air & odour management

# ENGINEERING BULLETIN

**Reference No:** General fire risk to commercial kitchen filtration plants
**Date:** 01.03.2017
**Product Range:** All type of filters used in filtration of grease

## Introduction

The risk of fires originating from a commercial kitchen exhaust system is important. In the past few years, high profile restaurants have been subject to fires which have been reported in the press as per some of these following examples:

- http://www.smh.com.au/nsw/porteno-fire-started-in-the-flue-above-the-famed-bbq-pit-investigators-say-20150110-12lj9p.html
- http://www.dailytelegraph.com.au/news/nsw/fire-rips-through-rockpool-bar-grills-kitchen/news-story/335f0e955b4dd8338814757d3a4a014c
- http://www.abc.net.au/news/2016-11-11/wool-shed-pub-at-docklands-on-fire/8018410
- http://www.gourmettraveller.com.au/restaurants/restaurant-news-features/2016/10/melbournes-rosas-kitchen-has-closed/

In certain cases, it has been asked of AOM to fully equip a commercial kitchen with high efficiency grease filtration equipment at the pressure of their insurance companies who were prepared to put a halt to their premiums.

The reasons behind the fires are relatively clear and are tied to a build-up of grease in the exhaust hoods and ducting which is highly flammable and an ignition of the grease either through the cooking equipment (flames, sparks) or by electrical contact points (fan).

## Risks and requirements of filtration equipment

AOM Australia has stated the need to:

1. Ensure that preliminary grease filtration equipment complies to AS1668.2-2012 section E5 Kitchen Exhaust Hoods Incorporating Grease-Removal Filters. *Hoods shall incorporate a device that will impede the process of grease within the airstream in accordance with the following* (a) *Filter media and holding frame shall be constructed of rigid material not deemed combustible when tested in accordance with AS 1530.1* Which is why AOM has tested and certified our honeycomb filters to AS1530.1.

2. For high grease high heat cooking Types (Type 4 and Type 5 cooking based on AS1668.2-2012) equip the exhaust hoods with high efficiency filtration equipment to filter out the majority of grease from the airflow and limit the build-up of grease within the ducting.

On certain projects, non-compliant exhaust points require the need for high efficiency grease and smoke filtration as well as odour mitigation in order to establish an Engineer Solution to AS1668.2-2012. Alternatively, Clients may simply want to achieve a high level of filtration and odour mitigation in order to minimise any potential impacts of kitchen exhaust air discharge. Hotels often have discharge points located vertically but at podium levels, with hotel rooms rising up from the podium.

There are two main products on the market that are being used to achieve high efficiency kitchen exhaust filtration:

- **Electrostatic Precipitators**, such as sold by AOM Australia, coupled with odour mitigation equipment such as ozone injection using ozone generators or in certain cases activated carbon filters. Electrostatic filters achieve high efficiency filtration of grease and smoke, whilst minimising system resistance. Cleaning of the filters is required, though methods are standardised and cleaning and maintenance is relatively simple.

- **Large filters banks** are now being used which often include numerous filtration steps composed of mesh prefilters, bag filters, HEPA filters and activated carbon. These high efficiency filters have mainly being used in filtering supply air. These are high efficiency filters with consequential very high system resistance and, in AOM's opinion, they are not adapted to kitchen exhaust filtration due to the high levels of grease to be filtered. These filters tend to block rapidly and require important maintenance including replacement of filters. The after sales of different replacement parts is high.

**Key question regarding fire risk**

However, in addition to their operational limits, the main question revolving around the used of bag and heap filters in kitchen exhaust filtration is:

**Do these filters meet the requirements of AS1668.2-2012 and in particular AS1668.1-2015 with regards to overall fire risk of the exhaust system?**

AS1668.2-2012 clearly states that: *1.6 System Objective Systems designed in accordance with this Standard ae intended, for a single fire event, to achieve the following (….) (e) Restrict the initiation of fire within ductwork. (f) Restrict the spread of fire and smoke within ductwork.*

So do these filters increase the fire hazard as well as the potential fire intensity of a duct fire by introducing materials, that cause a large build-up of grease, that do not abide by AS1530.1 as a non-combustible material?

**AOM electrostatic precipitator in a duct fire**

AOM Australia EAN Series electrostatic precipitators were recently involved in a duct fire which originated from solid fuel cooking equipment and rose into the ducting, burning the grease that had built up downstream of the filter. The intensity of the fire was such that the electrostatic cells located in the

electrostatic precipitators buckled and partially melted (though they did not combust) thus blocking the fire from moving downstream of the filter into the ducting. The overall unit however maintained its structural integrity and contained the fire within the upstream duct work section.

**The need for cleaning and regular maintenance**

The AOM unit had been regularly maintained as per AOM Australia specifications. The Defra Report *Guidance on the Control of Odour and Noise from Commercial Kitchen Exhaust Systems* (2005) clearly states that *Good maintenance (of kitchen exhaust systems) is required by the food hygiene regulations and will also minimise the risk of fire. Recommendations for maintenance of odour control system include:*

- *System employing fine filtration and carbon filtration.*
    - *Change fine filters every two weeks.*
    - *Change carbon filters every 4 to 6 months.*
- *Use a system employing ESP and other in line abatement.*
    - *Clean every 2-6 months*

This clearly underlines the higher maintenance requirements to filter banks containing bag and HEPA filter systems in commercial kitchen exhaust compared to ESP systems in order to minimise the risk of fire of the overall system.

**Conclusions**

Though standards do not clearly state that materials not deemed to comply with AS1530.1 can't be located in commercial kitchen exhaust ducting (as opposed to the kitchen exhaust hood), the general requirements of AS16682.1-2015 would result in the exclusion of these materials in commercial kitchen exhaust filtration plants.

AOM Australia electrostatic precipitators handled themselves extremely well when confronted with a duct fire. This reinforces our view that the AOM HCFO Series hood, which includes our stainless steel honeycomb filters certified to AS1530.1 and high efficiency electrostatic cells (as found in our EAN Series

in duct electrostatic precipitators) located within the hood structure, is an efficient and cost effective tool in managing fire risks within a commercial kitchen exhaust system. The equipment is designed to stop kitchen fires from moving into ducting exhaust ducting by acting as a flame barrier and ensuring high efficiency grease filtration within the hood structure, thus limiting the build-up of flammable material in ducting.