YAMURA
MAKE KITCHEN DIFFERENT

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Halton
FOODSERVICE

CAPTURE JET HOODS FUNDAMENTALS

Monday, 04 September 2017

What's the Capture Jet 3 technology ?

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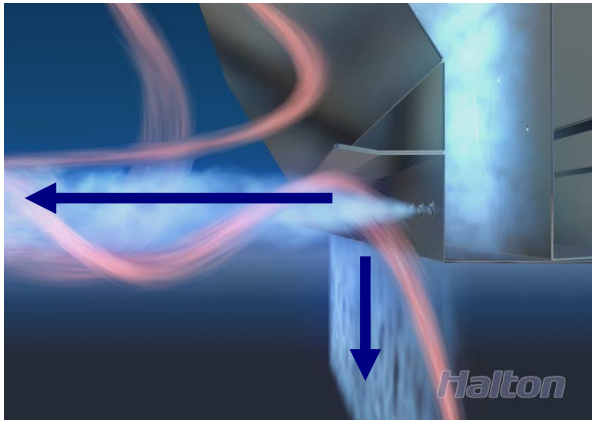
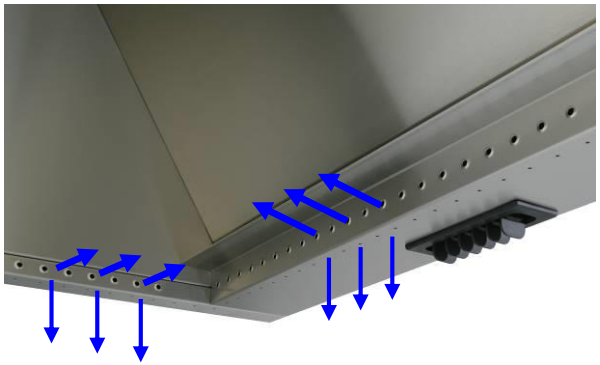
What's the Capture Jet 3 technology ?





The Capture Jet technology consists of two sets of nozzles. One set of shaped nozzles, one set of vertical nozzles.

> The horizontal nozzles increase the driving speed at the front of the hood and push vapours back toward the extraction plenum.

> The vertical nozzles increase the containment volume and prevent vapours escaping from the containment volume.

Both front and sides of hoods are equipped of this dual capture jets constituting an outer boundary

Capture Jet hoods are up to 40% more efficient compared to traditional hoods

Capture Jet hoods fundamentals

What's the Capture Jet 3 technology ?

- The Capture Jet Technology **reduce exhaust airflow rates and energy consumption by 35 to 45%** compared to traditional systems … without any compromise on capture & containment efficiency
- Therefore, the Capture Jet technology assures **reduced installation costs** and allow to **recover rental or usefull surface** by reducing the surface of technical rooms and ductwork
- The Capture Jet technology **assures the best IAQ* and lead to the IEQ**** through the reduction of the drafts and noise level inside the kitchen (thanks to exhaust airflow reduction)
- The Capture Jet technology contributes directly to the **efficiency of OAQ*** solutions and safety technologies** (UV system or ecology units)

*Indoor Air Quality ** Indoor Environment Quality *** Outdoor Air Quality

What's the Capture Jet 3 technology ?

Among all …

The Capture Jet technology lead to a profitable , healthy and safety business.

Capture Jet 3 hoods solutions in a few minutes

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CAPTURE JET HOODS FUNDAMENTALS

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Capture Jet 3 fundamentals and exhaust design

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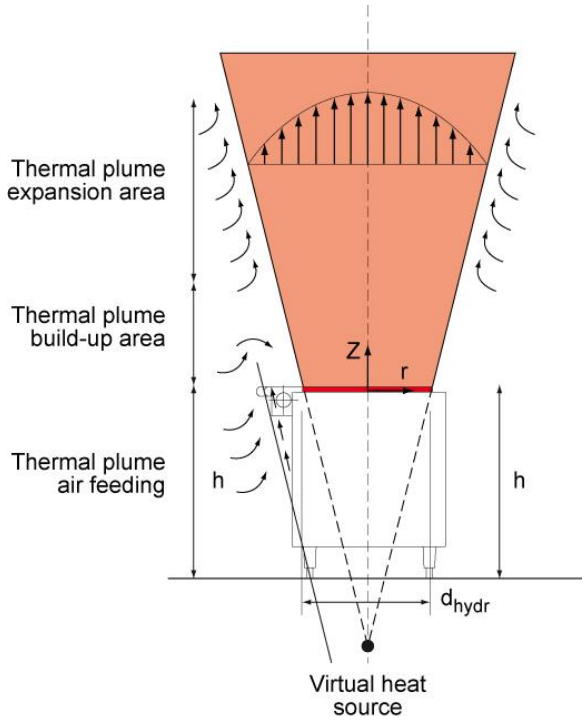
Exhaust design fundamentals

THERMAL PLUME is the first fundamental



A free convection flow forms above each kitchen appliance due to differences in temperature or density between :

> The air which warm up in contact of cooking appliances

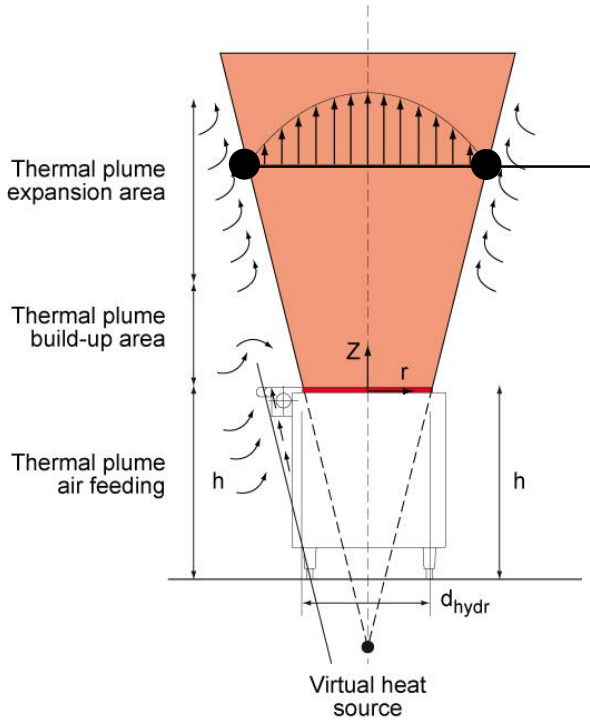
> The ambient air.

The flow pattern forms a plume which concentrate all thermal and weight transfers. The plume is fed with the ambient air from the ground.

The **thermal plume** can be regarded as a free stream above the cooking point which induces air from the environment. Particles near this stream are carried among it.

Exhaust design fundamentals

THERMAL PLUME is the first fundamental



THERMAL PLUME = NEED

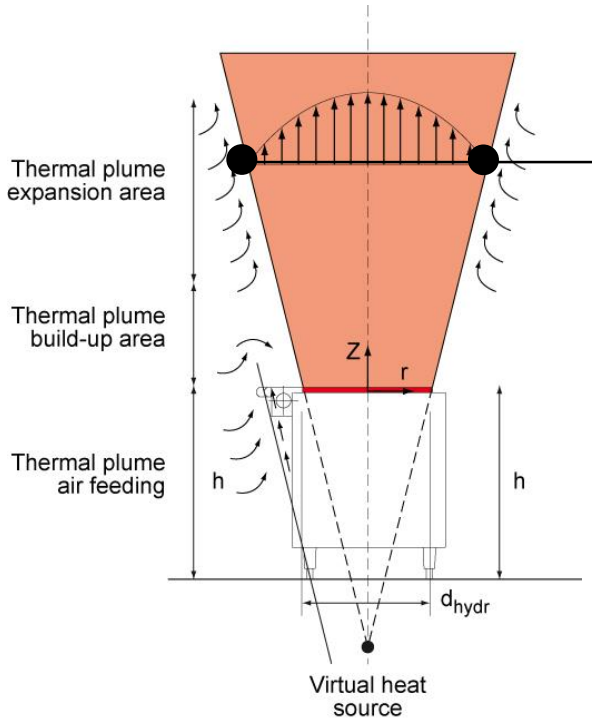
> The higher the free distance between cooking appliances and a hood, the bigger the thermal plume

> Exhaust airflow can't be lower than thermal plume

> Goal is to exhaust steam and particles with an airflow as near as possible from the thermal plume

Exhaust design fundamentals

THERMAL PLUME is the first fundamental

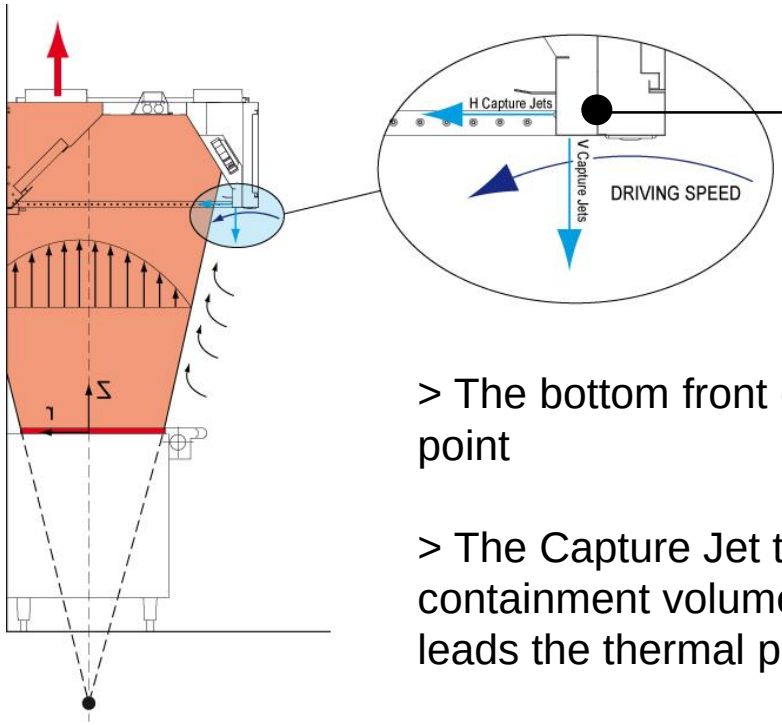


THERMAL PLUME = NEED

- The exhaust airflow can't be lower than the thermal plume whatever the kind of the hood
- Thanks the lowest working airflow of all markets, the Capture Jet technology exhaust airflows are the closest from the thermal plume

Exhaust design fundamentals

THERMAL PLUME is the first fundamental



WEAK POINT OF HOODS

> The bottom front of each hood constitutes its the weak point

> The Capture Jet technology allows to increase the containment volume and to generate a driving speed which leads the thermal plume inside the containment volume

Exhaust design fundamentals

THERMAL PLUME is the first fundamental

VITAL CONDITIONS FOR A GOOD CAPTURE AND CONTAINMENT

> CONTROL OF THE DRIVING SPEED at the front of the hood to lead thermal plume inside the containment volume

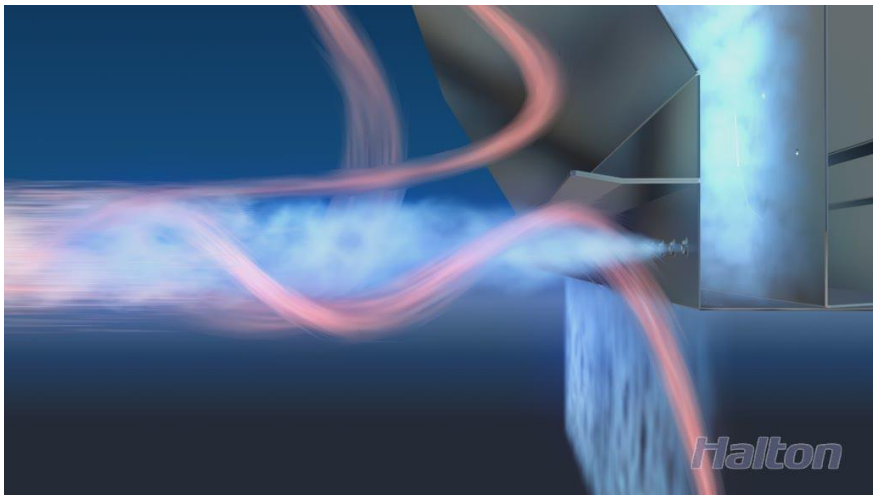
> CONTAINMENT CAPACITY of the hood to store the pollutants peaks while it is exhausted

> NET EXHAUST AIRFLOW at the enter of the containment volume

> NO DRAFTS inside the containment volume of the hood

Capture Jet 3 fundamentals

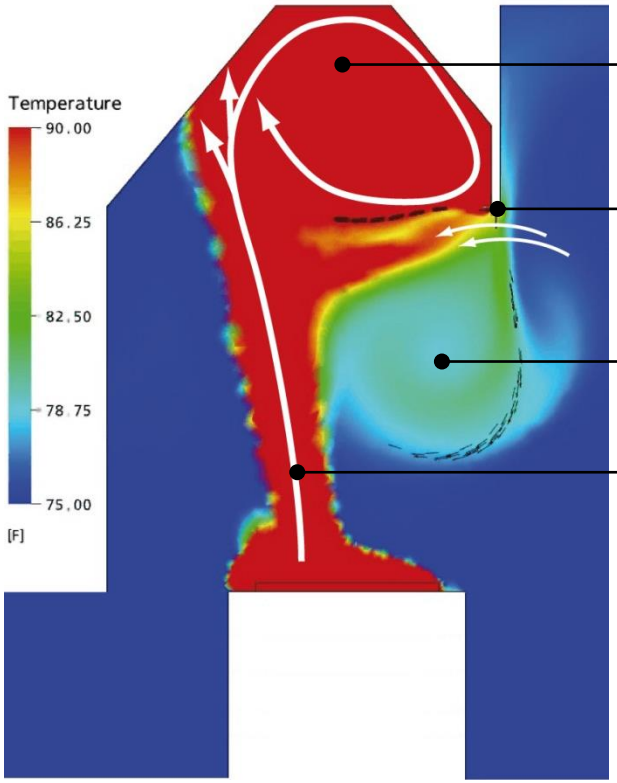
What is the Capture Jet 3 technology



CAPTURE JET 3 TECHNOLOGY MATCHES ALL THOSE CONDITIONS

Capture Jet 3 fundamentals

What is the Capture Jet 3 technology



Containment capacity is increased by the recirculation effect coming from the association of capture jets and hood design

