Secondary filters shall be of the dry disposable type suitable for high dust holding capacity and for face velocity up to 2.5 m/sec. The filter module thickness shall not be more than 300 mm.

The filter shall have an average arrestance efficiency of 99% and dust spot efficiency of 90% (equivalent to MERV 13) based on ASHRAE Standard 52.1 and 52.2.

The initial air resistance shall not exceed 1.5 mbar at face velocity of 2.5 m/s.

2.10.5 Air Filters For Fan Coil Unit

The filter shall be cleanable type mounted in light weight metal frame with media held in position with PVC coated heavy gauge galvanised iron wire mesh of mesh size not larger than 75 x 75 (mm). All joints shall be fitted air tight with felt stripes. The complete unit including filter box shall be suitably treated against corrosion. The face velocity of air passing through the filter shall not exceed 1.8 m/sec and the initial air resistance shall not exceed 0.4 mbar.

## 2.11 Dehumidifiers

Dehumidifiers shall be provided and installed where required and as shown in the Specification Drawings and with capacities as specified in the Schedule of Technical Requirements.

Each dehumidifier shall be complete with an automatic humidistat to cut off the power supply at pre-set humidity level and restart upon increase in humidity in the space. Each unit shall also have a drip tray complete with hose connection and ball float, for 24 hour holding capacity. An overflow signal light incorporated in the unit shall flash when the tray is full. All dehumidifiers shall be suitable for 230 volts, single phase, 50 Hz supply.

## 2.12 Air Curtains

The air curtains shall be of grille and exposed type for wall mounting across the required entrances as indicated on the Drawings.

The finishes shall be of a colour to the approval of the Architect. The design and installation shall provide easy access for maintenance and repair. The fans shall be of centrifugal type with a downward wind spreading velocity in excess of 1 metre per second at 3 metre vertically below the outlet. The fans shall be statically and dynamically balanced, coupled direct to the motors running on sealed bearings and noise level within 55 phons.

The air curtains shall be of two-speeds controlled by a remote switch suitable for single phase 230V electrical supply. The high and low speeds shall be 9 and 7 metre per second at the nozzle discharge respectively.

The air curtains shall be supplied and installed inclusive of all necessary fixture connected in series to extend as a continuous unit across the entrances as indicated on the drawings.

## 2.13 Air Cleaning System for Kitchen Exhaust

The Air Cleaning System shall consist of a two stage filtration system consisting of:

a) Stage 1 - Electrostatic Air Filter for filtration of dust, smoke, oil mist and cooking fumes

b) Stage 2 – Activated Carbon Bank Filter for odour absorption

2.13.1 Electronic Air Filter (EAF)

The EAF shall be supplied and installed in a 20 gauge galvanised steel enclosure/cabinet with industrial grade electrostatic cells, solid state power supply,

pre-filters, etc as a complete factory assembled unit with industrial grade external finish of semi gloss baked-on epoxy ester. The air intake and discharge grille, the pre-filter and the electronic cells shall be removable for cleaning without using any tools.

The pre-filter provided shall be with aluminium mesh, washable type and have an average arrestance efficiency of 90% and dust spot efficiency of 30% (equivalent to MRV 8) based on ASHRAE Standard 52.1 and 52.2.

The electrostatic cell shall be based on the principle of two stage electrostatic precipitation; consisting of the Ioniser Section and the Collector Section.

The ionising electrodes shall be of tungsten material, rigidly supported to withstand the impingement from the air flow. The electrodes shall be designed with sufficient length to achieve the required ionising effect. High voltage support insulators shall be of Teflon material, glazed to enhance dielectric strength and retard tracking.

The repelling and collecting plates shall be of one piece construction with sufficient depth in the air flow direction to achieve the required filtration via the different polarity between the plates. The plates shall be of minimum 0.8mm thick aluminium and rigidly retained in place with tubular spaces and tie rods. The plates shall be spaced to achieve the maximum filtration efficiency with minimum static losses.

The solid state power supply providing DC high voltage to the electrostatic cell shall be of self regulating without being affected by moderate input voltage fluctuations. It shall also be interlocked to stop all operations when the housing access is opened and discharges all the cells automatically. In addition, an interlock shall be provided to disconnect the power to the EAF when the exhaust fans are not running.

The EAF shall be provided with LED lights for On/Off status, Fault and Wash check indicators. In addition, dry contacts shall be provided for interfacing to the Computer-based Control System for the On/Off and Fault status.

The EAF shall achieve the minimum oil mist reduction efficiency of 90% based on the USA National Institute for Occupational Safety and Health (NIOSH)'s Manual of Analytical Methods - Oil Mist Test Method 5026 at its nominal rated air flow rate with static pressure loss of not more than 100 Pa. The EAF shall also be able to capture sub-micron particle size down to 0.01 micron.

2.13.2 Activated Carbon Bank Filter (ACB)

The ACB shall be supplied and installed in a 20 gauge galvanised steel enclosure/cabinet as a complete factory assembled unit with industrial grade external finish of semi gloss baked-on epoxy ester.

The enclosure/cabinet shall have sufficient slots to accommodate the required number of activated carbon trays in V configuration to maximise the air contact surface area with the activated carbon pellets. The trays shall be removable for replacement/maintenance without using any tools.

A post filter suitably sized to trap blown away carbon pellets shall be provided.

The activated carbon pellets shall be manufactured from good grade bituminous coal to produce high quality carbon that can meet the demands of the kitchen exhaust air treatment. The carbon shall have a minimum carbon tetrachloride (CTC) activity of 50% to 60% with the following activated properties:-

| | | |
|---|---|---|
| a) | Surface area | 950 – 1,100 m2/g |
| b) | Bulk density | 0.48 – 0.52 g/cm3 |
| c) | Loose filled density | 0.43 – 0.47 g/cm3 |

| | | |
|---|---|---|
| d) | Moisture content | < 5 % w/w |
| e) | Hardness | 93 – 99 % |
| f) | pH value | 7-8 |
| g) | Pallet | 3-4 mm |

The ACB shall be designed with sufficient quantity of activated carbon arranged to ensure the residential time required for effective odour absorption is achieved at static pressure loss of not more than 125 Pa at its nominal rated air flow rate.