Are Your Kitchen Hood Filters Compliant?

Do your kitchen hood filters comply with the current Australian Standards for fire safety?

Why Install Kitchen Exhaust Hood Filters?

The purpose of a kitchen exhaust hood filter is:

- Particle filtration - To reduce the amount of grease and oil in the exhaust duct
- Fire safety – To prevent flames from entering the duct

The most commonly offered metal grease filters within the Australian market are:

- aluminium honeycomb filters
- stainless steel honeycomb filters
- stainless steel baffle filters

Fire Safety for Commercial Kitchens

Fire statistics from Australia, the UK and the US show that restaurant fires typically start in the kitchen area and a significant number of these fires enter the kitchen exhaust system. “A fire that originates within the kitchen or at the hood filters can spread into and up the ductwork system, fuelled by the oil and grease within the duct.”[i]

“Grease filters will capture a percentage of oil and grease, depending on their performance efficiency, installation quality and cleanliness management. No filter will capture 100% of the grease and any grease that passes through or around the filters will build-up on the internal hood, duct and fan surfaces.”[ii]

It is generally accepted that grease filters can reduce the amount of grease that enters the exhaust duct, reduce the average “fuel load” in the duct and extend the length of time required between duct cleaning.

Current Australian Standards for Grease Filters in Kitchen Exhaust Hoods

The Building Code of Australia (BCA), is the backbone of legislation that determines the law regulating several aspects of kitchen exhaust design, AS/NZS 1668.1 and 1668.2 are cited in the BCA – so must be complied with by law.
Within Australia, grease filters are typically manufactured to meet the following current Australian Standards:

- **AS/NZS1668.2-2012**: The use of air conditioning and ventilation in buildings - Mechanical ventilation (local exhaust ventilation of kitchens)
- **AS1530.1**: Methods for fire test on building materials, components and structures - Combustibility test for materials
- **AS/NZS1668.1-2015**: The use of ventilation and air conditioning in buildings - Fire and smoke control in buildings (kitchen exhaust hood systems)

**AS/NZS1668.2:2012**

The most commonly referenced standard is AS/NZS1668.2:2012 that requires that grease filters or grease removal devices are incorporated into kitchen exhaust hoods to “impede the process of grease within the airstream in accordance with the following:

- Filter media and holding frame shall be constructed of rigid material not deemed combustible when tested in accordance with AS 1530.1.
- The filters shall be removable by hand, without the need of tools, for the purpose of their cleaning and the cleaning of the supports and grease drainage devices, unless an in situ washing system is provided.”

Installation positioning parameters are also outlined and minimum distance guidelines between the grease removal filter / device and cooking surface are specified based on the type of heat source.

These standards have been designed to help lower the likelihood that a cooking flare-up will cause ignition within the exhaust hood.

**AS1530.1**

AS1530.1 outlines methods for testing material combustibility; and in regard to grease filters, tests whether or not the filter material is deemed combustible or non-combustible based on certain criteria.

> “These test results relate only to the behaviour of the test specimens of the material under the particular conditions of the test and they are not intended to be the sole criterion for assessing the potential fire hazard of the material in use.”

This test assesses the combustibility of filter material (typically aluminium or stainless steel) in a brand new / unused state - not in a used state that replicates real world kitchen applications (loaded with grease in a manner representative of cooking that produces grease-rich exhaust) - as per international standards, such as UL 1046.

**AS/NZS 1668.1:2015**

AS/NZS 1668.1:2015 is an important standard that also applies and specifies the following clause:

> “6.2.9 Flame and spark arrestance

Where the length of an exhaust duct within the building exceeds 10 m and where an exposed flame or embers may be present as part of the cooking process, devices that prevent the spread of flames in accordance with UL1046 shall be incorporated into kitchen exhaust hoods (or filtration systems).

Appliances (such as wood-fired ovens and similar appliances) that can produce sparks shall additionally incorporate a spark arrestor at the connection of the appliance to the duct.”
solid fuels, and determines that hood filters shall comply with the flame and spark arrestance criteria of UL1046, (detailed later in this article).

If your kitchen hood canopy filters are not marked with a statement of UL 1046 compliance, then they may not be certified to the UL 1046 standard.

It should be noted that some kitchen hood filters marketed within Australia are “accredited by the UL (Underwriters Laboratories) as flame-resistant”. This accreditation refers to the UL 900: Standard for Air Filter Units (detailed later in this article), and is not equivalent to UL 1046.

International Standards for Grease Filters

A number of international standards and codes regulate hood grease filters overseas. These include:

- UL 1046: Standard for Grease Filters for Exhaust Ducts

UL 1046

Within the UL 1046 Standard, grease filters are “investigated to determine their abilities to:

a) Limit the projection of flames downstream when subjected to flames on the upstream face, after having been loaded with grease in a manner representative of cooking that produces a grease-rich exhaust,

b) Drain any collected grease in such a manner that it does not fall back onto the cooking surface.”[vi]

NFPA 96

Created by the National Fire Protection Association (USA), the NFPA 96 details the codes and standards that fire marshals follow and commercial cooking operations are required to adhere to.