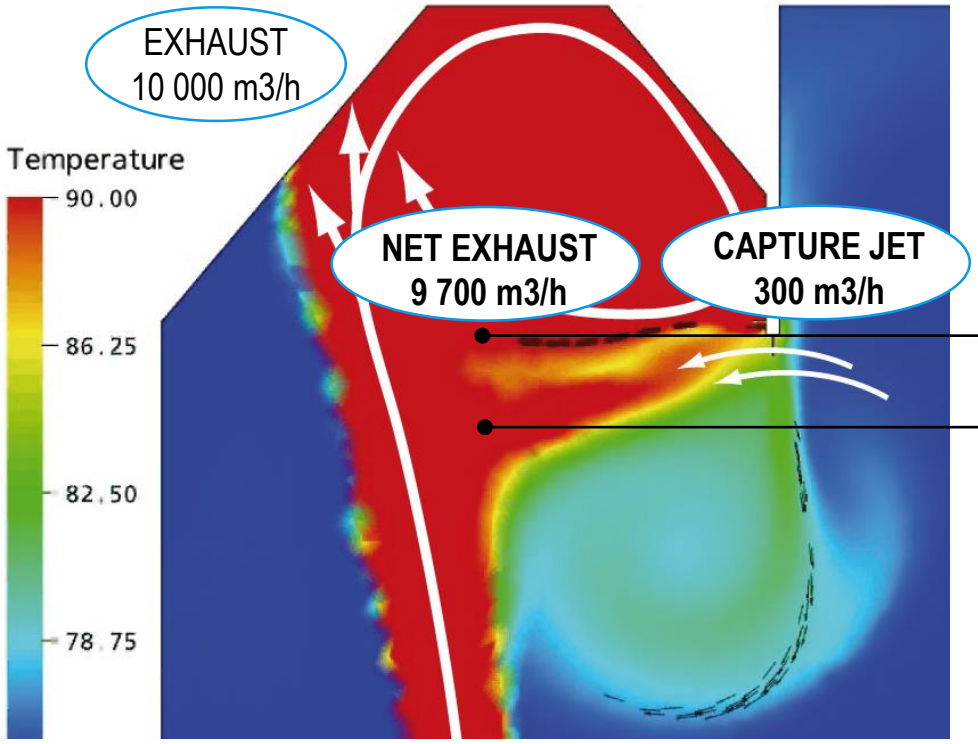
Driving speed is increased by the induction effect of the horizontal nozzles

Containment capacity is increased by the vertical nozzles

THERMAL PLUME = NEED

Capture Jet 3 fundamentals

What is the Capture Jet 3 technology



NET EXHAUST

The Capture Jets need an insignificant running airflow and pressure !!

> 30 m^3/h/ml @ 60 Pa for the front

> 20 m^3/h/ml @ 60 Pa for the sides

Example : 300 m3/h for a hood 5000x1300 mm

THERMAL PLUME = NEED
9700 m^3/h

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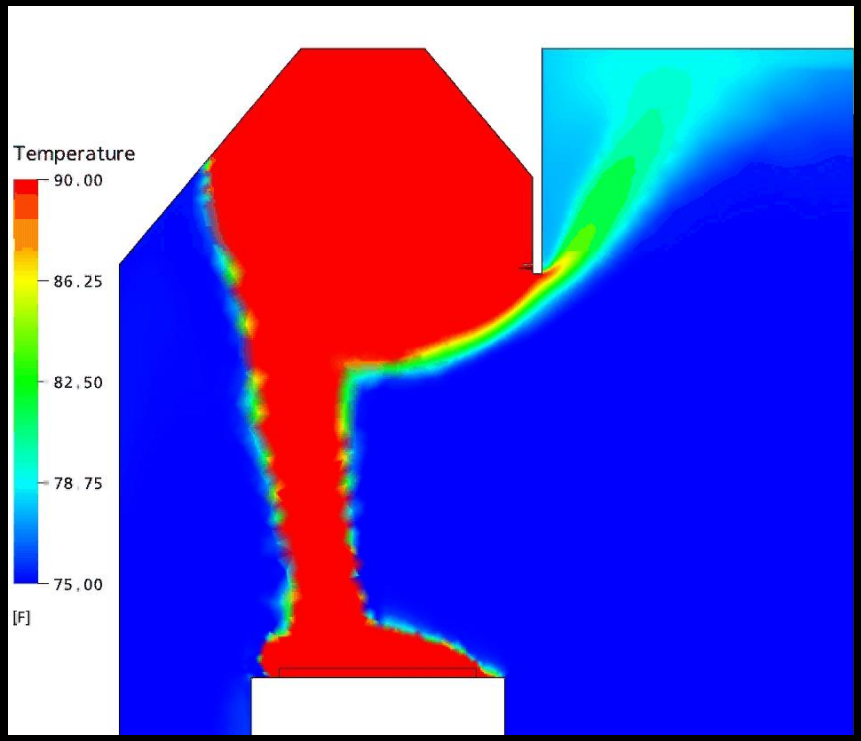
Capture Jet 3 fundamentals

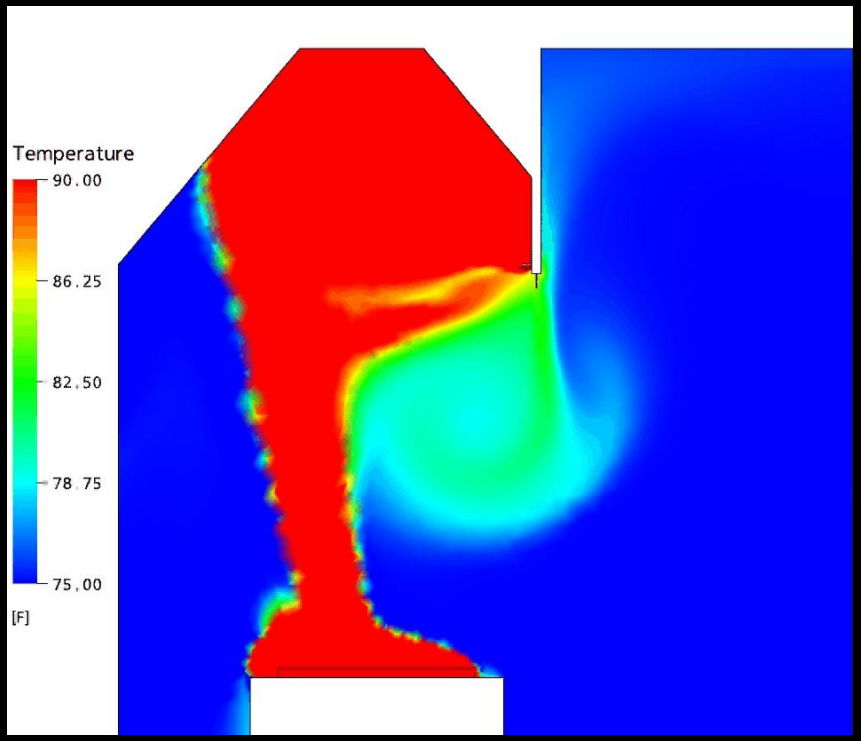
Original Capture Jet technology

Exhaust airflow insufficient for capture and containment



Capture Jet 3 technology

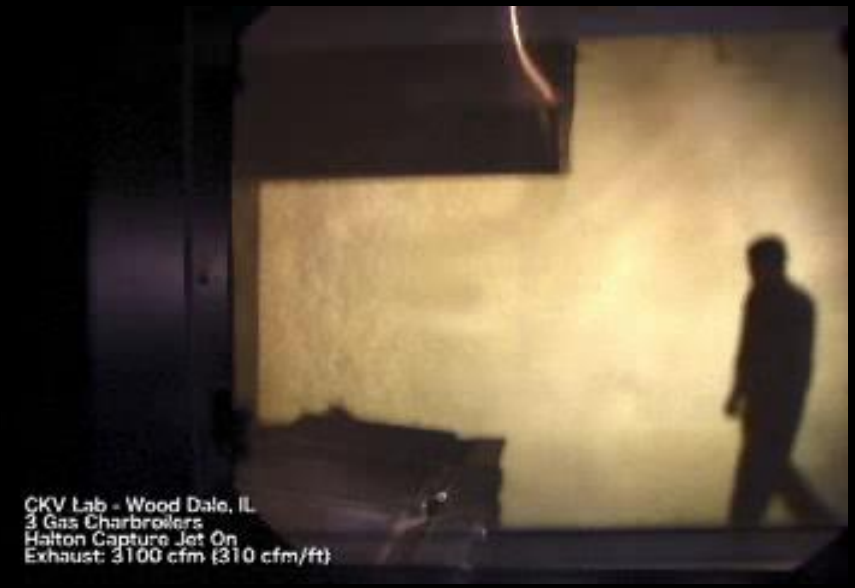
Same exhaust airflow



Capture Jet 3 fundamentals

WITHOUT Capture Jet technology
Schlieren video

WITH Capture Jet 3 technology
Schlieren video



Capture Jet 3 fundamentals

Supply or so called make-up air is integral part of the final result

The draft generated by the man's walk is enough to spread the thermal plume. **Imagine what would be the effect of diffusers** wrongly designed or bad balanced between the cooking area and the rest of the kitchen.

CAPTURE JET HOODS FUNDAMENTALS

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Capture Jet 3 benefits

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Capture Jet 3 technology benefits

Energy savings and environment friendly technology

> Exhaust airflow rates reduced by up to 40% thus reducing the energy consumption of the kitchen and running costs

* Lower exhaust and supply fans consumption
* Lower supply fan consumption
* Lower heating and/or cooling needs

> Lower greenhouse gases emission

Capture Jet 3 technology benefits

Savings on installation costs

> Exhaust airflow rates reduced by up to 40% thus reducing the installation costs

* Smaller ductwork
* Smaller exhaust and supply AHU

> The reduction of the shaft surface increase the rental surface

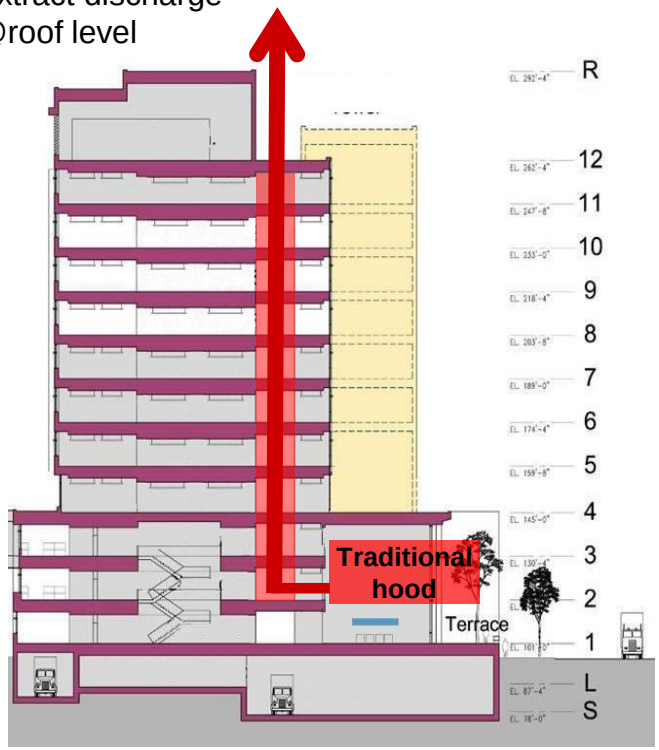
> No additional ductwork for the Capture Jet technology

* Capture Jets are self sufficient thanks to Capture Jet fan
* Total connection flexibility

