20/KCJ/0000/1008/EN

KCJ

Closed kitchen ceiling with Capture Jet™ system

- Maximum thermal and acoustic comfort
- Optimal hygiene, air quality, and safety
- Energy savings
- Easy cleaning and maintenance
- Excellent visual comfort and pleasant working environment
- Turnkey projects: design, installation, and implementation by a team of experts
- Adaptability to developments in the kitchen
- Many customisation opportunities

The kitchen ceiling with KCJ Capture Jet system is a flexible and aesthetically pleasing solution that harmoniously combines several functions: extraction, air supply, lighting, and a suspended ceiling. All components are designed to guarantee optimal hygiene levels and easy maintenance in accordance with HACCP recommendations. The ceiling is suitable for central kitchens but also for all closed cooking areas or demonstration kitchens characterised by:

- High concentrations of equipment
- Use of mostly steam-producing equipment
- A strong architectural or decorative focus

Featuring a closed design and manufactured entirely of stainless steel, the product is equipped with the latest dual Capture Jet technology constituting an outer boundary. Combined with a laminar-flow-type compensation system, it helps to reduce extract air flow rates by at least 15% compared to traditional ventilated ceilings while retaining maximum air quality and comfort for users.

The kitchen area is freed from the effects of a hood. From the very first day, the entire kitchen benefits from additional integrated uniform and direct lighting. The visual comfort and the impression of size are incomparable.

Also, the kitchen ceiling system provides excellent fire protection, limiting the spreading of fire in the building.

Extraction plenums are equipped with KSA high-efficiency cyclonic filters. They are designed such that their number and location can be adjusted to suit any development of the kitchen space.

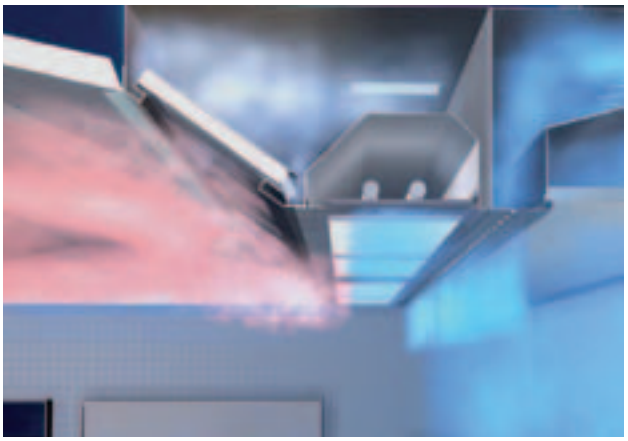
Operation

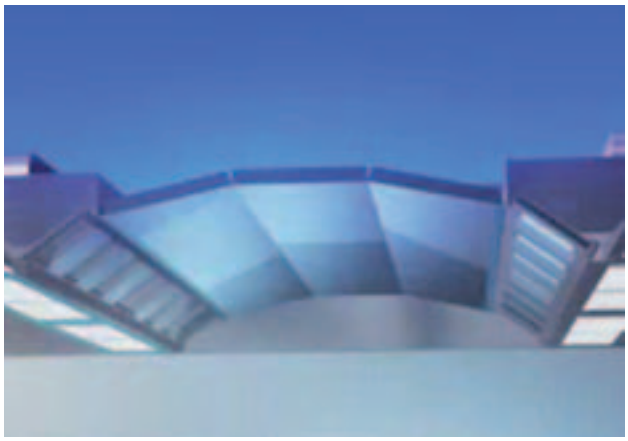
Cooking equipment generates large plumes of hot air, loaded with solids, grease vapours, water, and odours. These plumes or convective flows (1) naturally rise toward the kitchen ceiling.

While the absence of containment screens on a kitchen ceiling completely releases the volumes, providing unrivalled working comfort, the convective flows are left to their own devices. The combination of the capture jets (2) and the laminar-flow air supply (3) allows convective flows to rise freely and be removed by the extraction plenum as quickly as possible, without mixing with the fresh air that is brought into the kitchen.

The KCJ kitchen ceiling system is a closed type. All extraction plenums are connected to the extraction network in order to guarantee absolute hygiene. There is no contact between the cooking vapours and the building's structures or with services situated above the kitchen ceiling. Through its manner of construction, the kitchen ceiling protects building structures against fire. All components in the extraction areas are made from AISI 304 stainless steel with a minimum thickness of 1 mm, for a 30-minute fire rating.

Extraction plenums and ductwork connections are carefully designed and dimensioned to provide great flexibility in modifications to the layout of the cooking area.





20/KCJ/0000/1008/EN

* Patent pending.