Only removable grease filters, baffle filters or grease removal devices that are listed “in accordance with UL 1046”[vii] are permitted.

NSF/ANSI 2-2014

Within the NSF/ANSI 2-2014 standard:

“ 5.52.1 Exposed filters used in hoods shall be:

- readily removable; and
- installed to prevent dripping onto food; and
- self-draining; and
- designed and manufactured to be pressure cleaned”[viii]
Within overseas markets (such as USA and Europe), a number of baffle style grease filters seem to meet these stringent international standards and codes for fire safety and grease drainage. It should be noted that Honeycomb style grease filters do not meet this criteria and are not sold in these markets.

**UL 900 Vs UL 1046: Don’t assume “accredited by the UL as flame-resistant” refers to UL 1046**

Clause 8.2.2.6 – Fire and flame resistant standards within UL 900: Standard for Air Filters outlines classifications for air filters, when subjected to a flame exposure test “when clean”.

1. “Class 1 Air Filters – Those that, when clean, do not contribute fuel when attacked by flame and emit only negligible amounts of smoke.
2. Class 2 Air Filters – Those that, when clean, burn moderately when attacked by flame or emit moderate amounts of smoke or both.”[ix]

This test assesses the flame resistance of filter material when subjected to a UL Spot Flame Test in a brand new / unused state – not in a used state that replicates real world kitchen applications (loaded with grease in a manner representative of cooking that produces grease-rich exhaust) – as per international standards, such as UL 1046.

**Grease Hood Filters: How do They Work?**

**Honeycomb Style Kitchen Hood Filters**

Honeycomb style filters are typically manufactured from aluminium or stainless steel. Honeycomb filter media utilise a foil strip, which is incorporated into a series of double compound curves, which form a non-nesting system of smooth-walled honeycombs. The filter’s honeycomb construction divides air as it is drawn through the filters, splitting the air into separate airstreams, causing the grease-laden air coming from the cooktop to change directions. The momentum of the grease causes it to condense and stick to the aluminium or stainless steel filter media.

Regular cleaning of the honeycomb filter media and frame is recommended to:

- prevent dangerous amounts of combustible material (condensed grease) from building up in the filter media and spreading flames should fire break out on the cooking surface
- reduce the risk of collected grease dropping from the filter media onto the cooking surface
• ensure the build-up of condensed grease on the filter media does not impede on the exhaust airflow or filter function over time

**Baffle Style Kitchen Hood Filters**

Baffle style filters are typically manufactured from stainless steel. They function by forcing grease-laden air to quickly and repeatedly change direction as it rises through the filter. Because the grease droplets cannot change direction as rapidly as the air carrying them, they end up condensing to the metal blades and then subsequently draining into the filter tray.

This method drastically reduces the risk of spreading flames should a fire break out on the cooking surface below (as dangerous amounts of combustible material are unable to build up on the filter face). Additionally, because grease is filtered into a tray and not retained in the filter face, there is no build-up to risk grease dropping back from the baffle filter onto the cooking surface below or to hinder exhaust airflow and function over time.

Regular cleaning of the filter and filter tray is recommended to empty the drained grease and ensure ongoing filter performance. Stainless steel construction means they are often easier to clean in-house (dishwasher safe).

**Captrate® Solo: High Efficiency, Single Stage Baffle Style Kitchen Hood Filters**

The Captrate® Solo is a single stage filter featuring a unique S-baffle design in conjunction with a slotted rear baffle design.

This unique design creates a superior, highly efficient single stage baffle filter that is able to remove a high percentage of the total grease particulate emissions produced during commercial kitchen cooking operations.

With 3 times the grease capture efficiency of standard baffle filters the Captrate® Solo can significantly reduce duct contamination and cleaning frequency and help to extend the life of downstream particle and odour control filtration.
Captrate® Solo filters are constructed to meet UL 1046, NSF-2 and NFPA 96 standards and codes, which cover a range of commercial kitchen exhaust duct, ventilation control and fire protection criteria. The stringent criteria of these international standards and codes confirm their abilities to:

- remove atomized grease from the airstream
- limit the projection of flames downstream when subjected to flame on the upstream face, after having been loaded with grease in a manner representative of grease-rich exhaust
- be self-draining - able to drain and remove the oil / grease load from the filter surface in such a manner that it does not fall back onto the cooking surface and also reduces the risk of fire
- have the structural integrity for routine commercial use, handling, cleaning and maintenance

Captrate® Solo filters are constructed from 430 SS; a robust, lightweight material creating a single unit assembly that does not require any components to be separated for cleaning or maintenance. These filters will help you achieve AS 1668.2 compliance, as they are easy to remove from kitchen exhaust canopies. In-house cleaning is achieved simply by soaking these filters in a commercial degreaser overnight and / or washing in a standard dishwasher cycle.

**References**


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