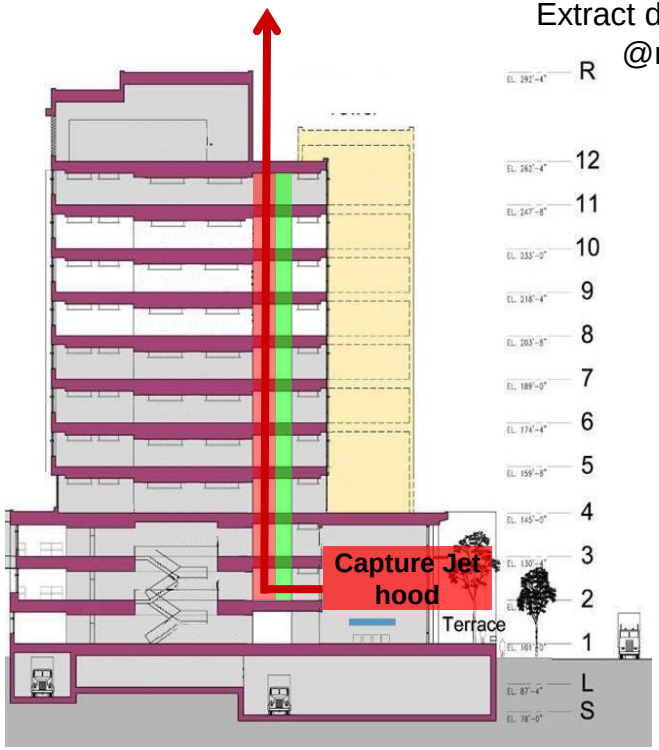
Capture Jet 3 technology benefits

The reduction of the shaft surface increase the rental surface

Conventional Kitchen
Extract discharge
@roof level



Capture Jet Kitchen
Extract discharge
@roof level



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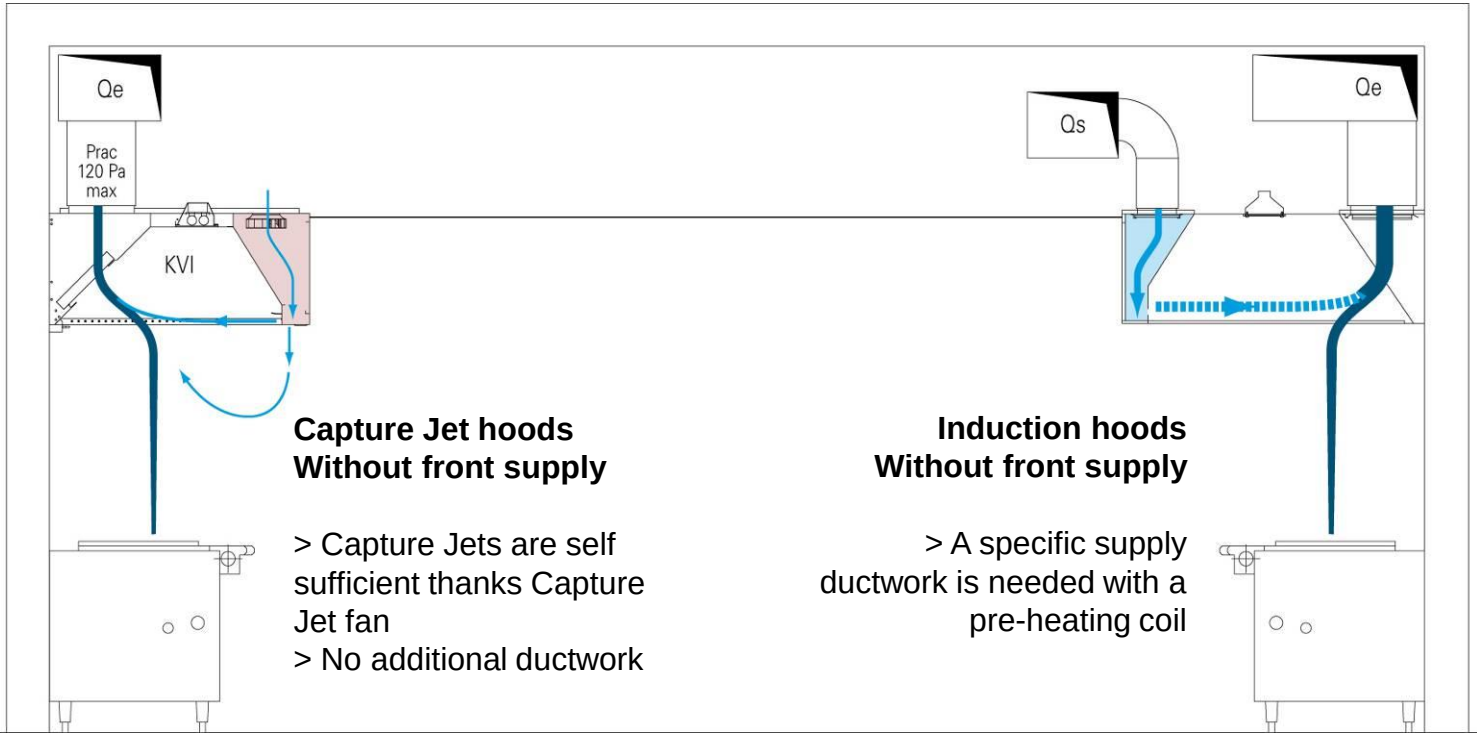
Capture Jet 3 technology benefits

No additional supply ductwork for the Capture Jets



Capture Jet hoods
Without front supply

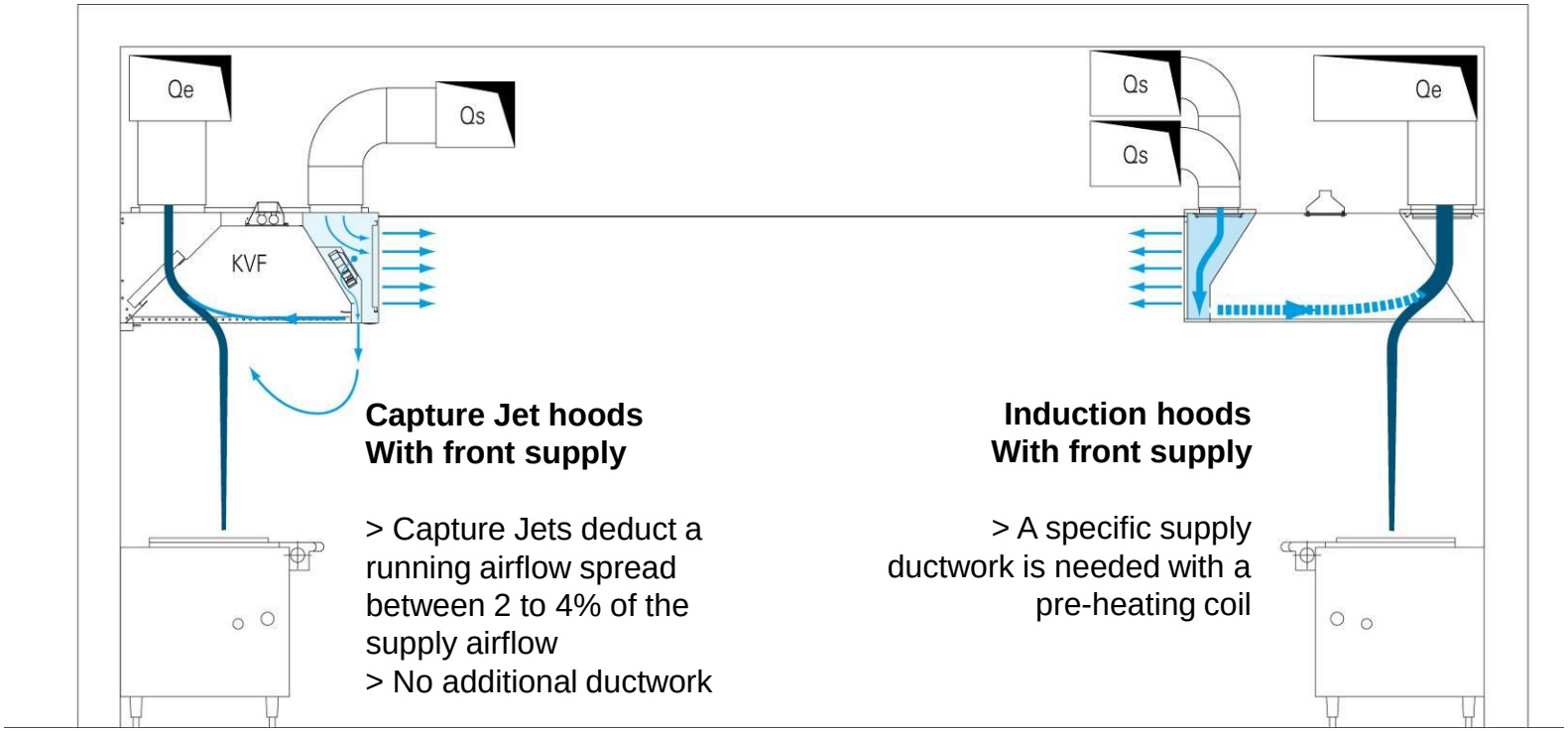
> Capture Jets are self sufficient thanks Capture Jet fan
> No additional ductwork

Induction hoods
Without front supply

> A specific supply ductwork is needed with a pre-heating coil

Capture Jet 3 technology benefits

No additional supply ductwork for the Capture Jets



Capture Jet hoods
With front supply

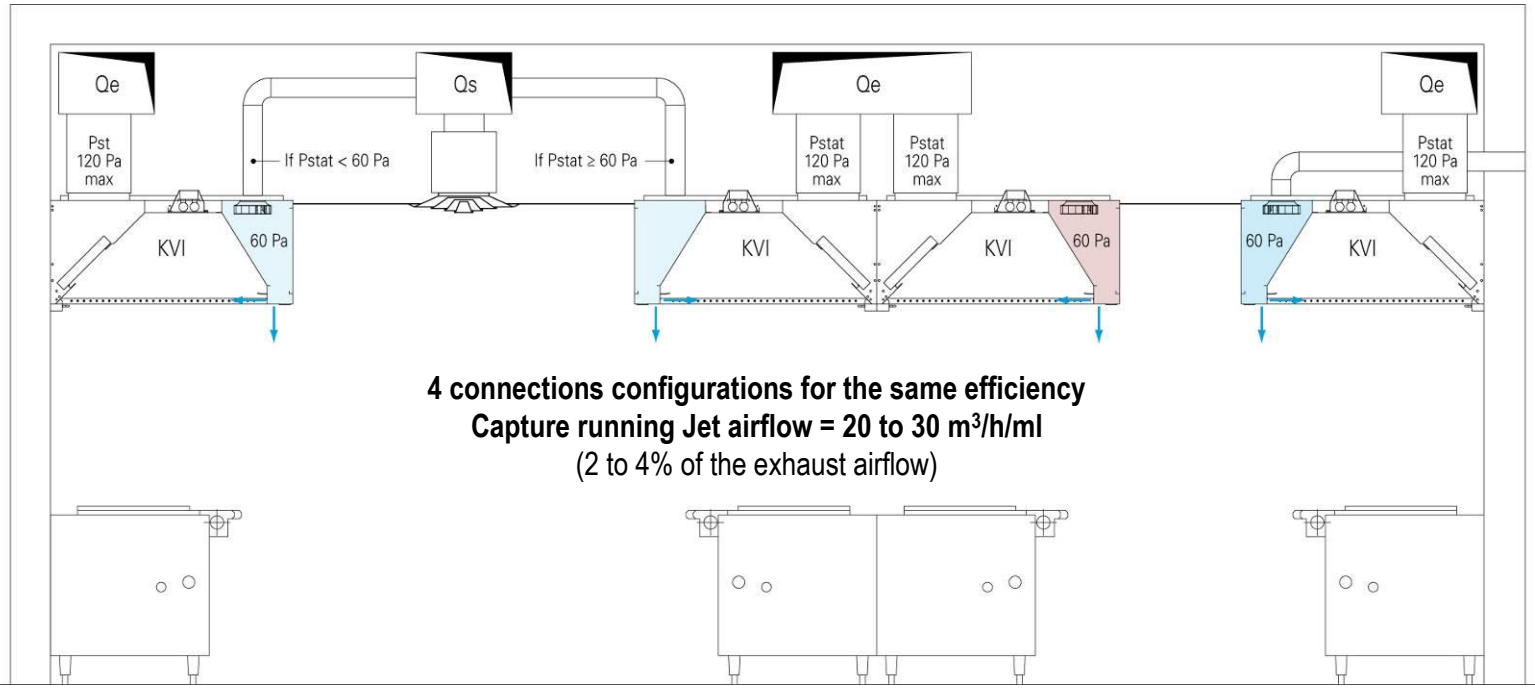
> Capture Jets deduct a running airflow spread between 2 to 4% of the supply airflow
> No additional ductwork

Induction hoods
With front supply

> A specific supply ductwork is needed with a pre-heating coil

Capture Jet 3 technology benefits

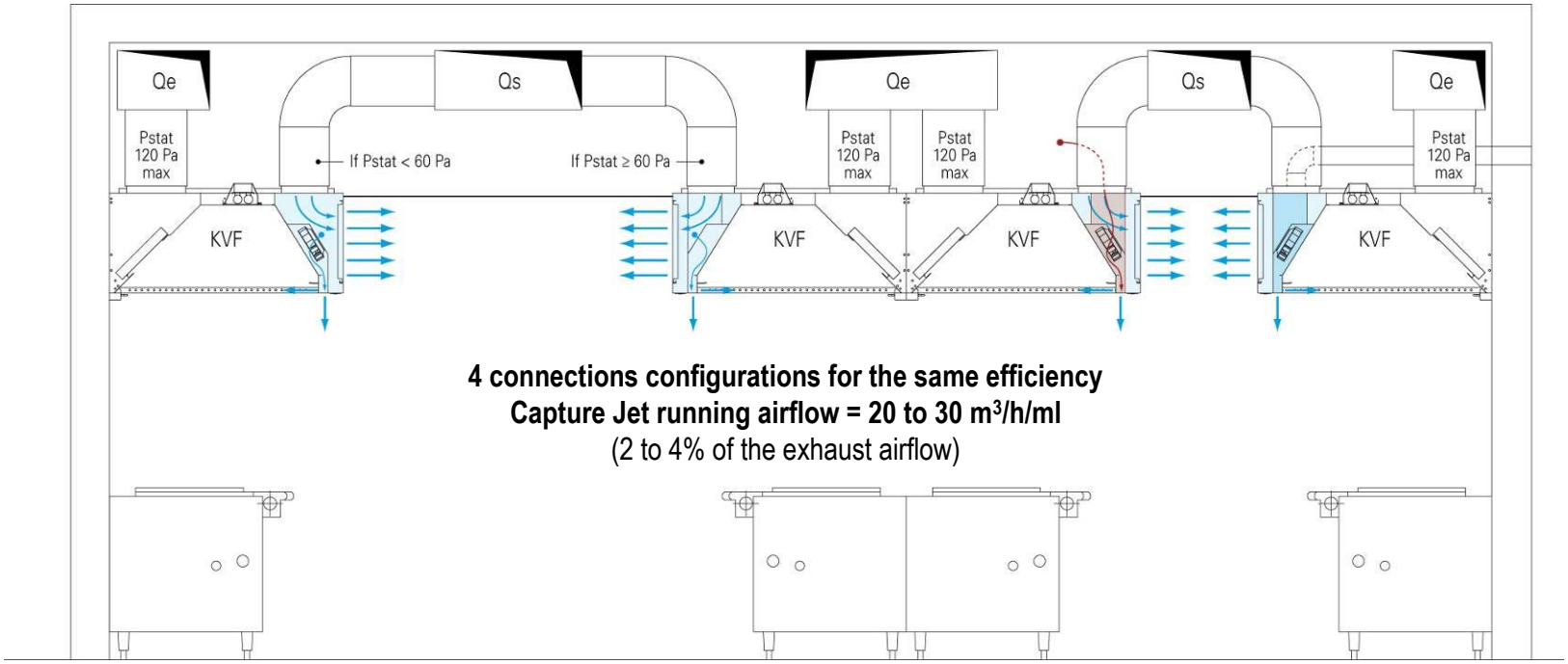
Total connection flexibility



4 connections configurations for the same efficiency
Capture running Jet airflow = 20 to 30 $m^3/h/ml$
(2 to 4% of the exhaust airflow)

