



A Beginners Guide to

PROJECT MECHANICAL SERVICES HOOD DESIGNS

*for Commercial Kitchen Ventilation
Systems in New Zealand*



CONTENTS

Table Of Contents

Commercial Kitchen Ventilation.....	4
Poor Hood Design.....	5
Mesh Honeycomb vs. Baffle Filters.....	6
Delta Hoods.....	7
LoFlo Hoods.....	9
Save Energy.....	11
Induction Technology.....	12
Peripheral Filter Bank Designs.....	13
Advantages of LoFlo.....	14
What is UV.C?.....	17
Hood Design Considerations.....	18

COMMERCIAL KITCHEN VENTILATION

Why is it important?

Kitchen ventilation is the branch of ventilation that focuses in the treatment of air from the cooking process. The primary function of a kitchen hood is to protect the area surrounding the cooking equipment from grease, steam and smoke, which amongst other things can contain carcinogens.

The minimum requirements to conform to the NZ building code, AS1668, food safety regulations and health and safety regulations are;

- An air flow shall be created across the cooking process to capture fumes created, and the by-products of vapour shall be collected and contained.
- Supply air is required for gas appliances to ensure complete combustion of the fuel and is also recommended for all cooking processes to ensure the enclosed workspace is ventilated by a sufficient quantity of fresh air.
- A recognised method of air flow calculation must be used to ensure the removal of odours, grease fumes and the products of combustion created in the cooking process (AS1668 or equivalent).
- Solid fuel appliances must have their own dedicated extraction system.

POOR HOOD DESIGN

What problems can it cause?

- When a hood is designed incorrectly it can have huge implications on the kitchen, including;
- Smoke, grease, odour escaping back into the kitchen/restaurant
- An uncomfortable working environment for the chefs
- Incomplete combustion of gas leading to carbon monoxide poisoning
- Significant fire risk throughout the building
- High energy usage
- Very difficult to clean the hood and filters, leading to poor hygiene levels
- Poor lighting on the working surface
- High noise levels

What makes a bad hood design?

- Poor fabrication (H&S)
- Incorrect Overhangs (Poor capture)



MESH (HONEYCOMB) VS. BAFFLE FILTERS

Mesh filters (Honeycomb/Impingement) have no barrier to flame and are less efficient than baffle type grease filters. Under the British and American specifications (UK DW172 standard and American NFPA96 standard) they shall not be used as a primary grease filter. Baffle type grease filters use the principles of centrifugal force to remove a wide range of grease particulate sizes.

It is also worth noting that mesh filters are by their very design, impingement filters. It is widely accepted now that Mesh filters propose a much higher fire risk in commercial cooking operations.

When 'clean', mesh type filters often have a much lower resistance however, once the filters start to clog this increases and the efficiency decreases. Baffle type filters have a higher resistance, however this is a constant pressure drop, as they do not clog and they drain the grease into a manageable containment system, also reducing the fire risk significantly. The stainless-steel baffle filters offer a more aesthetically pleasing look, are easier to clean and are more durable than mesh filters.



Guide to Project Mechanical Services Hood Selection:

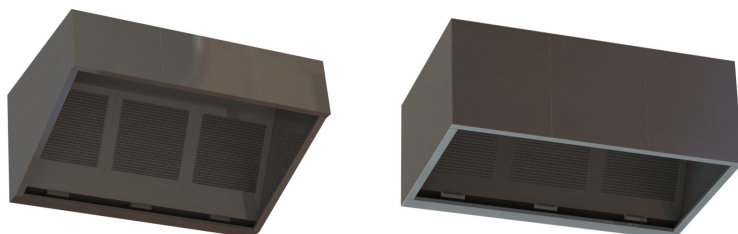
The Delta range of modular extraction hoods have been created to provide an economical solution for commercial kitchen ventilation. Designed and manufactured using the latest 3D CAD/CAM technology, Delta hoods offer exceptional build quality and guaranteed low lead times at an incredible price. The Delta range of extraction hoods are perfect for small cafes, fast food outlets and restaurants. The box shape of this range allows for installation of salamanders under the hood.