Double and peripheral capture jets (patent pending)

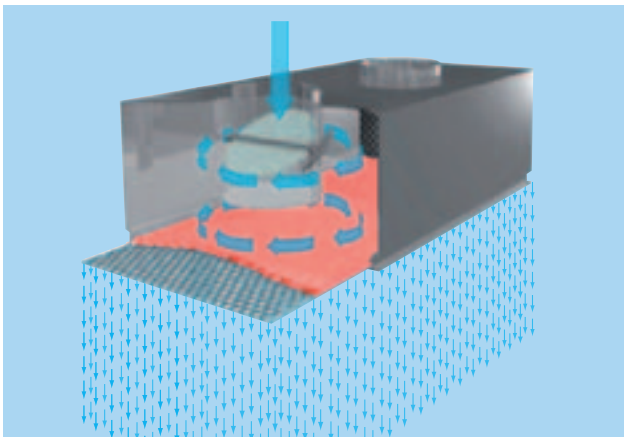
- 15% greater efficiency than traditional ceilings
- Increased capture and containment capacity
- Elimination of the risk of cooking vapour re-circulation
- Energy savings with optimal air quality

The Capture Jet technology consists of two sets of nozzles, one vertical and one horizontal.
- The horizontal nozzles push vapours back toward the extraction plenum.
- The vertical nozzles increase the containment volume and prevent vapours escaping from cooking areas and entering re-circulation with the fresh air.

Arched design

- Increased containment capacity
- Better capture efficiency
- An aesthetically pleasing ceiling

The arched shape of the panels between extraction plenums increases the containment volume. Peak vapour emissions are stored there before being aerodynamically directed towards the extraction plenum.



20/KCJ/0000/1008/EN

Laminar-flow air supply modules

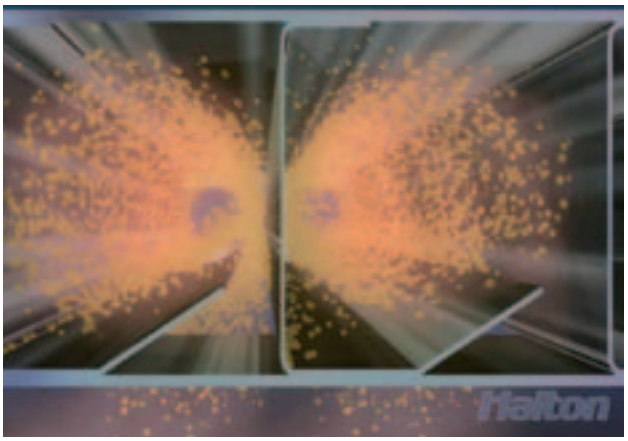
- Completely draught-free compensation control
- A high comfort levels for users

The air supply modules are designed to spread fresh air through the kitchen at extremely low velocity . The absence of draughts not only helps to avoid dispersing convective flows from the cooking equipment but also guarantees users' comfort.
The modules are composed of a distribution cylinder, which enables flow velocity to be reduced and fresh air to be uniformly distributed in the plenum. The flow is then streamlined, thanks to the combination of a honeycomb structure and a perforated front.

Comfort limit height

- Total control of air quality in the work area
- Well-being and productivity

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. The absence of flow disturbances prevents this fresh air from mixing with convective flows from the cooking equipment.
A comfort limit naturally appears in the kitchen's air levels through stratification. The Halton ceilings are designed such that this limit point is above head level. Below the limit height, air quality is optimal. The polluted air above is extracted through the kitchen ceiling system.



KSA cyclonic filters

- Minimisation of grease deposits in the ducts
- Hygiene and safety

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.
The KSA filters are 95% efficient in removal of 10 µm particles. They are UL-accredited as flame-resistant (Underwriter Laboratories) and have NSF hygiene and safety approval (National Sanitation Foundation, USA).