Capture Jet 3 technology benefits

Total connection flexibility



4 connections configurations for the same efficiency
Capture Jet running airflow = 20 to 30 $m^3/h/ml$
(2 to 4% of the exhaust airflow)

Capture Jet 3 technology benefits

Emission control and Heat recovery friendly

> The Capture Jet technology is a must for UV grease removal technology (Capture Ray) efficiency

* Low exhaust airflow allows better exposure time
* Low exhaust airflow reduces the number of UV lamps

> The Capture Jet technology (associated with UV technology) improves heat recovery efficiency

* Through higher ΔT on the recovery unit
* Smaller exhaust and supply AHU

> The Capture Jet technology facilitates the purpose of emission control units

* Low exhaust airflow reduces unit size
* Low exhaust airflow reduces unit running costs

Capture Jet 3 technology benefits

Capture Jet is a must for rental surface increase

> The association of the Capture Jet technology with emission control units allows the highest rental surface increase

* Reduction of the exhaust ductwork size
* Clean air at the exhaust discharge
* Multiple possibilities of discharge location
* Suppression of the exhaust shaft

Capture Jet 3 technology benefits

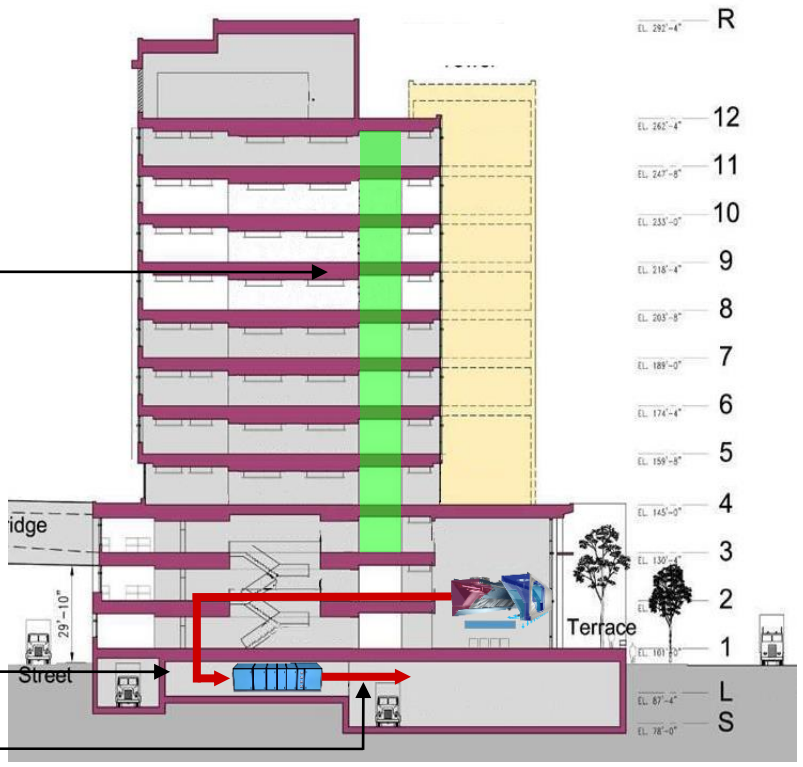
The suppression of the exhaust shaft increases the rental surface

Capture Jets associated with an emission control unit

Shaft not required for kitchen exhaust.
Can be used for other purposes

Emission control unit

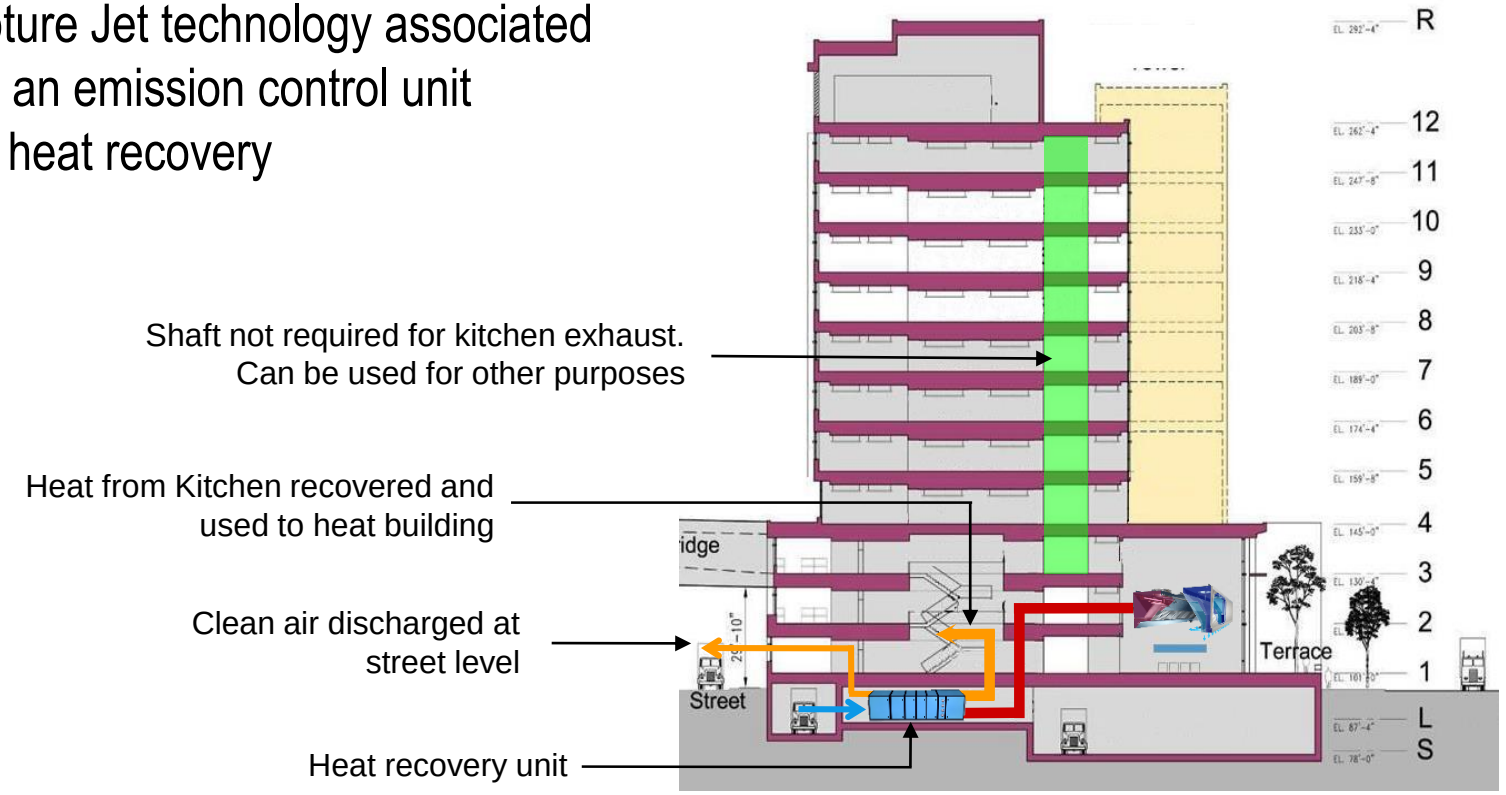
Discharge into Basement Parking Area



Capture Jet 3 technology benefits

The suppression of the exhaust shaft increases the rental surface

Capture Jet technology associated with an emission control unit and heat recovery



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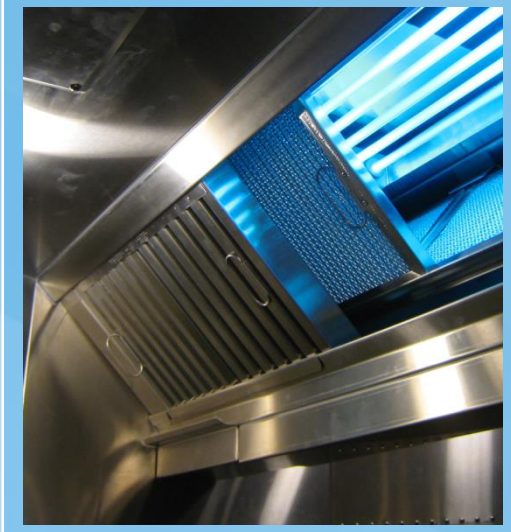
Capture Jet 3 technology benefits

UV technology (Capture Ray) friendly



> The association of the Capture Jet technology with emission control units allows the highest rental surface increase

* Reduction of the exhaust ductwork size
* Clean air at the exhaust discharge
* Multiple possibilities of discharge location
* Suppression of the exhaust shaft

Low velocity supply supervision

Comfort, IAQ (Indoor Air Quality) and productivity

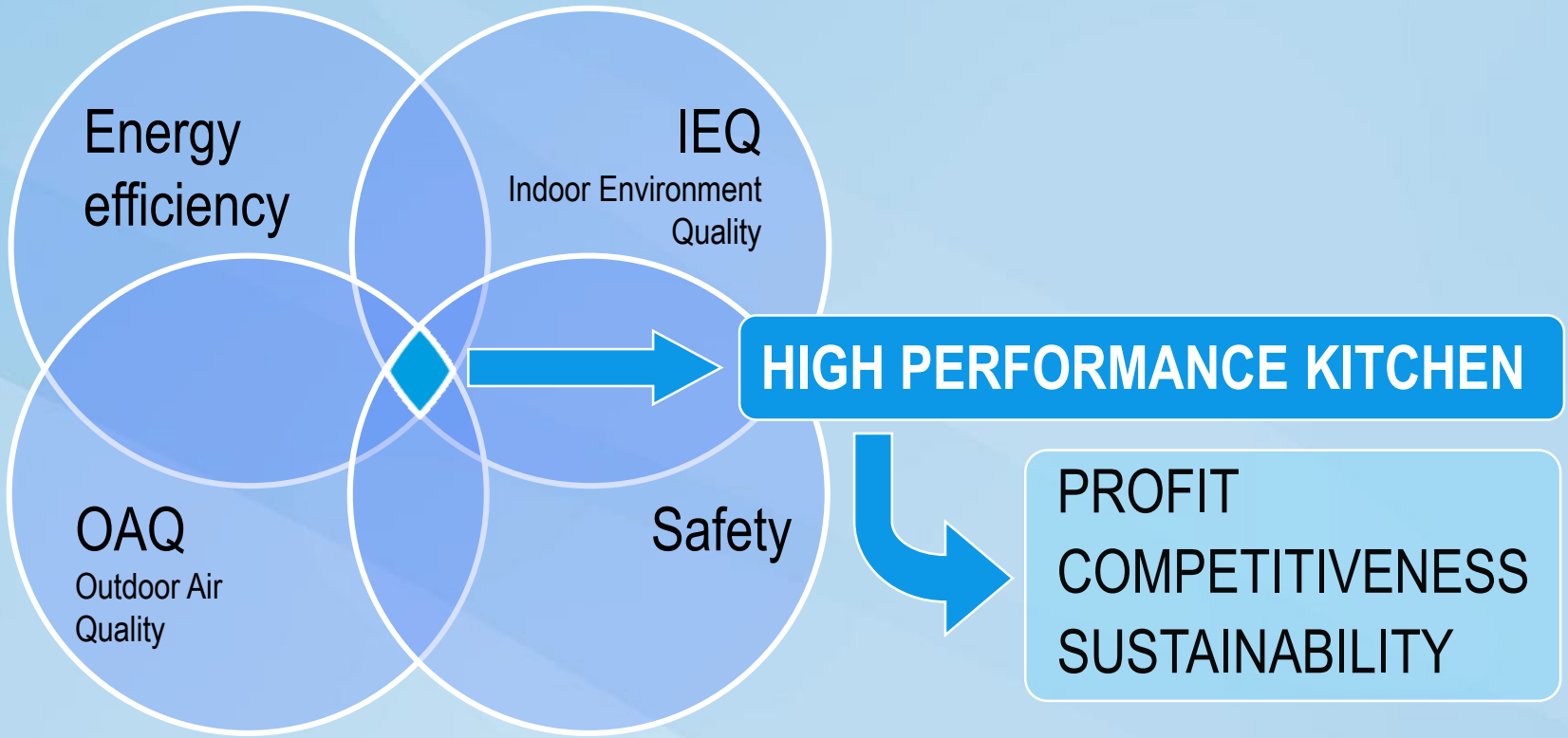
> The exhaust airflow reduction in the kitchen increases the comfort level for all the staff

* Reduction the drafts risk
* Reduce the sound level of the kitchen

> Comfort and IAQ are maximum, allowing wellbeing and productivity increase

Capture Jet 3 technology benefits

Capture Jet 3 is a must for High Performance Kitchen



CAPTURE JET HOODS FUNDAMENTALS

Monday, 04 September 2017

Objective efficiency of Capture Jet hoods : The Capture and Containment point

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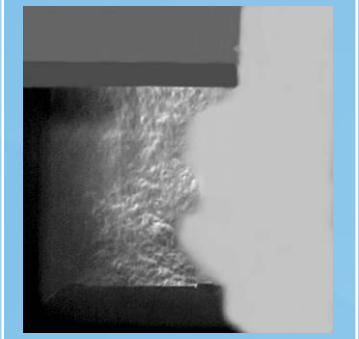
The Capture and Containment point

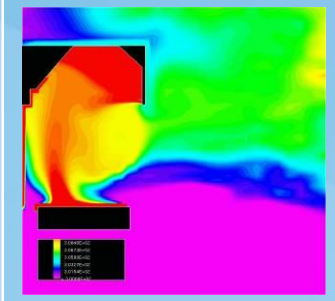
The Capture Jet technology, as efficient as it is, **is nothing without an accurate and objective determination of this efficiency.**

The efficiency of all Halton hoods as been determined with the Capture and Containment point method defined by ASTM 1704 protocol.

