of ventilation design and construction and the following is the suggested standard document that it is recommended that should be sent to your suppliers at the time of requesting a quotation.

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Construction

Kitchen ventilation canopy shall be (extract, supply, capture & containment as required) and shall be as per design layout drawing but this is subject to, in all instances, a final site survey to be undertaken by the supplier in accordance with DW172.

The unit shall come complete with full-length, stainless steel grease filter housing.

The canopy shall be constructed from 1.0mm thick grade, 304 satin-finish stainless steel, with a 50mm x 25mm perimeter condense channel. All joints and seams shall be liquid tight. In the outer face; a full-length, fully insulated, make-up-air plenum complete with removable stainless steel, perforated plate diffusers. Insulation shall be rigid foil faced non fibrous slab. Class 1 spread of flame, and fixed to the plenum with a combination of adhesive, tape and stick pins.

Removable stainless steel grease collecting drawers shall be provided within the apron of the filter housing. Hanging brackets shall be provided on the roof of the canopy. The hood shall be provided and assembled on site in sections to accommodate site sizes and access requirements.

Grease Filters

Grease filters shall be typically heavy-duty, washable, stainless steel, baffle type in the full-length filter housing and shall not exceed 500mm in any one direction. Filters shall be easily removable and installed so as to minimise air leakage around the perimeter. Baffle filters shall be installed at an angle of not less than 45° from the horizontal. The capacity of the collection drawer shall be sufficient to suit the type of cooking and frequency of cleaning and because the grease is retained, care shall be taken to ensure that the grease collection drawer is isolated from the extract air stream. For plenums that contain more than one filter, supports may be required to ensure that the housing remains stable.

Lighting

Unless specifically requested otherwise shall be recessed, vapour-proof, fluorescent type

fittings. Integral lighting is to be provided within all canopies. The lighting is to be designed to provide an average illumination level of approximately 500 lux at the working surface. All light fittings should be incorporated into a suitable housing to isolate them from the cooking/washing process. The light enclosure shall be sealed against ingress of grease and moisture. Surfaces facing the cooking area shall be designed to achieve a rating of IP55. All sealing gaskets between the removable reflector and the light housing are to be of food quality neoprene and be able to

withstand temperatures up to 100°C. The lighting lens is to be made from a temperature resistant material such as polycarbonate sheet or safety glass. In both cases, the outer surface should be of a smooth and easy to clean finish. The light housing is to have an easily removable cover for easy access and replacement of the fluorescent tubes. The light housing shall be manufactured from a material or colour which will ensure maximum light reflection downwards towards the working surface. Wiring from the light fittings is to be routed to a single junction point on the canopy and be connected to supplies provided by others. Where surface mounted lighting is to be used all electrical wiring is to be concealed above the canopy.

Ductwork

Where ductwork is to be included within the project, the ductwork shall be manufactured supplied and installed in accordance with DW172. Special attention is drawn to all ductwork as described in section 15.2 and 15.3 and shall be low pressure Class A and in accordance with HVCA Specification number DW/144 with a minimum thickness of 0.8mm. Where it is not possible to immediately discharge the captured air within the confines of the kitchen fire zone, fire rated ductwork must be used to comply with BS 476 part 24/BS BS9999.

Fans and controllers

Where fans and controllers are to be supplied and fitted as part of the system the fan and controller selection shall be the responsibility of the supplier, but in any event will achieve the required extract rate as detailed in accordance with DW172. It will, as described in DW172, account for all pressure drops within the system. In all instances the system will be provided with suitable e-stops. In all cases field wiring should be carried out by a suitable, qualified electrical engineer including wiring into e-stops. The gas solenoid valve (whether supplied or not), balancing and commissioning of the system and provision of commissioning certificates, including air flow readings will be the responsibility of the supplier. Recent changes to Building regulations and the implementation of the Energy Related Products Directive impact on the selection of fans and controllers.

UK Building Regulations:

The new 2013 Approved Documents for Part L (Conservation of Fuel and Power) of the building regulations mark an evolution in kitchen fan design. Central to the changes are amendments to a kitchen fan’s maximum Specific Fan Power (SFP) which came into effect on 6 April 2014. Within this raft of new documents it is the Non-Domestic Building Services Compliance Guide, published to accompany Part L. Within the guide a maximum Specific Fan Power (SFP) in air distribution systems in new and existing buildings for kitchen extract (fan remote from zone with grease filter) is listed as 1.0W/l/s. This marks a significant step change for kitchen extract fans which often need to accommodate high air changes, elevated temperatures and significant levels of grease, the latter that often requires filters to protect the fans.