Maintenance

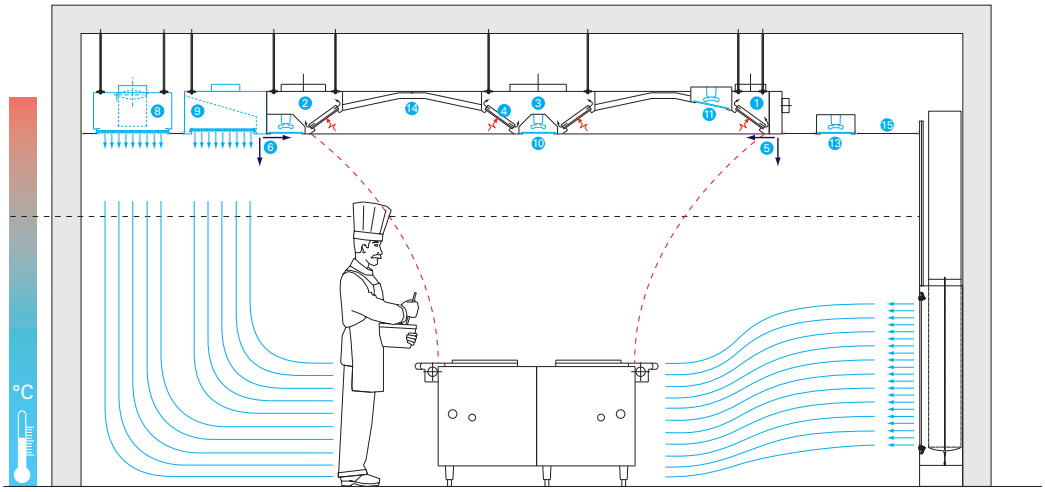
- Components that are easy to access and clean
- Maximum hygiene and quick maintenance

The arches are designed to fit together with an overlap. The neutral sheets are fixed in place with special U profiles. Arches and sheets remain perfectly in place during cleaning operations, without risk of accidental lifting. These assembly provisions also prevent cooking vapours passing into the ceiling.
All of the components can be disconnected, and the system can be reassembled without tools, for quick and easy maintenance and access to the technical area above the ceiling

Lighting

- Uniform lighting
- Great visual comfort for users

With five models to choose from, the lights can be uniformly distributed throughout the kitchen area, whatever the kitchen ceiling configuration. All models are equipped with electronic ballast and use a Siteco power rail system, enabling the number of lights that are switched on to be adjusted. The lighting is uniform and suited to activity in the kitchen, for improved visual comfort for users.



General principles

• Extraction plenums constructed from AISI 304 stainless steel, 320 grain, with no visible screws and rivets. TAB™ (Testing and Balancing) plug for pressure testing for direct control of air flow rates. Flanges with 1.5 mm welded seam and plenum body with 1 mm.
1 - Single plenum
2 - Single plenum with integrated light fitting
3 - Double plenum with integrated light fitting

• High-efficiency KSA cyclonic filters, accredited as flame-resistant, easily dismantled and cleaned by machine. Construction of AISI 304 stainless steel, constant pressure drop.
4 - Cyclonic filters: 500 x 250 x 50 mm

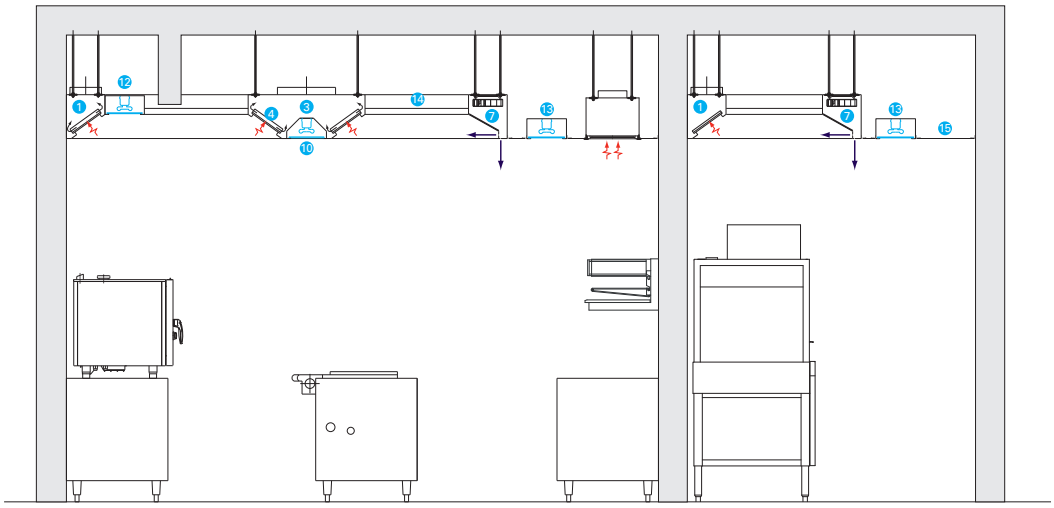
• Ventilated ceilings equipped with double Capture Jet technology and peripherals. Module construction of AISI 304 stainless steel, 320 grain, with no visible screws and rivets.
5 - Single Capture Jet module
6 - Combined Capture Jet and laminar supply module
7 - Arched Capture Jet module with integrated Capture Jet fan