The Capture and Containment point

What is the Capture and Containment (C&C) point ?





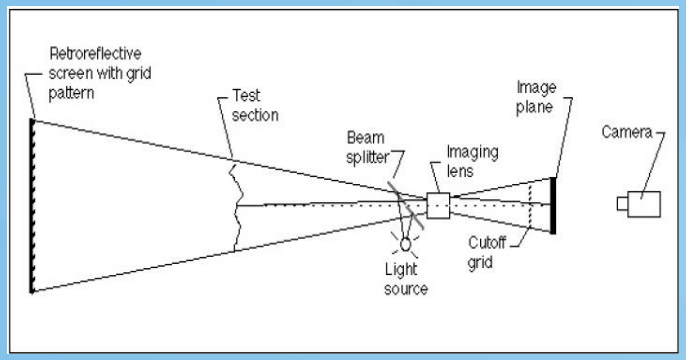
> The Capture efficiency is the ability of the kitchen hood to provide sufficient **Capture and Containment** (C&C) at a minimum air flow rate

> Standard F1704 by the **A**merican **S**ociety for **T**esting and **M**aterial (ASTM) has provided the basement for determining the C&C performance of kitchen hoods

> ASTM 1704 is an objective method to determine precisely the efficiency of kitchen hoods

The Capture and Containment point

How to measure this C&C point?

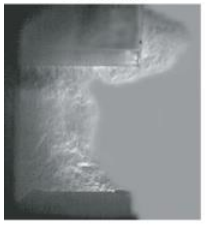


> An innovation in Commercial Kitchen field is the use of Schlieren technology to perform thermal imaging of the cooking plume to precisely measure the point at which C&C is obtained

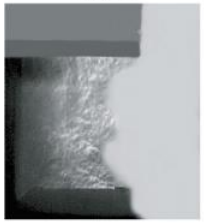
> In 1999, Halton is the first manufacturer to use this thermal imaging technology for products R&D projects or for specific customer testing campaigns

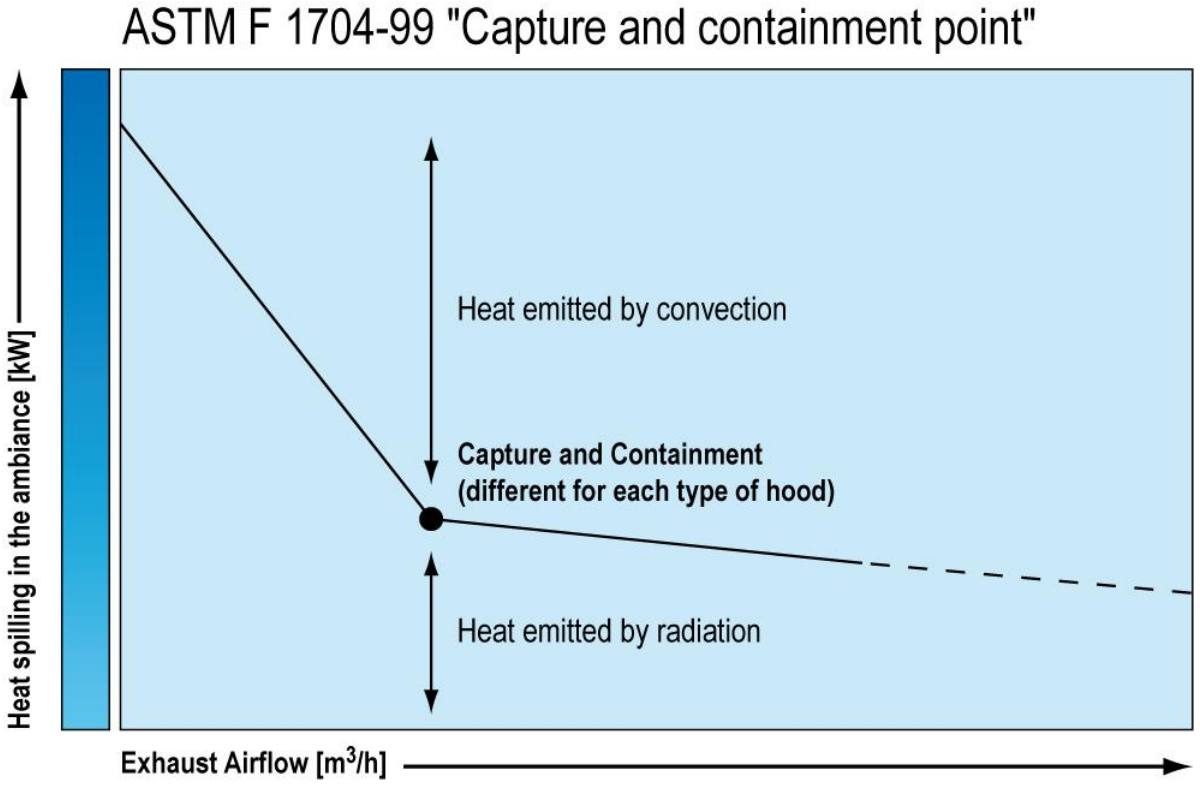
The Capture and Containment point

Heat spread
in the ambience
100%



Capture and
containment
100%





ASTM (American Society for Testing and Material) - Protocol F 1704-99
«Test Method for Performance of Commercial Kitchen Ventilation Systems»

The Capture and Containment point

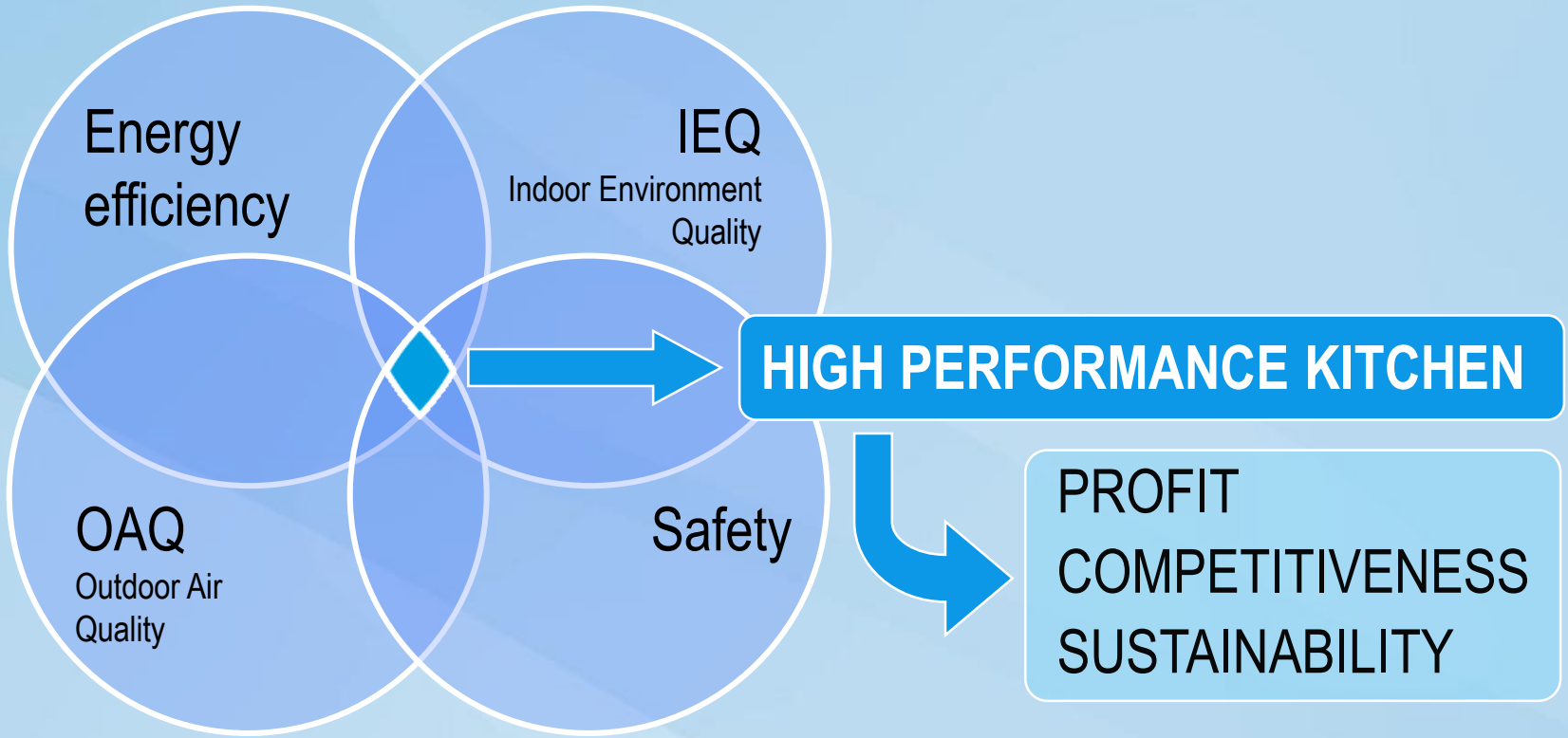
The efficiency of all Halton hoods as been determined with the Capture and Containment point method by an **independent laboratory**…

…showing that the Capture Jet technology is **up to 40% more efficient than traditional hoods**, especially induction hoods.

Objective Capture Jet hoods efficiency is used in all Halton tools especially HELP and allows us to **guaranty the efficiency of our solutions**.

The Capture and Containment point

The objective determination of the Capture Jet 3 efficiency is an integrated part of HPK



CAPTURE JET HOODS FUNDAMENTALS

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Objective heat loads determination: HELP exhaust design tool

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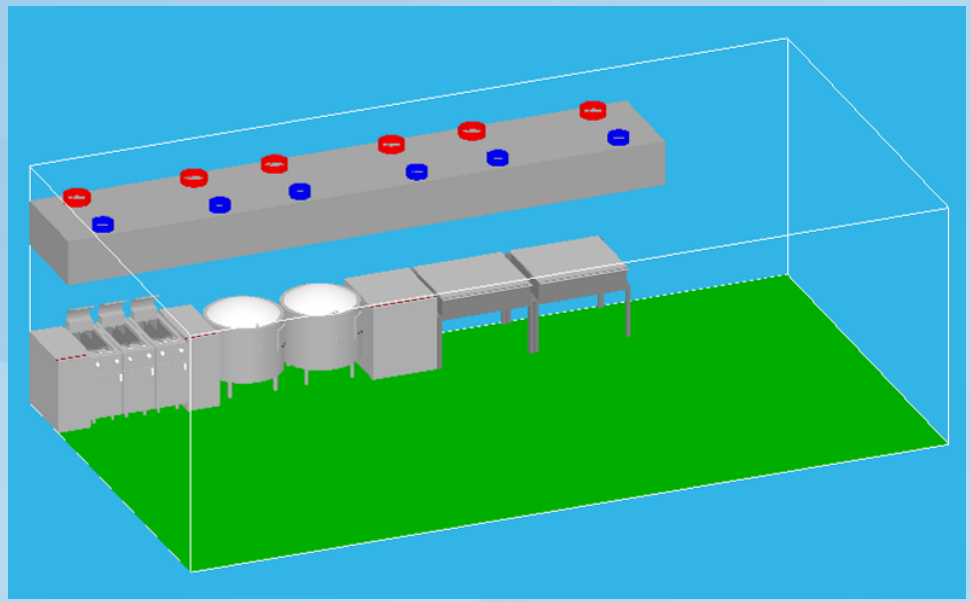
HELP (Hood Engineering Layout Program) exhaust design tool

The Capture Jet technology, as efficient as it is, **is nothing without an accurate and objective determination of this efficiency …**

… and also nothing without an **accurate exhaust airflow calculation method**, based on the real needs of each cooking appliance.