SFP (W/(L/s)) is the specific fan power of the air distribution system and maximum values are detailed in the UK building regulations.

SFP = (Psf + Pef)/q

* Psf (W) is the total fan power of all supply air fans at the design air flow rate including switchgear and controls associated with the fans (W).
* Pef (W) is the total fan power of all exhaust air fans at the design air flow rate including switchgear and controls associated with the fans (W).
* q is the design air flow rate through the system, which should be the greater of either the supply or exhaust air flow (L/s) through the unit.

The Energy Related Products (ERP) directive

This directive includes products which impact on energy consumption and the products affected have been divided into ‘Lots’, with the formulation of legislation being prioritised based on the biggest impact to reduce energy consumption.

Air Conditioning & Ventilation Systems

AHUs are considered as Lot 6 Ventilation products which do not have a primary purpose of heating or cooling (a possible secondary function coming from an external boiler or chiller). Pre-heating and pre-cooling energy consumption is included in Lot 6 Air Conditioning, Lot 1 CH Boilers and Lot 21 Air Heating legislation. The AHU energy usage to be considered is therefore only due to the external pressure drop for the heating or cooling coil. Lot 6 Ventilation includes mechanical

ventilation units with an electrical input power larger than 125W having the function of exchanging relatively clean outdoor air and polluted indoor air to create healthy Indoor Air Quality for building inhabitants.

What does this all mean?

* All ventilation units shall be equipped with a multispeed drive (3 or more fixed speed steps) or a variable speed drive (frequency inverter) or electronically commutated motor (EC).
* The minimal thermal efficiency of a heat recovery system shall be 67% for Tier 1 and 73% for Tier 2 which will encourage the use of counter flow and rotary heat exchangers.
* The minimum Tier 1 and Tier 2 fan efficiencies will encourage the use of direct driven backward curved centrifugal fans.
* The maximum Tier 1 and Tier 2 internal specific fan power requirements will encourage the use of lower face velocities and hence lower pressure drops.

Exclusions:

* Potentially explosive atmospheres, emergency use only, high temperature applications, toxic, highly corrosive, flammable and abrasive applications.
* Units including a heat exchanger or a heat pump technology, whereby the purpose of the unit is predominantly heating or cooling.

The proposed mandatory implementation date for Tier 1 is 1st January 2016 and Tier 2 is 1st January 2018.

Other ERP lots which effect AHU design and selection:

* Electric Motors (IEC) Regulation 640/2009 - Applicable to electric single speed, three phase 50Hz or 50/60Hz (0.75-375kW), squirrel cage induction motors having 2 to 6 poles rated for continuous duty operation.

Between 1st January 2015 and 1st January 2017 there is a 2 tier implementation culminating in a minimum efficiency of IE3 level, or shall meet the IE2 level whilst used with a VSD (variable speed drive).

* Lot 11 Fans Regulation 327/2011 - Lot 11 is applicable to fans driven by motors (input power 125W – 500kW) including those integrated into other products. This regulation defines minimum Fan Motor Efficiency Grade (FMEG) classifications to ISO 12759, fans tested to ISO5801. The mandatory implementation date for Tier 1 was 1st January 2013 and Tier 2 is 1st January 2015.

Implications of the ERP Legislation:

* Approximately 70% of the fans which were acceptable in 2010 will have to be withdrawn from the market by 2015; high efficiency direct drive backward curved centrifugal fans will become prevalent together with larger diameter fans running at lower speeds.
* The introduction of IE2 and subsequently IE3 motors will help to improve the overall fan efficiency for fans fitted with three phase motors which are currently border line.
* The traditional single phase low efficiency voltage speed controllable motors will be replaced by high efficiency EC motors.
* Occupancy sensors and variable speed drives will be used to provide demand control ventilation.
* Face velocities and duct leakage rates will reduce, low resistance filters and high efficiency heat recovery cells will be fitted and filter changes will be more frequently implemented to reduce the energy usage.