Delta 1100 wide A & B type Hoods

Features:

- Quick turnaround time from order.
- Economical solution.
- Meets minimum requirements of the NZ building code & AS1668.
- 'A type' hoods suitable for low ceiling heights.
- 'B type' hoods available for all other applications and ideal where salamanders are used.
- LED Lights available on request.
- Baffle type filters available on request.
- Make Up Air available on request.
- Manufactured from T304 food grade stainless steel.



DELTA GUIDE

Delta 1500 wide A & B type Hoods

Features:

- Quick turnaround time from order & Economical solution.
- Meets minimum requirements of the NZ building code & AS1668.2012
- Manufactured from T304 food grade stainless steel.
- LED Lights available on request.
- Baffle type filters available on request.
- Make Up Air available on request.
- Ideal for covering combi ovens and equipment that produces a lot of steam and smoke such as solid fuel appliances.
- Powder coating available





kitchen ventilation system

**LOW VELOCITY
ENERGY SAVING DESIGN
REDUCED FIRE RISK
SUPERIOR PERFORMANCE**

European design. Proudly manufactured in New Zealand.

LO FLO HOODS

Lo Flo hoods offer 'best practice' and is the optimum solution for all commercial kitchens. Based on an internationally recognised standard DW172:2018, it offers state of the art hood design with **energy saving** co-efficient based extract calculations.

Benefits:

- Designed to DW172 meaning energy saving with lower extract volumes & bigger overhangs
- Return air means improved operator comfort & spot cooling technology
- Reduced maintenance required for ductwork - less grease
- Reduced Fire Risk
- Baffle filters
- LED light fittings delivering 500 lux as standard
- Manufactured in New Zealand with very low lead times
- Great aesthetic design
- UV filtration available to remove odour & grease from ductwork
- Reduces required install time on site
- Quotations and drawings all prepared in New Zealand
- Full range of extract only, return air, peripheral extract and reduced height hood options available.



LO FLO

kitchen ventilation system

SAVE ENERGY

Typical Example of Energy Saving



3,506 l/sec extract
2,805 l/sec supply



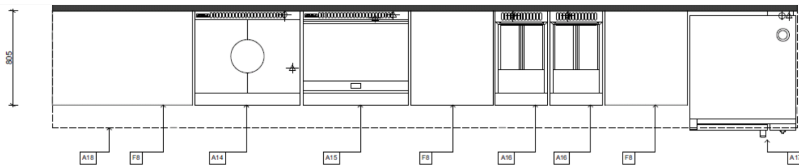
1,770 l/sec extract
1,510 l/sec supply



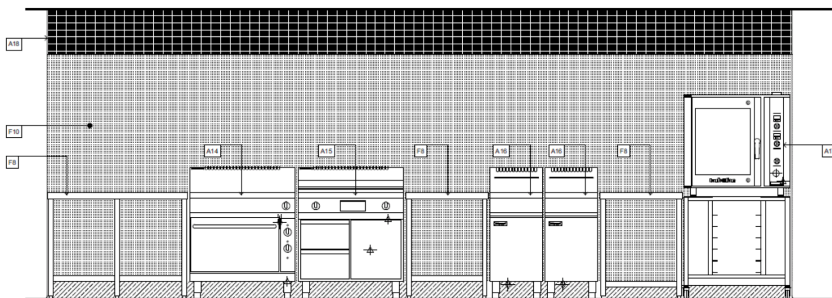
= 50% LESS AIR...

LO FLO Estimated Yearly Running Cost Saving
\$2,184.00 per year based on the above figures.

In this example, the cost difference between AS1668
and Lo Flo is paid back in **2 years**.

