

## **SECTION 4      ALTERNATIVE PASSIVE FILTRATION FOR** **CONTROL OF PARTICULATE PHASE** **CONTAMINANTS**

Passive filtration is an option to Electrostatic Precipitation, however, to achieve separation efficiency close to the Electrostatic the filtration must be applied in stages, the primary stages will obviously be more sacrificial than the preceding stages.

### **Three Stage Filtration**

Although termed as three-stage filtration the process really combines four stages as it is assumed that good quality canopy filters will be in use to remove the bulk of the grease and fats. Under design operating conditions the canopy filters will remove 80-90% of the condensed oil and grease.

The first stage of filtration will take the form of a non-woven synthetic, which will be of a fire retardant material. Under design operating conditions this filter will remove a good proportion of the fats and grease which have penetrated the canopy filters.

The second stage of filtration requires a filter with a significantly higher efficiency than the first stage, if for no other reason than protecting the third stage which will be a high cost item. The secondary filter will be made from micro fine glass fibre held in place by a resin binder and resting on a cerex scrim to prevent fibre mitigation. The substrate media is formed into pockets or bags to extend the filter face area, reduce pressure loss and increase life. The efficiency of this filter will be in the region of 95%.

The third stage of filtration comprises a HEPA traditional or absolute unit that will be more commonly seen in clean room applications. The filter is made up by creating a mini pleat of fine permeable paper held in place by a resin divider. This filter is the most important and expensive part of the entire system, it operates at an efficiency of 99% and is designed to remove the sub micron particles that have penetrated the previous stages of filtration.

### **Efficiency**

The passive filter is very efficient for removing the particulate phase but as with the Electrostatic Precipitator it cannot remove the gaseous phase, therefore a separate odour control stage will be necessary.

### **Pressure Loss**

The passive filter presents a very high pressure loss approximately 160mm water gauge. This is one of the points that detracts from the use of passive filters as the high pressure loss greatly increases the duty of the fan which will lead to greater noise pollution and increased operating costs.

## **Maintenance**

The system is very heavily maintenance orientated. The first stage will need to be changed every one or two days with the second stage every three to four weeks. The final stage will last between nine and twelve months.