The Tiered minimum efficiency requirements of ERP and ongoing UK Building Regulation updates will continue to influence Fan and AHU development.

It will be the supplier’s responsibility to ensure the fan selection meets all of the above and the SFP is detailed within the technical information provided on the drawings.

Fire Suppression - ANSUL R102 or equivalent

Where requested, a restaurant fire suppression system shall be supplied and installed as a pre-engineered, wet chemical, cartridge-operated, regulated pressure type, with a fixed nozzle agent distribution network. It must be listed with Underwriters Laboratories, Inc. (UL) and be insurance industry's red book approved.

The system shall be capable of automatic detection and actuation and/or remote manual actuation.

The detection portion of the fire suppression system should allow for automatic detection by means of specific rated fusible links, which, when the temperature reaches the rating of the link, the link separates, allowing the regulated release to actuate.

The system shall have fire suppression capabilities for all kitchen cooking hazard areas.

Drawings

Drawings should be submitted within an agreed period *(to be stipulated by the member)* following receipt of order and should include as a minimum the following information.

* Canopy weight
* Extract and supply flow rates
* Fixing details
* Spigot connection points
* Specific fan power

If a full or part system is being provided, the following, where being supplied, should

also be included

* Fan Make and Fan model number
* Full Load Current of the fan
* Start Current of the fan
* kW of the fan
* Voltage of fan
* Specific fan power (SFP)
* DBA of the fan @ 3m
* Control package including make and model number of the panel
* Gas interlock make and model

Site works should commence in line with the site programme.

DW172 compliance

In all instances the hood and system shall be designed, manufactured and installed to comply with B&ES (formerly HVCA) Specification DW172, Kitchen Ventilation Systems and follow compliance with the TR/19 Guide to Good Practice published by B&ES (formerly HVCA).

The following should in all instances be included:

* Provision of extract flow and supply rates based on the thermal convection method for airflow calculations as detailed in DW172
* Site survey to check final dimensions, access & programme
* AUTOCAD drawings for approval and co-ordination
* Manufacture in accordance with approved drawings
* Delivery to site in one consignment
* Installation; to be carried out during normal working hours and in a continuous manner. Any overtime, broken time, night work or the like required to suit your works conditions should be clarified at the time of quoting and included in your costs, no additional costs will be allowed without express written consent and approval. The supplier is deemed to have obtained all relevant information to enable a quote to be prepared.
* Masking of gaps that occur during canopy installation due to inaccuracies in the building structure.
* Any infills from the top of the canopy to ceiling above (this should be clarified at both design and again at survey stage)
* Any lifting gear, scaffolding , tools and/or machinery required to undertake your works (external scaffolding required for any external plant should be clarified at quoting stage as being required or being provided by the main contractor or other parties and not simply assumed and excluded)
* Silicone sealing of your works on any wall interface joints
* Removal from site of all waste and packaging associated with your works
* Removal of any protective film (unless expressly instructed in writing from us)
* Operating & maintenance manuals
* Provision of airflow readings to demonstrate the system is working within the design parameters
* Provision of As Fitted Drawings
* Live testing of services
* Testing & commissioning

Applicable Standards

In all instances the supplier will ensure that what they are providing complies with the specific standards applicable. The following are the current applicable standards and is not meant to be exhaustive but for reference only

* BS EN 13053: Ventilation for buildings. AHUs. Rating and performance for units, components and sections.
* BS EN 1886: Ventilation for buildings. AHUs. Mechanical performance (Stipulates the casing air tightness).
* BS EN 779: Particulate air filters for general ventilation. Determination of the filtration performance. (G1 to G4, M5 to M6 & F7 to F8).
* BS EN 13779: Ventilation for non-residential buildings.
* BS EN 1822: High efficiency air filters. Determination of the filtration performance. (E10 to E12, H13 to H14 HEPA & U15 to U17 ULPA).
* EN 308: Heat exchangers. Test procedures for establishing performance of air to air and flue gas heat recovery devices. (At reference conditions of +5˚C outside, +25˚C inside and dry conditions).
* DW172 (2005 or as amended) specification for Kitchen ventilation systems
* DW144 (1998 or as amended) specification for sheet metal ductwork
* TR19 (2005 or as amended) Internal cleanliness of ventilation systems