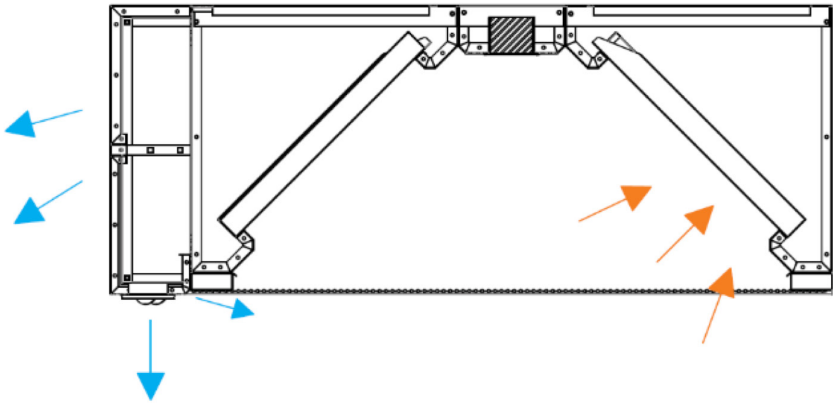


Cooking Line Elevation



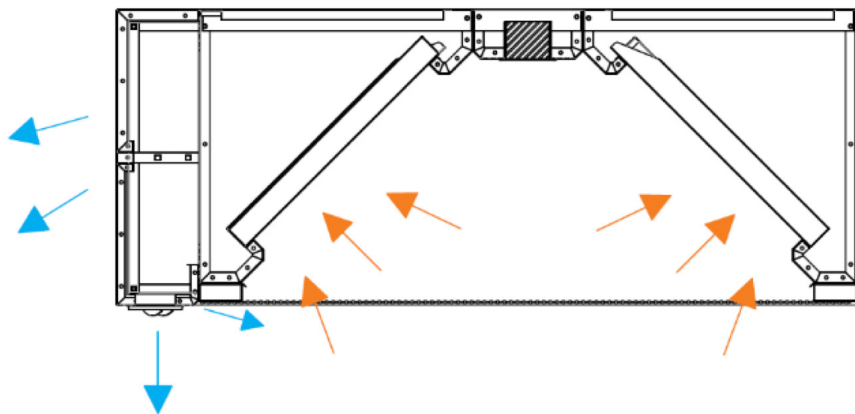
Cooking Line Elevation

INDUCTION TECHNOLOGY



Lo Flo uses induction technology on the inside of their hoods to assist in capturing and containing effluent produced by the cooking process. This acts like an 'air curtain' in helping to contain smoke and also cools and enlarges the grease particles making the baffle filters more efficient. Our Lo Flo hoods also incorporate spot cooling technology to provide cooling to the chefs below.

PERIPHERAL FILTER BANK DESIGN



Peripheral Filter Hoods are the only design where we can ensure full capture for cook lines generating thick acrid smoke such as char grills, solid fuel and woks.

These hoods operate in a different way. Our high -efficiency stainless steel grease filters are positioned at the periphery of the canopy, where they can extract and filter the fumes from the cooking process before they manage to escape. This eliminates the need for high extract volumes or complex induction jet systems.

ADVANTAGES OF LOFLO

Advantages of LoFlo over other locally manufactured hoods:

Below is a description of some of the features, benefits and ultimately value that our Lo Flo range of hoods brings to our customers.

Energy Saving With Lower Extract Volumes:

Benefit: Our extract calculations are derived from DW172:2018 Method 1 (Thermal Convection Method) and the thermal coefficient for each item of equipment is specified by DW172:2018. These often result in lower extract volumes required over the prescriptive and engineered procedures set out in AS1668.2002 by up to 50%. This complies directly with NZBC H1 Energy efficiency and more specifically: H1.3.6 HVAC systems must be located, constructed.... The supply air volume requirements also reduce.

VALUE: More comfortable working environment, with less air movement and cross drafts. Clients can save money on conditioned air and running cost of the mechanical systems.