HELP (Hood Engineering Layout Program) exhaust design tool

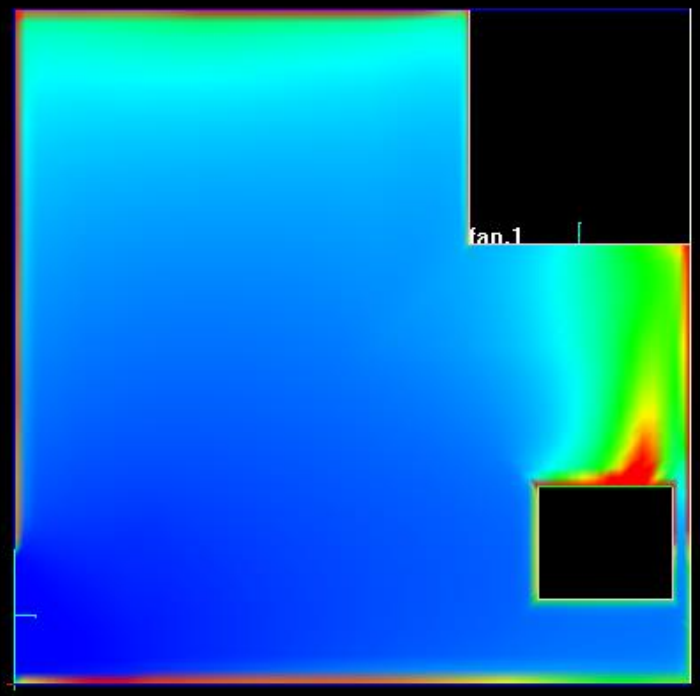
Example of exhaust airflow design with HELP …



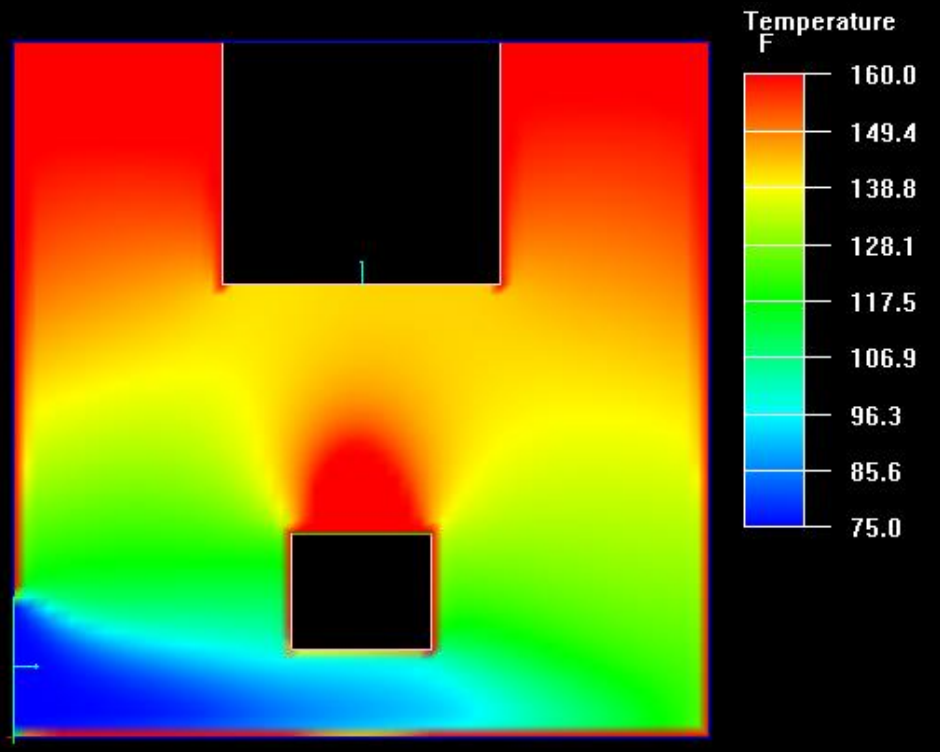
Total cooking power
> 213 kW Gas

Cooking appliances
> 2 braising pans
> 1 range with oven
> 2 tilting kettles
> 3 fryers

Profile of Convective Flow



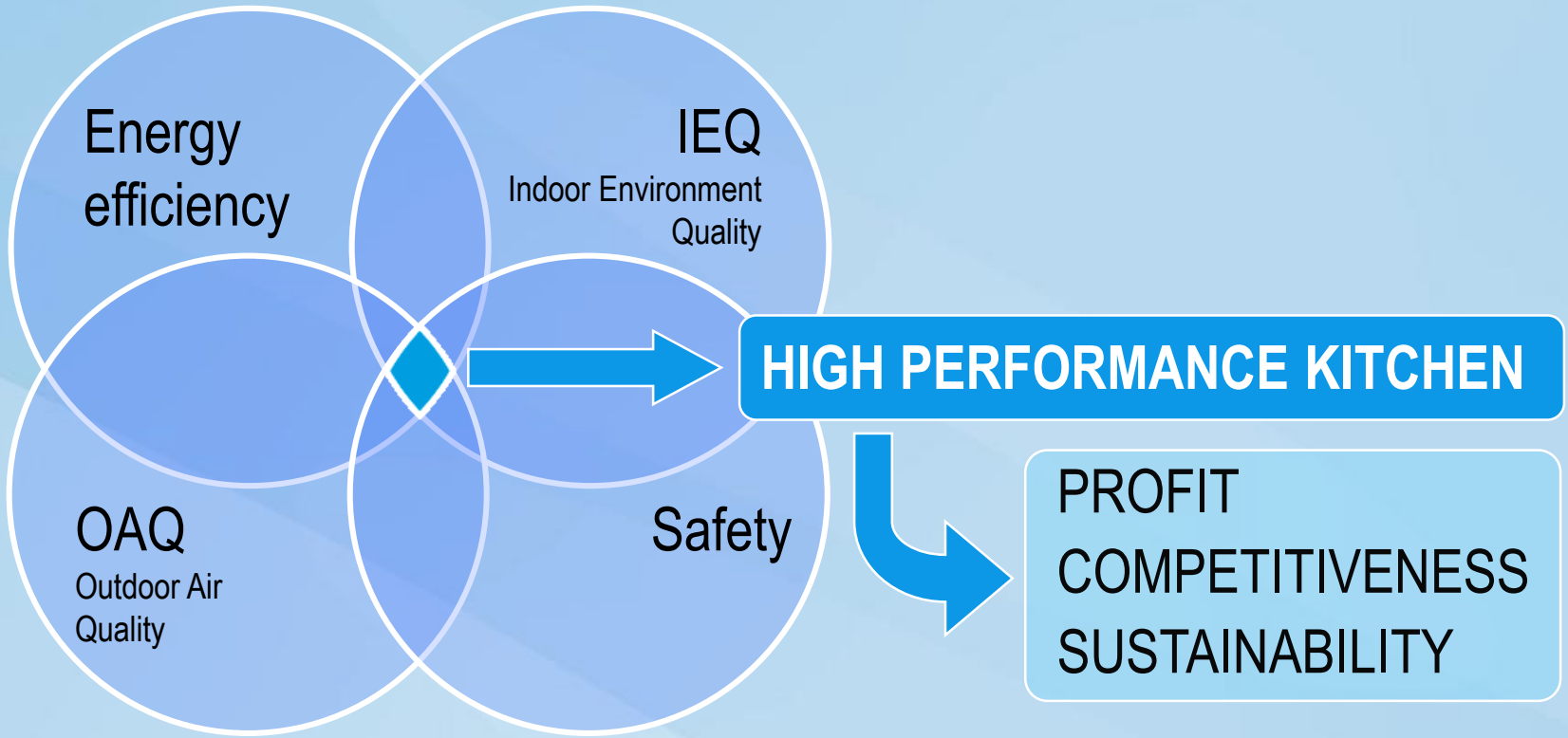
Wall mounted hood



Island hood

The Capture and Containment point

An efficient calculation method based on real heat loads of the cooking appliances is an integrated part of HPK



CAPTURE JET HOODS FUNDAMENTALS

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Low velocity supply supervision as a integrated part of the final result

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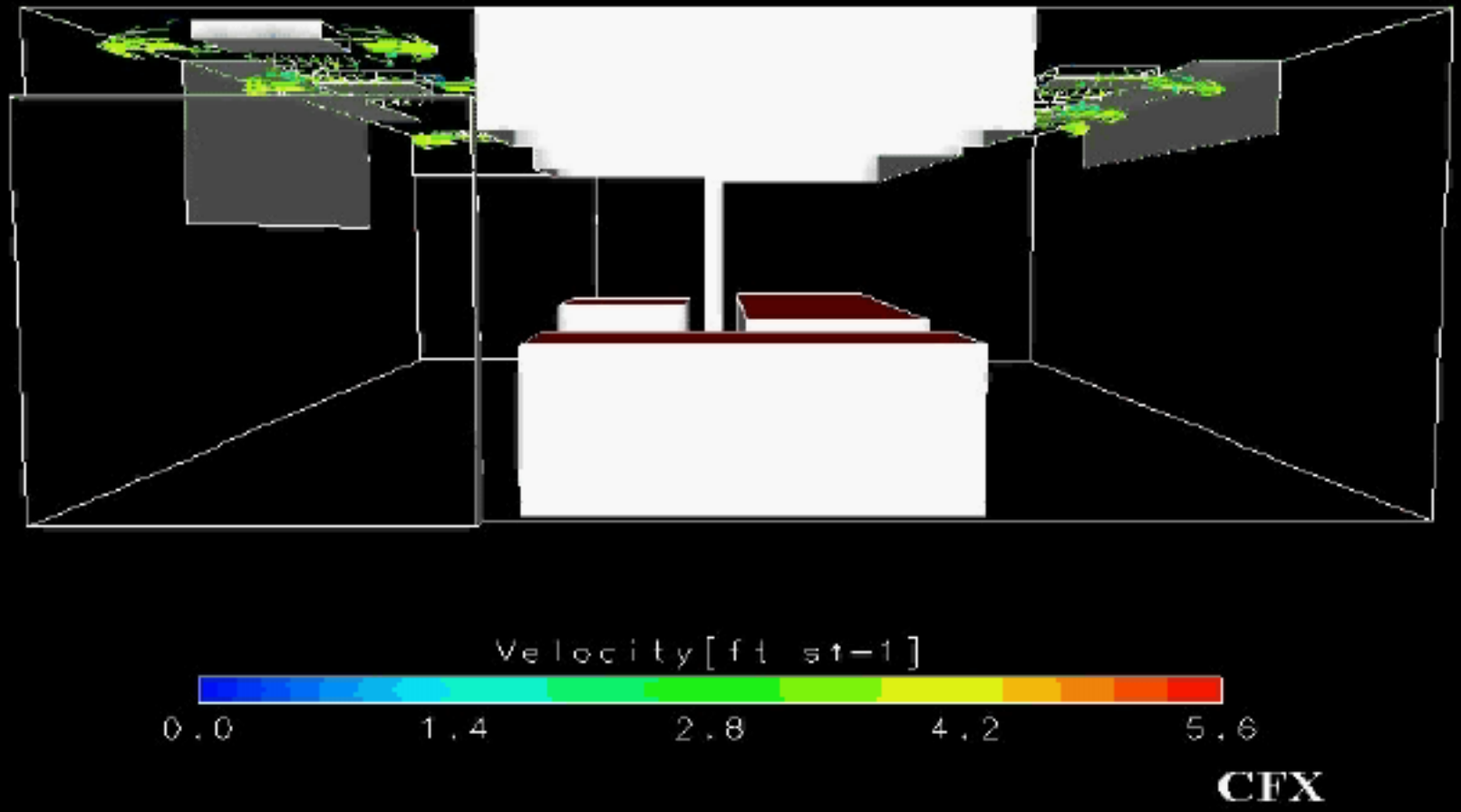
Low velovity supply surpervision

- The supply is an integrated part of the final performance of the kitchen ventilation system …
- … the low velocity supervision impact directly on the exhaust airflow … the lower the drafts, the lower the exhaust airflow
- … the low velocity supervision impact directly on the user comfort and the IAQ (Indoor Air Quality)

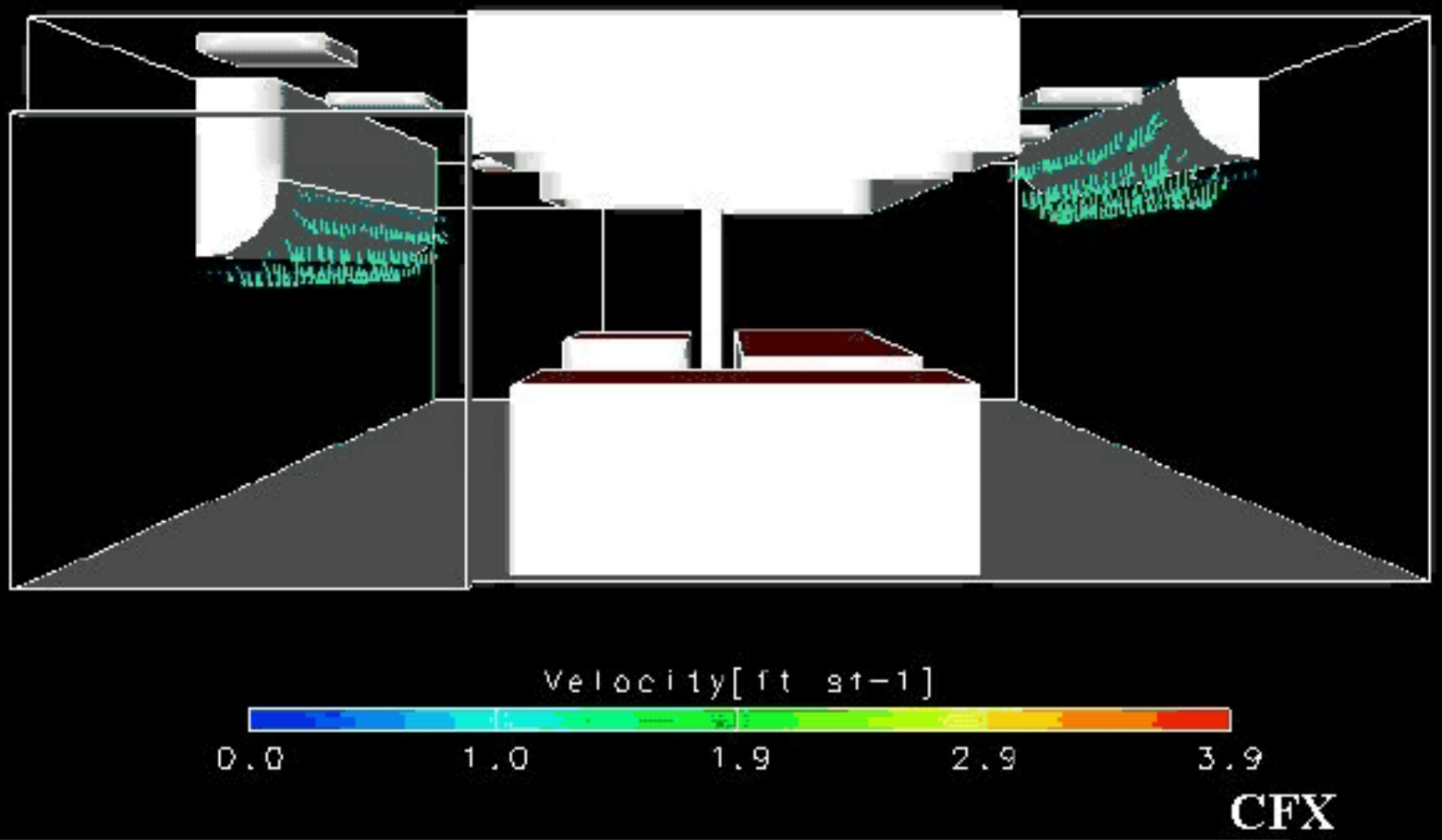
Capture Jet 3 fundamentals

Supply by mixing systems (diffusers)