• Laminar-flow supply modules. Constructed from AISI 304 stainless steel, 320 grain, with no visible screws and rivets. Stainless steel or aluminium facing, equipped with a honeycomb structure.
8 - Single module
9 - Single module with integrated Capture Jet system

• Two-tube lights, IP54, foliated glass bowl 6 mm thick with plastic divider. Three-phase power rail system.
10 - Light fitting integrated into the extraction plenums
11 - Light fitting integrated into the arches between plenums
12 - Light fitting integrated into the panels between plenums
13 - Light fitting integrated into neutral zones

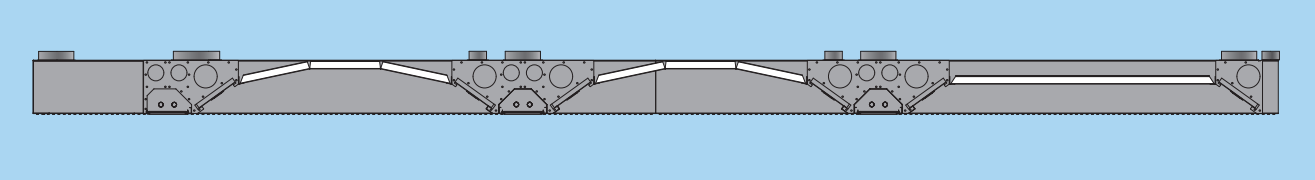
• 14 - Flat or arched ceiling between plenums: standard construction in AISI 304 stainless steel, 320 grain.

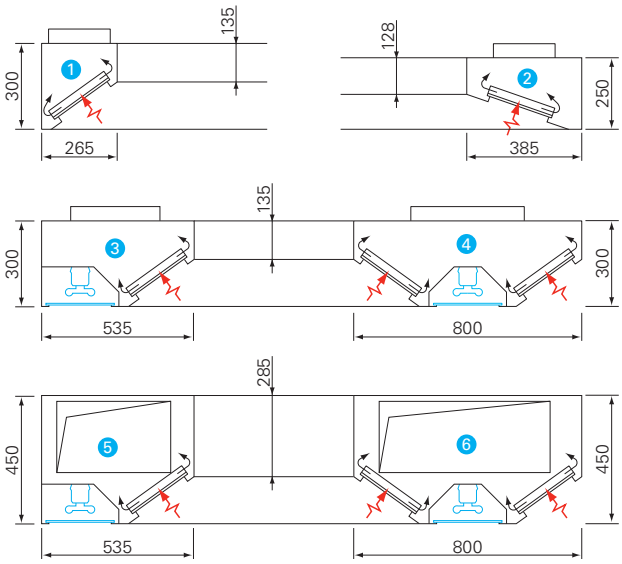
• 15 - Neutral zones, outside cooking areas: standard construction of aluminium pads or panels supported by aluminium profiles, with lights or integrated spotlights and with optional stainless steel neutral zones



Construction and components

Extraction plenums





Constructed from AISI 304 stainless steel, 320 grain, with no visible screws and rivets. Strong side flanges, with a thickness of 1.5 mm. Welded seam for perfect rigidity and waterproofing. TAB plug for pressure testing for quick and reliable control of air flow rates.

1 - EP/S – standard single plenupm without light fitting
2 - EP/SF – extra-flat single plenum without light fitting
3 - EP/SL – standard single plenum with light fitting
4 - EP/DL – standard double plenum with light fitting
5 - EP/SLC – single plenum with integrated collector and light fitting
6 - EP/DLC – double plenum with integrated collector and light fitting

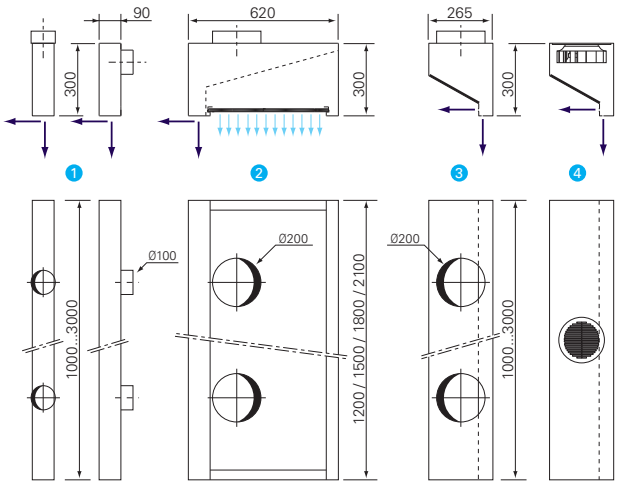
Maximum plenum length: 3,500 mm
Longer lengths are obtained by on-site connection of plenums together .