Highly Efficient Baffle Grease Filtration:

Benefit: Most hoods in New Zealand come equipped with honeycomb filters (also known as impingement filters). These are unhygienic and increase the risk of a fire in the kitchen significantly. Lo Flo filters are stainless steel baffle type grease filters that drain away the grease into a management system in the hood, reducing the risk of fire and reducing the amount of times ductwork needs cleaning.

VALUE: Reduces cost of filter maintenance as can be done by staff using the Dishwash machine and will last a lot longer than honeycomb. Improves the aesthetics of the kitchen, looks cleaner.

Extensive Range Of Hood Sizes/Types Available:

Benefit: Lo Flo variations, including 'low-velocity' and energy saving options means we have a solution for every type of kitchen requirement.

VALUE: Our range of alternative engineered solutions are more flexible than traditional hoods meaning we can provide better solutions to any project.

Health & Safety Has Been Heavily Considered In The Design:

Benefit: Component sizing has been carefully considered to minimise risk to operatives when lifting, handling & installing the hoods during manufacture and on site. All folds in the filter housing have a safety edge and there are no 90-degree sharp edges.

VALUE: Easy and safe to clean.

Spot cooling for Improved Operator Comfort:

Benefit: Radiant heat cannot be removed from the cooking process therefore all make up air hoods are fully equipped with adjustable spot coolers for operator comfort. This directional air is delivered via smart cooling terminals in the lower front edge of the hood.

VALUE: A nicer working environment means happier staff

Easy To Install:

Benefit: Reinforced fixing points have been strategically positioned to minimise site installation times. The modular construction means easier manual handling and can be brought into site in sections.

VALUE: Cheaper and quicker to install.

Great aesthetic design:

Benefit: The design of Lo Flo hoods was driven by the requirements and opinions of our customers who were consulted at every stage of the design process. The hoods have been designed so there are no visible fixings. Only the finest materials, with consistent finish are used in the manufacture process. These are selected & utilised to reflect our concerns for the environment.

Powder coating available for fully customisable hoods.

VALUE: Commercial kitchen are becoming focal points of the restaurant and it is essential that the equipment is visually pleasing. This is key for kitchen designers and owner/operators alike. A clean hood reflects better on the restaurant than a hood full of grease.

Lo Flo Peripheral extraction for solid fuel:

Benefit: Peripheral extraction is a design that puts filters at the front and back of the hood allow for exceptional smoke removal capabilities. This allows efficient

ADVANTAGES OF LOFLO



capture for appliances that produce acrid smoke, and is especially good for solid fuel appliances, woks and chargrills.

VALUE: This design is the most efficient method of capture and containment of fumes ensuring the kitchen and restaurant doesn't fill with smoke.

Lo Flo hoods can incorporate UV filtration:

Benefit: Ultra violet filtration systems remove grease and odours from the airstream reducing the fire risk and reduce maintenance costs.

VALUE: Allows customers to meet stringent council requirements and prevents unsightly grease build ups.

Return Air:

Benefit: Bringing air back into the kitchen mechanically, reduces the amount of conditioned air removed from the restaurant/kitchen saving money. Return air ensures there is sufficient ventilation for clean combustion of gas equipment meeting NZ gas regulations. Bringing the air back in ensures the kitchen is under the right amount of negative pressure. Extract only hoods can create problems with skimming food through servery passes and issues with door pressure.

VALUE: Return air creates a comfortable working environment and is the safest and best practise.

WHAT IS UV-C?

What is UV-C and how does it help with odour management & grease removal?

The use of fats and oils in commercial kitchens leads to foul odours and a buildup of grease in commercial kitchen ductwork increasing the fire risk. Most hood filters will be around 40-70% efficient meaning that there is always grease carryover into the extraction duct work.

One method to reduce the grease and remove the odour is by installing UV-C lamps inside the hood plenum or extract ductwork. The UV-C lamps work by oxidising cooking odours and breaking the molecules of the odour – This is an extremely efficient combination known as Ozonolysis and Photolysis.

