

Vita – House of Social

Kitchen Extraction Project Assessment

Reco-Air Internal Recirculation System

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Reco-Air Internal Recirculation System - House of Social - Manchester

Site Assessment

An open plan Food & Beverage project, with five kiosk kitchens, offering various operators a standard three metre cookline footprint, enabling the introduction of a full range of all electric cooking equipment, meeting the needs of each individual concept, whilst future proofing the space for any changes in operators over time.

We would, ordinarily, size the Reco-Air Recirculation Unit in accordance with BESA's DW/172 Industry Guidelines, with extraction rates based on their recommended Thermal Convection Method. However, at this stage of development and, indeed, going forward should concepts change, we do not have full cookline specifications or specific equipment data sheets for each kiosk.

We have, therefore, currently sized the Reco-Air unit selection on the Face Velocity Method, based on the client's desired canopy width dimension of 3.0 metres and, given that a Combi Oven could be part of any of the initial or future cooklines, we have sized the depth of all canopies at 1.6 metres, to ensure the correct overhang in compliance with DW/172.

With a capture velocity of 0.25 m/sec (max), the resulting extraction rate, at 3.0m x 1.6m, equates to 1.2 cu.m/sec. Our model RA 0.8-42, with a maximum capacity of 1.3 cu.m/sec, has been selected accordingly for all kiosks. It is likely that most cooklines, once we have their proposed cooking equipment and have carried out a Specific Extract Flow Rate (SEFR) calculation, will require less than the 1.2 cu.m/sec and, therefore, each unit will have a high and a 0.9 cu.m/sec low airflow setting. At the lower airflow setting odour adsorption through the system will be enhanced, as detailed below.

As a further enhancement to the overall capture and containment performance of the cooking effluvia, we have specified Halton canopies, inclusive of Capture Jet technology. This provides a fine curtain of air around the perimeter of the canopy. With this technology, the manufacturer states on their website there could be a further benefit; 'up to 30 to 50% reduction in extract airflow rates compared to traditional suction only hoods.' We do not propose any reduction to the high and low settings above, although, Capture Jet will help to ensure any spillage or drift is kept to a minimum and that cooking effluvia within the canopy is drawn away quickly.

Unit Specification

The cooking effluvia from the canopy enters the Reco-Air system and passes through a selection of filters to remove particulate. This clean air, still including odour, passes through the fan, ensuring any grease build up is minimal and then, through a bank of active carbon canisters adsorbs the odour. The RA0.8-42 is equipped with 2 of each passive filters per grade & 42 Carbon Canisters.

The filter grades are as follows:

- F1: Filters are Grade G4 and remove the large particulates of airborne grease.
- F2: Filters are Grade M6 and remove the finer particulates of airborne grease & oil mist.
- F3: Filters are Grade E10 and remove the particulates of airborne smoke & water vapour.
- F4: 42 Carbon Canisters

At 1.2 cu.m/sec the carbon canisters provide odour suppression, with a minimum contact / dwell time of 0.2 seconds & an efficiency of approximately 85%. On the lower air volume, this increases to 0.27 seconds, improving the efficiency to approximately 88%. DW/172 recommends a dwell time of 0.2 seconds.

Acoustics and Breakout Noise

As the Reco-Air recirculation unit is an internal system, there is little or no impact to the external environment from the units. Each unit will be located at the end of the canopy, minimising the duct run and, therefore, external pressure on the system. The Reco-Air unit creates noise through the movement of air from the canopy through the filters, with the fan ramping up as the filters become soiled. The faster the fan is rotating the higher the noise levels. The unit is double skinned with a rock wool core and, where the unit is open at the grille, the carbon canister filters behind also help attenuate the noise from the fan.

We calculate a theoretical noise level based on the pressures through the system and therefore fan speed at both new clean filters and assuming all filters are dirty. It is most unlikely that all filters reach 'dirty' status at the same time, but it gives a worst case value. The original RA0.8 model, witnessed at Goody in Manchester, has a minimum and maximum theoretical 1m free field casing breakout noise of 50dBA and 55dBA, respectively.

In comparison the larger RA0.8-42 proposed, has a theoretical 1m free field casing breakout noise of 47dBA and 59dBA, running at 1.2 cu.m/s and at 0.9 cu.m/sec 41dBA and 59dBA. The actual levels of noise generated at the canopy and discharge grilles, will be dependent upon the specific kiosk airflow rate, but ordinarily, we would not expect to witness anything above 65 dBA across our range.

The 150mm spiral bleed duct, noted below, opening to a 600mm square external grille with 50% open face at a flow rate of no more than 0.09 cu.m/sec has a theoretical noise level of 50dBA, excluding the impact of the carbon filters at the point of discharge, which should further reduce the levels.

We are not directly involved with the design, sizing or layout of the 'background' ventilation and, therefore, cannot make comment as to respective system noise levels.

System Optimisation

The flexibility in the system will ensure optimisation of the capture, containment and odour suppression, allowing the lowest airflow and, therefore, fan speeds for each operation, reducing the break out noise levels to an absolute minimum.

Within the duct design, we have added a small bleed duct to remove a proportion of the clean, filtered air to atmosphere, helping to ensure that fresh and cooler air is drawn into the kitchens. By creating this negative pressure at the canopy, we further improve capture.

Summary

As the industry's leading Recirculation unit manufacturer, the Reco-Air system meets full compliance with the Industry Guidelines, DW/172 and the City of Westminster Kitchen Extraction Guidelines, on which these are based. As our initial 'Home Authority' we worked with the team at Westminster Council to approve recirculation as an alternative to high level extraction, whilst incorporating our specification of manufacture. For this project we have recommended a robust system, future proofing the kitchens and offered flexibility to ensure each kitchen can be optimised, based on the equipment selected for capture, containment and odour suppression.