Installation height (plenum base)

Floor surface area	Minimum	BGN*
< 50 m²	2 300 mm	2500 mm
51–100 m²	2 500 mm	2750 mm
101–200 m²	2 500 mm	3000 mm
> 200 m²	2 500 mm	3250 mm

* Installation heights recommended by BGN (a German-based institution for food processing and restaurant operations)

Capture Jet system*

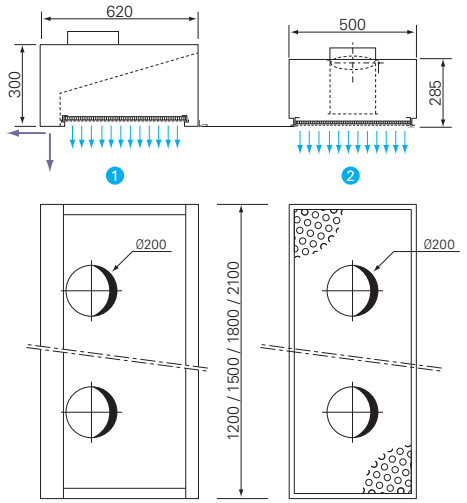


Constructed from AISI 304 stainless steel, of 1 mm thickness. Two sets of nozzles, one vertical and one horizontal.

1 - CJ/B – single Capture Jet, vertical connection
2 - CJ/C – combined Capture Jet and laminar-flow supply
3 - CJ/D – arched Capture Jet module
4 - CJ/DM – arched Capture Jet module with Capture Jet fan

* Patent pending.

Laminar-flow air supply modules



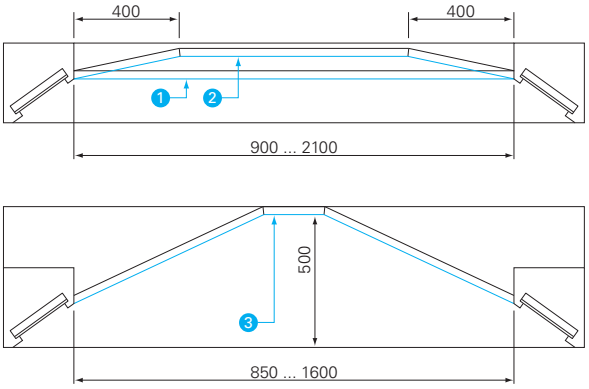
1 - CJ/C – laminar-flow air supply module with capture jets
2 - LF/A – single air supply module

• Single air supply module:
Plenum of galvanised steel. Tubular flow rate distribution system in perforated galvanised steel. Integrated balancing plate. Anodised aluminium facing at the front of a honeycomb structure. Finishing of angles in anodised aluminium. Anti-vibration fixing brackets.

• Air supply module with integrated Capture Jet units:
Design identical to the single air supply module. Plenum in AISI 304 stainless steel, 320 grain. System for distribution of flow between air supply and capture jets.

Options:
250 and 315 mm diameters available
Lateral spigots
Facing in painted aluminium (RAL colour of your choice)
Facing in brushed stainless steel (single air supply module) or painted stainless steel
External thermal insulation

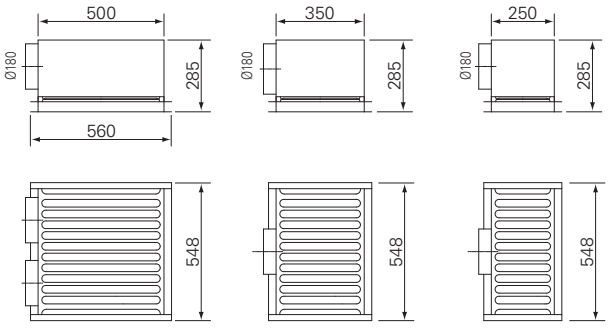
Active ceilings (extraction areas)



Standard construction in AISI 304 stainless steel, 320 grain, 1 mm thickness. Three panel types available:
1 - AC/F – stainless steel flat ceiling (aluminium optional)
2 - AC/D – stainless steel arched ceiling
3 - AC/HC – arched ceiling with high containment volume (For cooking equipment with high emissions or use in the food-processing industry)

Options:
RAL coloured paint

Plenum pinpoint extraction

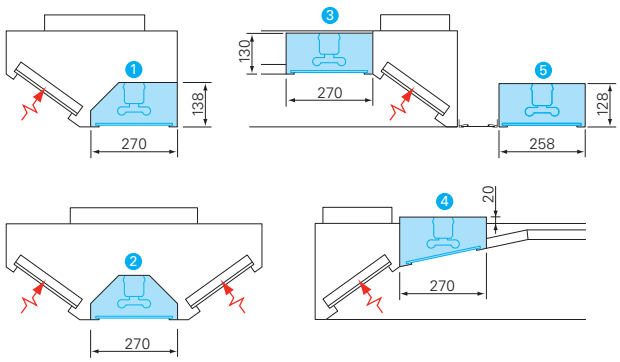


Longueur maximale : 3 500 mm (7 filtres).