There Are Some Key Considerations:

- The ozone generated requires at least 2 seconds dwell time to decay naturally, which can mean a large duct run is required to prevent pumping ozone out to atmosphere. (If this isn't possible then carbon filters/ozone zappers should be considered).
- H&S in design is extremely important as UV light exposure can cause severe burns.
- Most lamps will last Approx 8000 hours - It is expensive so CAPEX and OPEX needs to be considered.
- UV-C lamps do not remove smoke - High resistant baffle type filters should be used to remove as much grease as possible.
- UV-C lamps don't work well above 60°C.

HOOD DESIGN CONSIDERATIONS



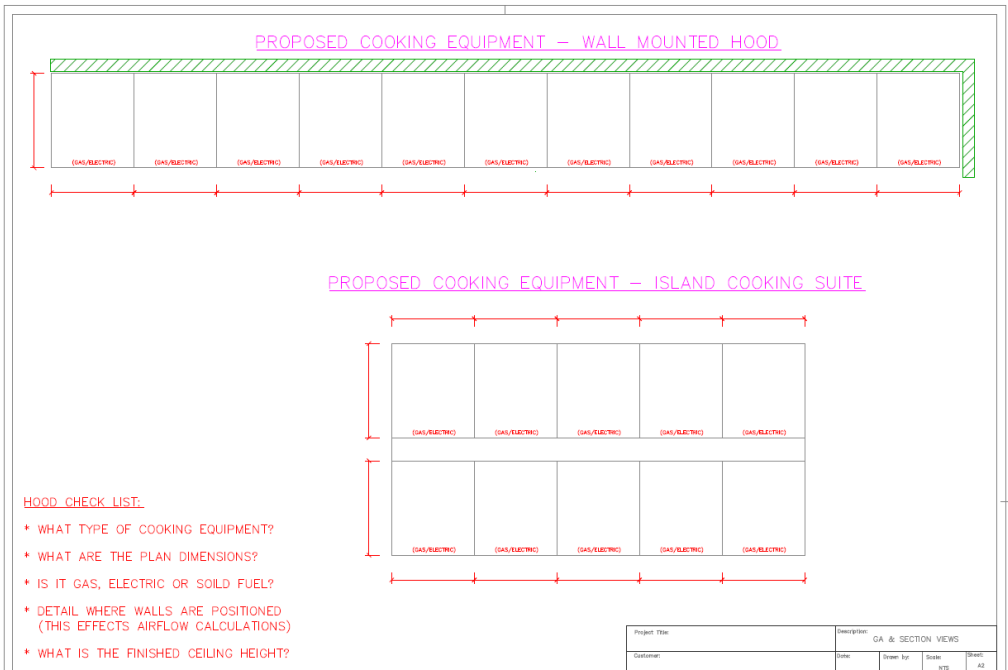
The 5 basic design considerations for hood design in NZ you must know:

There are many aspects of commercial hood design that rely on years of experience to deliver the right solution, however there are several basic principles that you must know when designing a hood in NZ:

- A hood should be mounted between 2000mm and 2100mm above floor level. This is so the user doesn't bang their head and ensures the hood isn't too high that smoke escapes.
- NZ Building Code states that solid fuel appliances must have their own duct work; this is to reduce the fire risk.
- Return air is required if there are gas appliances, and it is best practice to bring this in mechanically (fan forced).
- There must be a minimum of 150mm overhang (to the inside edge of the hood gutter) if the hood is designed to the NZ building code (AS1668).
- There must be a minimum of 250mm overhang if the hood is designed to an alternative standard i.e. VDI 2052 or DW172.

In designing a system, we need to know certain criteria to be able to size a hood correctly and calculate the required extract volumes:

- Kitchen layout.
- Equipment schedule & type (gas, electric or solid fuel).
- Equipment sizes.
- Any building features that may affect hood performance (Large servery area, near an open door, cross drafts, half the restaurant opens up to the outside, anything out of the norm etc).





www.projectmech.co.nz