

## **FILTRATION**

by

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### **Introduction**

Filters are installed in air conditioning and ventilation systems to remove unwanted particulate from the air stream. Proper selection and location of the filter media are essential to protect the occupants, duct systems, and equipment.

### **Filter Types**

The three major types of air filters are media, electronic, and electrostatic. The media type filters comprise the overwhelming majority of filters used in HVAC systems.

### **Media Filters**

Media filters are composed of filter material attached to a frame. The filter media is made from a variety of fibrous material. The low end, low arrestance filters use large glass fibers. Higher end, pleated filters use finer glass fibers formed into pleated panels. The media frame can be plastic or paper depending on the construction. Filters located in the supply air duct shall have plastic frames to reduce mold growth. Synthetic fibers are also used in various filter assemblies. Anti-microbial coating can also be incorporated into the media. Pleated disposable filters, with an efficiency of 65% are the minimum recommended filters. A small variety of washable media exist. However, this type of filter is not recommended due to the inability to completely clean and sanitize the filter.

### **Filter Enclosure**

The filter is only as good as the frame where it is installed. Filter racks supplied with most equipment are very ineffective. Usually filters do not properly fit in the racks allowing air to bypass the filter. A manufactured filter housing is highly recommended to be installed in the duct system. The rack assembly should be specifically made for the filter type and have a hinged, gasketed door.

### **Electronic Air Filters**

Electronic air filters utilize a high voltage wire grid to attract charged particulate. The filters require periodic service to remove the captured particles. A disposable pre-filter is highly recommended to be installed in conjunction with an electronic filter. The pre-filter increases the maintenance cycle by capturing most of the larger particulate. These filters are used most often when occupants have allergies.

### **Electrostatic Filters**

Electrostatic filters collect particulate on a charged grid. The grid is charged when air flows over the filter material. Periodic maintenance and washing is required. This type of filter is not recommended due to its inability to be completely cleaned and sanitized.

### **Filter Location**

Filters can be installed at various locations in the air conditioning system. The most common location is directly attached to the unit on the return air side. This location works well to protect the equipment and occupants. However, the return air duct attached to the unit is not protected. An additional filter should be installed on the backside of the return air grill.

A supply air filter is required when low particulate levels are required in the conditioned space. Hospitals use a very high-efficiency "HEPA" filter assembly. A 95% ASHRAE filter assembly can also be used when the arrestance of a "HEPA" filter is not required.

### **Anti-Microbial Lights**

Ultraviolet lights have been in existence for some time. These light have the ability to kill certain molds and bacteria, depending on the contact time. These lights work very well when installed in the air handling unit cabinet in close proximity to the drain pan. The UV light keeps the drain pan clean of mold and algae. One word of caution – the drain pan must be made of metal or UV stabilized plastic. The UV light will deteriorate any materials which are not stabilized. ~