Extraction plenums are intended to handle small-sized cooking equipment with low emission levels and located outside the cooking area covered by the kitchen ceiling (the active area), such as small broilers, small steam ovens, and induction hotplates.
Plenum in galvanised steel. Baffle filters in AISI 304 stainless steel, 320 grain, 1 mm thickness. Finishing of angles in anodised aluminium. Three sizes available:
1 - EP/B50 – FC filter, 500 x 500 mm, 600 m^3/h max. @ 55 Pa
2 - EP/B35 – FC filter, 500 x 500 mm, 450 m^3/h max. @ 55 Pa
3 - EP/B25 – FC filter, 500 x 500 mm, 300 m^3/h max. @ 55 Pa

Option :
Other diameter connections

Light fittings



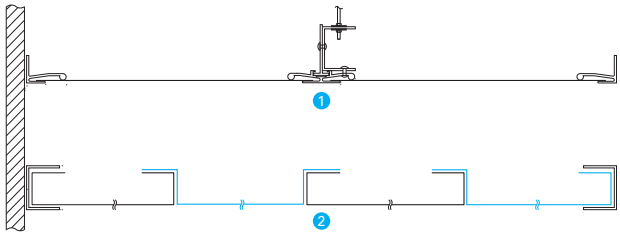
Two-tube lights, IP54, foliated glass bowl 6 mm thick. Electronic ballast (Siteco) and three-phase power rail system.

1 - IL/EP – standard single plenum with light fitting
2 - IL/EP – double plenum with light fitting
3 - IL/FC – light fitting flush with the flat ceiling
4 - IL/DC – light fitting flush with the arched ceiling
5 - IL/NA – light fitting flush with the neutral ceiling

The Siteco system allows the kitchen lighting to be adjusted by means of a three-phase power rail system, which allows one light in three, two in three, or all lighting to be supplied simultaneously.

Options:
IP65 protection, T5 tubes

Neutral ceilings



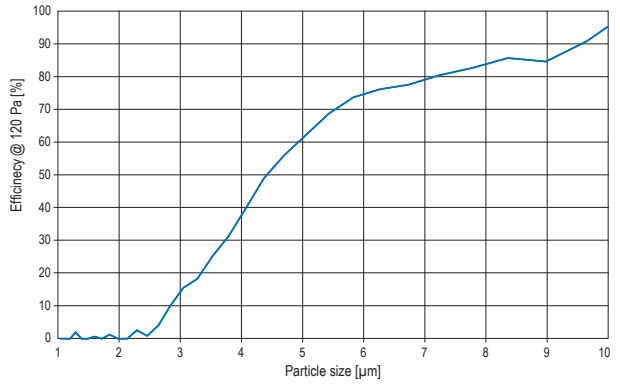
Neutral ceilings in areas with no cooking equipment.

1 - Panel system, with aluminium profile brackets
2 - Panel system, with aluminium angle brackets

NC/PLA – aluminium pads (1)
NC/PAA – aluminium panels (2)
NC/PAS – stainless steel panels (2)

Options:
RAL painting, stainless steel angles (panel system)
Soundproofing (panel system)

KSA cyclonic filters



Recommended air flow rate per filter	400 < Qe < 690 m³/h
Pressure drop	40 < ΔP < 120 Pa

Constructed from AISI 304 (1.4301) polished stainless steel. For 10 µm particles, 95% efficiency (@ 120 Pa). Flame-resistant filter accredited by the UL laboratory and with NSF hygiene and safety approval. Inclined filters to ensure good condensation removal, reduce the risk of fire, and guarantee perfect hygiene in cooking areas.