Capture Jet 3 technology

Supply by low velocity units (displacement)



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Low velocity supply supervision

Energy savings

> The low velocity supply, integrated or not in the hoods, allows to reduce the drafts at an extremely low level

* Convective flows are free to rise up without disturbance

> In addition to the Capture Jet exhaust airflow reduction, low velocity supply supervision allows to reduce further more exhaust airflow (by 5% compared to any mixing diffusion)

* Additional reduction of exhaust & supply fans consumption
* Additional reduction of heating and/or cooling needs

> Lower greenhouse gases emission

Low velocity supply supervision

Comfort and IAQ (Indoor Air Quality)

> The draft reduction in the kitchen increases the comfort level for all the staff

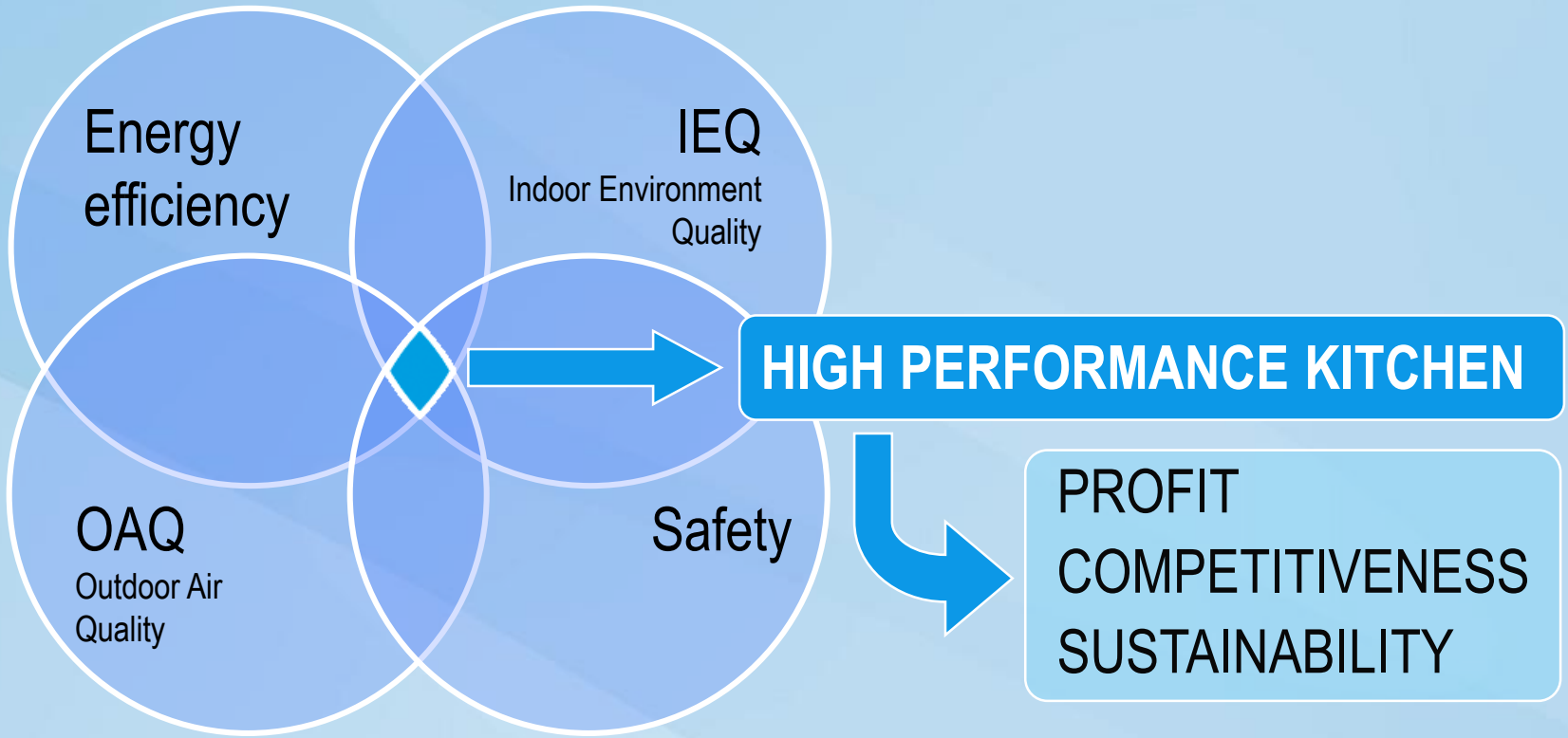
> The laminar-flow air supply modules allow the kitchen air to be renewed on the principle of air displacement. Fresh air naturally falls to the ground and fills the working area from that level.

* A comfort limit appears in the kitchen's air level through stratification

> Comfort and IAQ are maximum, allowing wellbeing and productivity increase

The Capture and Containment point

An efficient calculation method based on real heat loads of the cooking appliances is an integrated part of HPK



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CAPTURE JET HOODS FUNDAMENTALS

Monday, 04 September 2017

High efficiency cyclonic filters : a basic for the Capture Jet hoods associated solutions

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High efficiency filtration

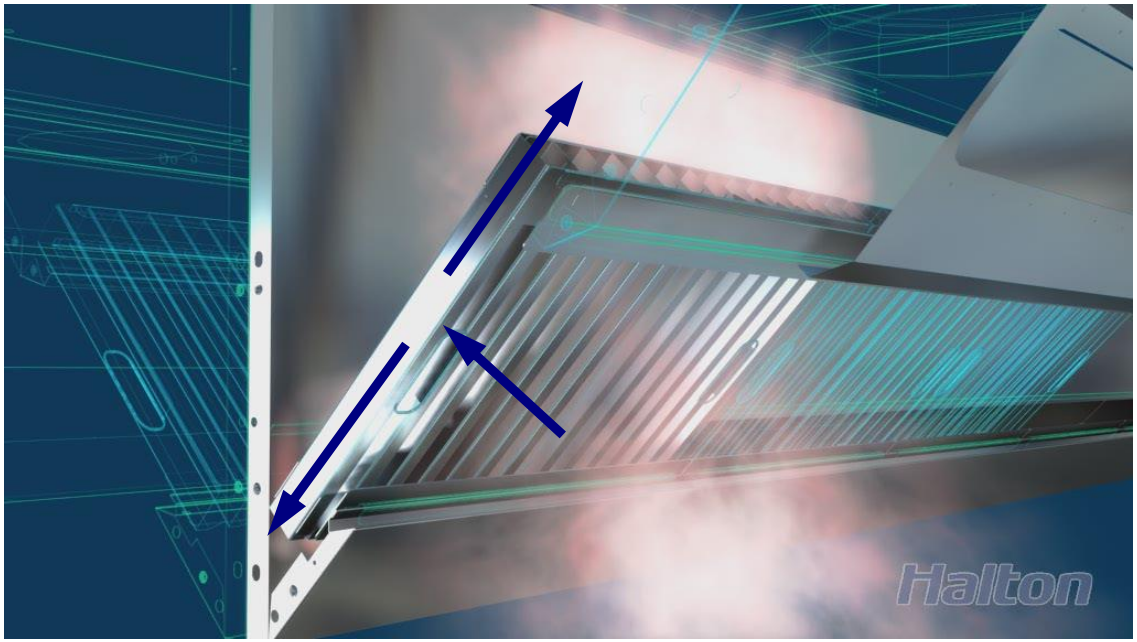


Decrease of fat and particles deposit inside the exhaust plenum and the ductwork

> Decrease the duration and the cost of statutory cleaning operations
> Decrease ductwork fire hazard
> Decrease emissions of cold grease odours
> Improve the hygienic conditions

Capture Jet 3 technology

KSA cyclonic filters



The KSA cyclonic filters are composed of honeycomb profiles. This special shape forces the air to swirl inside the profiles. The centrifuge effect is significant and, above all, continuous – especially in comparison to the action of traditional filters. Particles are thus pushed against the profiles. The collected condensation flows naturally towards the extraction plenum drains.

Capture Jet 3 technology

KSA cyclonic filters

KSA cyclonic effect

Schlieren video inside honeycomb profiles cut

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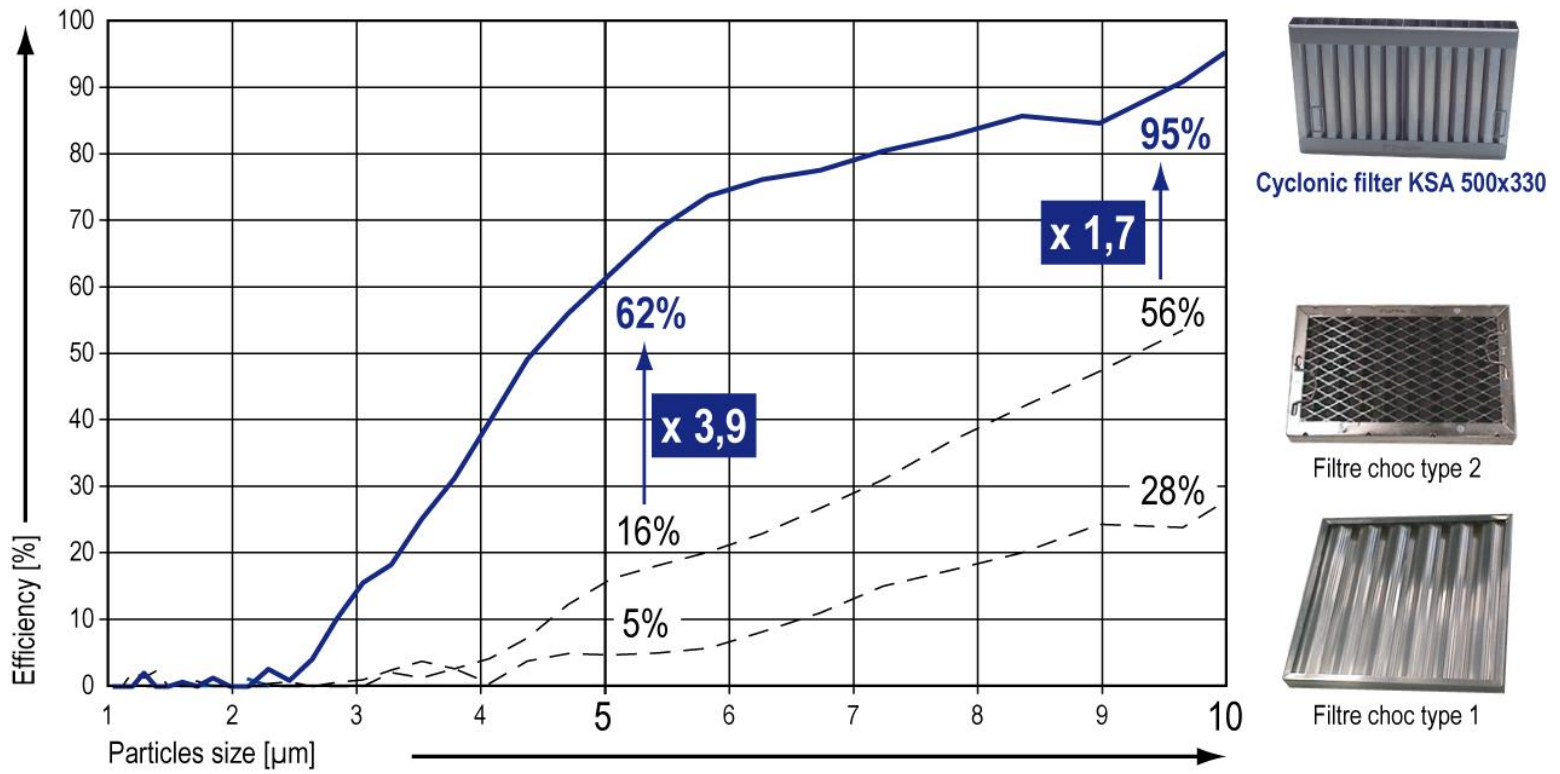
Capture Jet 3 technology