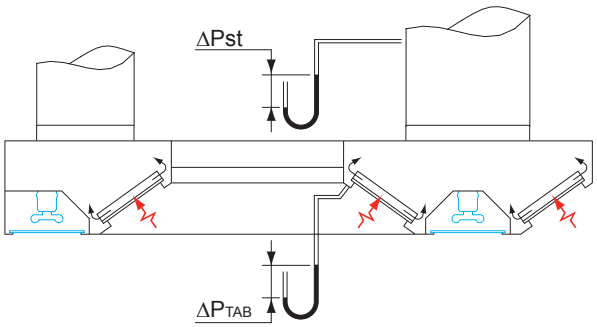
Quick selection data

Code	Description	Standard length [mm]	Footprint [mm]	Recommended air flow rate [m³/h/ml]	[l/s/ml]
EP/S	Single extraction plenum	1000...3500	500	400...1420	110...395
EP/D	Double extraction plenum	1000...3500	500	800...2840	220...790
CJ/C	Combined air supply and Capture Jet module	1000	-	750...1000	208...278
CJ/B	Capture Jet module	1000...3500	500	20...105	6...30
LF/A	Laminar air supply module	1000	-	400...1000	110...278

Ventilated ceiling weight: 15 to 20 kg /m²

Pressure drop, flow rate, and noise level control

Extraction



ΔP_{st} =Total static pressure drop, damper open (Pa)
ΔP_{TAB} = TAB static plug for pressure testing to control flow during the commissioning (Pa)
LpA = Level of noise pressure, in dB(A), with damper open and room attenuation ΔLr of 8 dB

ΔPst is given as a speed in the duct of between 3 and 5 m/s with rectangular spigots. The recommended speed for obtaining uniform pressure and good flow distribution over the length of the extraction plenum must be between these two values.

Total pressure drop per extraction plenum:

The maximum length of an extraction plenum is 3,500 mm. Longer lengths are obtained by connecting several plenums. The maximum number of filters per plenum varies from seven (single extraction plenum) to 14 (double extraction plenum). To calculate the total pressure drop for each extraction plenum, the total flow rate must be divided by the number of filters. The table below gives the total pressure drop.

Measurement and control of the extract flow per extraction plenum:

Each extraction plenum is equipped with a TAB plug for pressure testing. The pressure value measured enables calculating the flow extracted per filter by means of the tables below. This flow can also be calculated via the following formula:

$Qv = k \times \sqrt{\Delta P_{TAB}}$ k = 63 [m³/h] k = 18 [l/s]

The extract flow per extraction plenum is obtained by multiplying the flow per filter by the number of filters.

Technical features per KSA filter

Extraction rate per filter [m³/h]	[l/s]	ΔP_{TAB} [Pa]	ΔP_{ST}* [Pa] 3 m/s	4 m/s	5 m/s	LpA** [dB(A)]
200	56	9	20	27	37	21
250	69	15	25	33	43	26
300	83	21	32	40	50	31
350	97	29	41	48	58	35
400	111	38	50	58	67	38
450	125	48	61	68	78	41

* Damper open
** Damper open, room attenuation ΔLr = 8 dB

Extraction rate per filter [m³/h]	[l/s]	ΔP_{TAB} [Pa]	ΔP_{ST}* [Pa] 3 m/s	4 m/s	5 m/s	LpA** [dB(A)]
500	139	59	73	80	90	44
550	153	72	86	93	103	46
600	167	85	100	108	118	47
650	181	100	116	124	133	49
690	192	120	130	137	147	51

* Damper open
** Damper open, room attenuation ΔLr = 8 dB

Sound level per extraction plenum:

The method is the same as that used for calculating the pressure drop. The value for flow per filter enables determination of a filter's sound pressure level by consulting the tables above. The total sound level pressure of a single or double extraction plenum is obtained by using the correction factors in the table opposite.

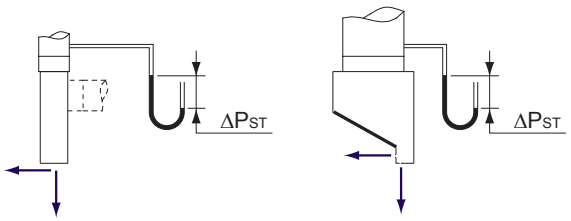
LpA plenum = LpA filter + Correction

Number of filters	1	2	3	4	5	6	7
Correction	0.0	3.0	4.8	6.0	7.0	7.8	8.5

Number of filters	8	9	10	11	12	13	14
Correction	9.0	9.5	10.0	10.4	10.8	11.1	11.5

Pressure drop

Capture Jet modules

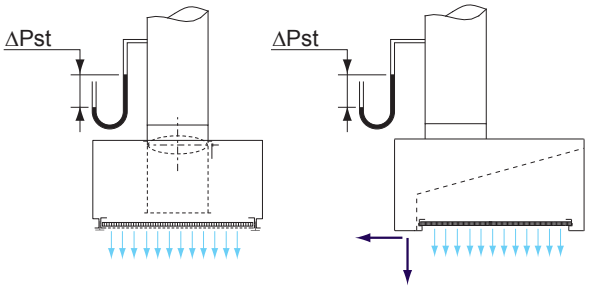


Single Capture Jet module (per linear metre):

Maximum length	3,500 mm
Flow	20 to 30 m³/h (5.5 to 8.3 l/s)
Static pressure drop	ΔPst = 40 to 60 Pa

Pressure loss, sound levels

Laminar air supply module



ΔPst = Static pressure loss, damper open (Pa)
LpA = Level of noise pressure, in dB(A), with damper open and room attenuation ΔLr of 8 dB

The recommended flow values to satisfy the VDI 2052 and DIN 18869 recommendations and limit the air velocity in the occupied zone to less than 0.25 m/s are identified by an asterisk (*).