KSA cyclonic filters efficiency



Cyclonic filter KSA 500x330

Filtre choc type 2

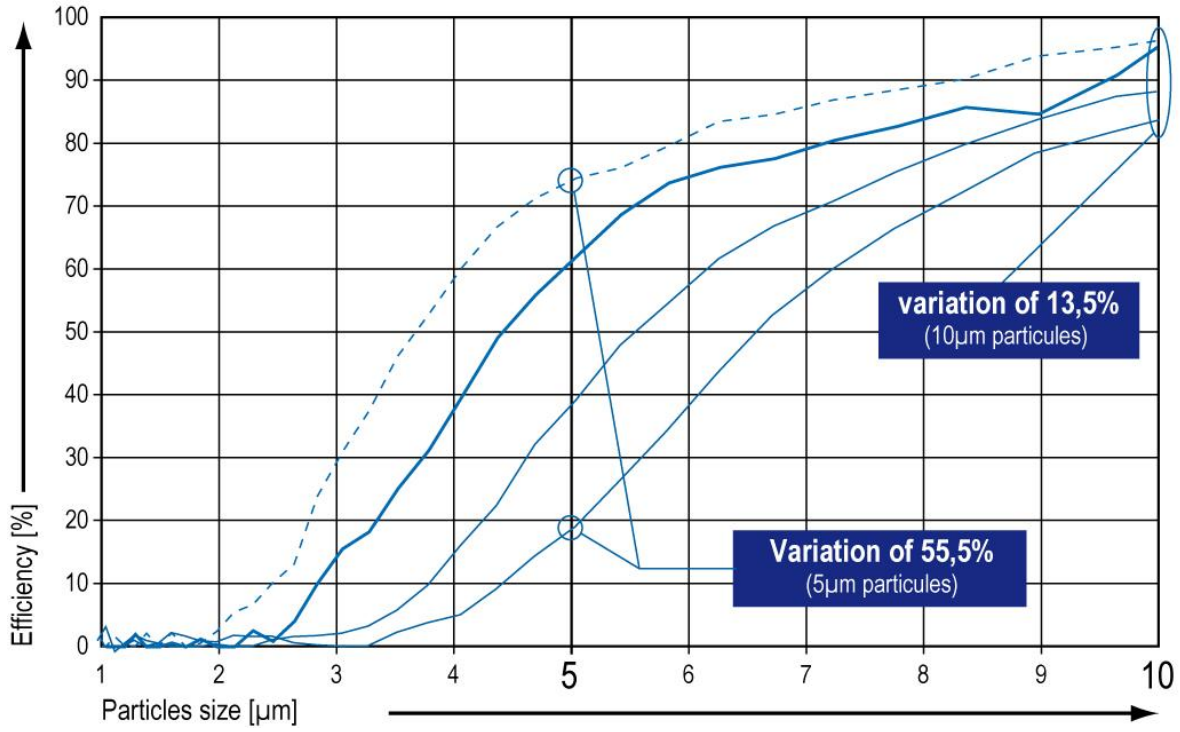
Filtre choc type 1

Test made by VTT (Technical Research Centre of Finland)
Following the VDI 2052 (part 1) «Ventilation Equipment for kitchens. Determination of Capture Efficiency of Aerosol Separators in Kitchen Exhaust»

Capture Jet 3 technology

KSA cyclonic filters efficiency

EFFICIENCY VARIATION OF KSA FILTERS WITH VARIABLE AIRFLOW



756 m3/h / 240 Pa
540 m3/h / 120 Pa
396 m3/h / 60 Pa
288 m3/h / 30 Pa

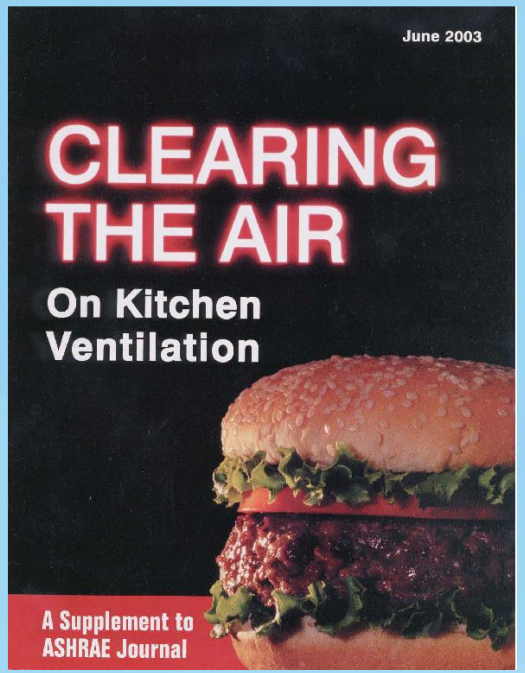
Filtre cyclonique KSA 500x330

Test made by VTT (Technical Research Centre of Finland)
Following the VDI 2052 (part 1) «Ventilation Equipment for kitchens. Determination of Capture Efficiency of Aerosol Separators in Kitchen Exhaust»

Capture Jet 3 technology

KSA cyclonic filters efficiency

Tests results published by Ashrae



> PROVED AND GARANTEED EFFICIENCY

> 95% efficient in removal of 10 µm particles
* Maximum fire safety
* High hygiene of exhaust ductwork
* Decrease of cleaning costs

> UL-accredited as flame-resistant

> NSF hygiene and safety approval
(National Sanitation Foundation, USA).

> Constant pressure loss

> High efficiency stability at low airflows

Monday, 24 November 2008

CAPTURE RAY TECHNOLOGY

Main principles

Cruise liner case study

- Cruise liner with
  * A main galley, equiped of the Capture Ray technology
  * A crew galley, non equiped of the Capture Ray technology
- Particular points :
  * **The Capture Ray technology is associated with the Water Wash system**
  * **The crew galley has been equiped with a UV retrofit system after a survey on the ductwork state**

Capture Ray technology

Cruise liner case study

Capture Ray technology

Cruise liner case study

Capture Ray technology

Cruise liner case study

WITH UV



WITHOUT UV



Source: Report on Applying Ultraviolet (UV) Light to Chemically Oxidize Grease in Ship Galleys

Capture Ray technology

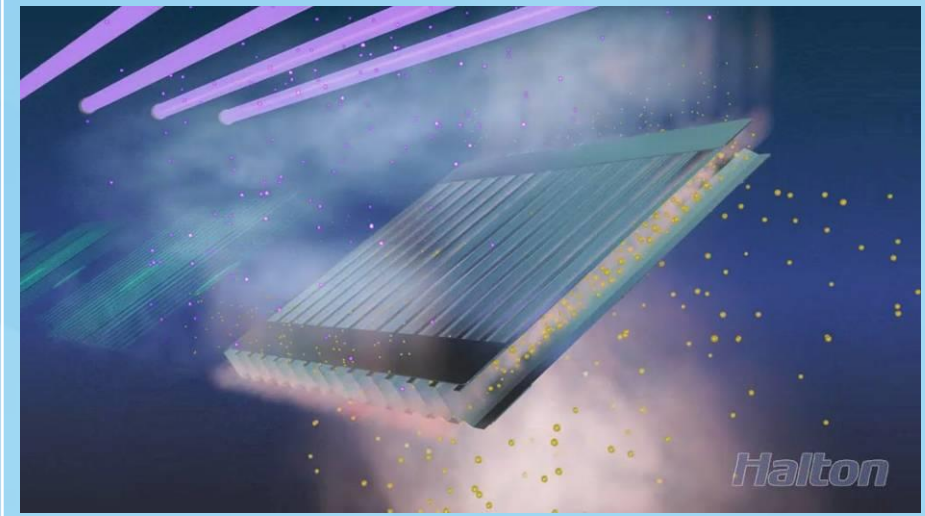
Cruise liner case study

WITH UV

WITHOUT UV

General principles

What is the Capture Ray technology ?

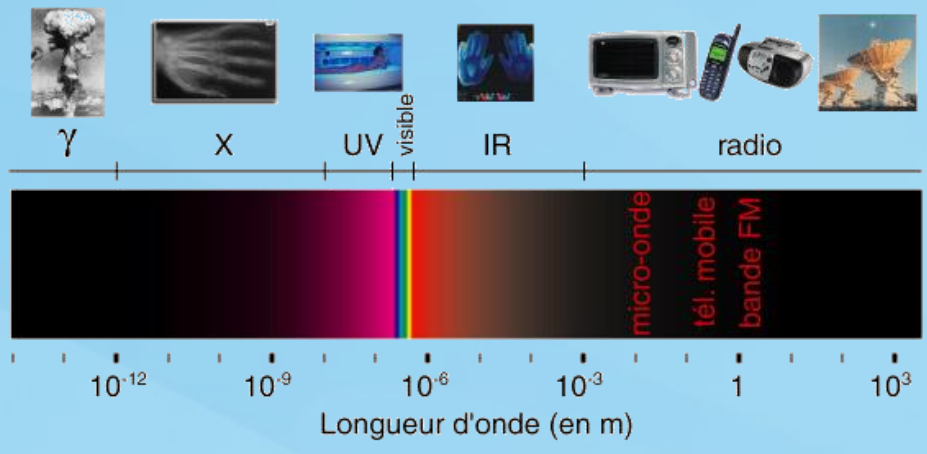


The exhaust plenum is equipped with UV-C lamps specially developed to neutralise the grease particles with a kind of cold combustion.

UV-C technology is efficient only on small particles and vapour grease. It can't be separated from the KSA cyclonic filters can efficiently take care of medium and big particles.

General principles

What is the Capture Ray technology ?



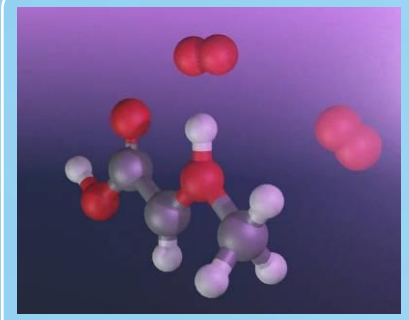
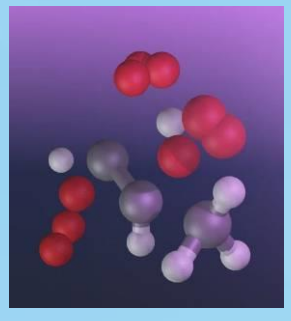
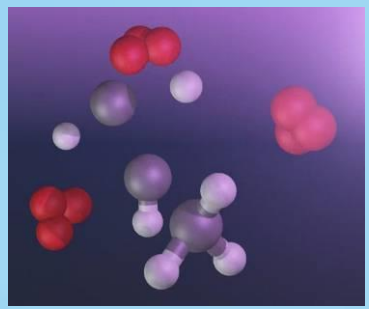
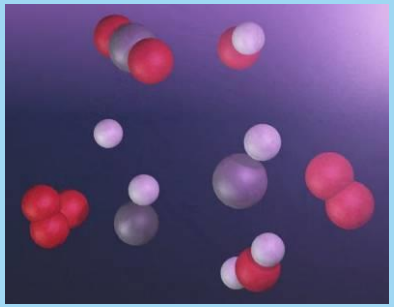
UV light is divided in 3 different spectres.

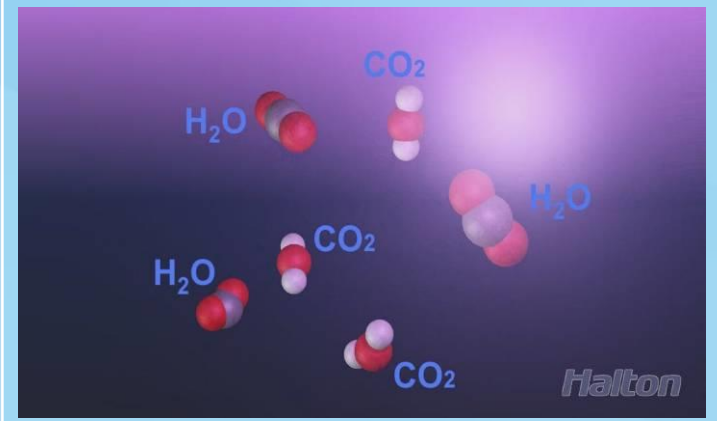
UV-A (which allow suntan)
UV-B (which provoke sunburns)
UV-C (most powerful spectre of UV light)

> The Capture Ray technology has been tested during several measurements campaigns by the Materials Characterization Centre of Western Kentucky University

Laminar flow supply units

What is the Capture Ray technology ?



The reaction is set in 2 different steps :

> **Photolysis** (direct effect of the UV light itself which breaks the grease molecular chains in shorter ones)

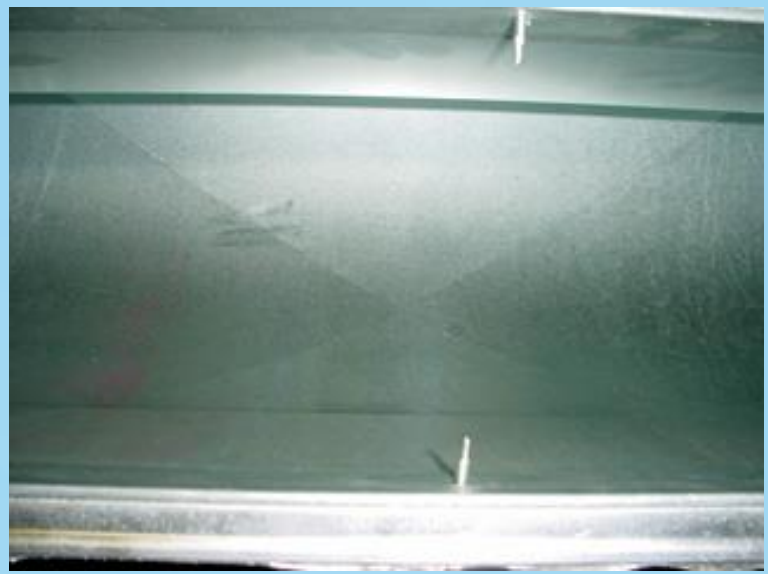
> **Ozonolysis** (effect of ozone generated by UV lamps which “burn” in a cold reaction the grease. The final result is H_2O, CO_2 and a small quantity of inert powder)

General principles

Without Capture Ray With Capture Ray

General principles

After the Capture Ray exhaust plenum



Further down in the ductwork

Impact of Capture Ray technology on odors

59% of the smelling compounds generated by fryers are removed.

45% of the smelling compounds generated by a grill (hamburgers) are removed.

To suppress odours, the Capture Ray technology has to be associated to an emission control system POLLUSTOP 2

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