Technical features

Length [mm]	Supply flow rate [m³/h]	[l/s]	ΔP_{ST} [Pa]	LpA** [dB(A)]
1 000	400*	111	11	21
	500*	139	17	25
	600*	167	25	30
	700*	194	34	34
	800	222	44	38
	900	250	56	42
	1000	278	69	46
1 200	500*	139	13	23
	600*	167	18	27
	700*	194	25	31
	800*	222	33	34
	1000	278	51	42
	1200	333	73	48

* Recommended flow to satisfy the VDI 2052 and DIN 18869 standards and limit the air velocity in the occupied zone to less than 0.25 m/s
** Damper open with room attenuation ΔLr = 8 dB

Length [mm]	Supply flow rate [m³/h]	[l/s]	ΔP_{ST} [Pa]	LpA** [dB(A)]
1 800	700*	194	13	25
	800*	222	18	28
	900*	250	22	31
	1000*	278	40	39
	1200	333	46	42
	1400	389	54	44
	1600	444	62	47
	1800	500	89	53
2 100	1000*	278	22	31
	1100*	306	27	34
	1200*	333	32	37
	1400*	389	43	41
	1600	444	56	46
	1800	500	71	50
	2000	556	88	53
	2100	583	97	55

* Recommended flow to satisfy the VDI 2052 and DIN 18869 standards and limit the air velocity in the occupied zone to less than 0.25 m/s
** Damper open with room attenuation ΔLr = 8 dB

Air supply module combined with capture jets

Length [mm]	Supply flow rate [m³/h]	[l/s]	ΔP_{ST}** [Pa]	LpA*** [dB(A)]
1 000	750*	208	50	41.1
	800	222	57	43.7
	1000	278	89	53.0
1 200	850*	236	49	42.0
	1000	278	68	48.5
	1200	333	97	56.1

* Recommended flow to satisfy the VDI 2052 and DIN 18869 standards and limit the air velocity in the occupied zone to less than 0.25 m/s
** Damper open
*** Damper open with room attenuation ΔLr = 8 dB

Length [mm]	Supply flow rate [m³/h]	[l/s]	ΔP_{ST}** [Pa]	LpA*** [dB(A)]
1 800	1150*	319	50	45.3
	1400	389	75	53.1
	1600	444	98	58.6
2 100	1250*	347	48	45.5
	1400*	389	61	49.9
	1600	444	79	55.2
	1800	500	100	60.0

* Recommended flow to satisfy the VDI 2052 and DIN 18869 standards and limit the air velocity in the occupied zone to less than 0.25 m/s
** Damper open
*** Damper open with room attenuation ΔLr = 8 dB

Suggested specifications

The kitchen / cooking area ventilation will be designed with a Halton KCJ ventilated ceiling with Capture Jet technology.

The ventilated ceiling with capture jets must be supplied and installed in accordance with the supplier's recommendations and plans, and it shall be designed specifically for the room. It must be a closed type, to avoid any contact between the cooking vapours and the frame and thus guarantee hygiene and safety. The flow rate for extraction must be based on an accurate calculation of the thermal flow generated by the cooking equipment covered by the ceiling. Accordingly, this calculation must take into account the type of equipment in the cooking area, the energy used by each item, the power of the units in use at any given time, the configuration of the cooking range, and the size of the equipment.

Extraction plenums

Extraction plenums shall be manufactured of AISI 304 stainless steel, treated on one side with the Duplo process (brushed, 320 grain), with a minimum thickness of 1 mm. The extraction plenums must be waterproof and resistant to the acidity of fats. Condensation will be collected in the lower part and removed regularly via a drain. The extraction units will be fitted with KSA-type stainless steel cyclonic filters. Their removal efficiency must be at least 95% for particles of 10 microns and above and must be certified by an independent laboratory, and their pressure drop should not exceed 120 Pa. The sound pressure level must not exceed 50 to 60 dB in measurements carried out 1.7 m from floor level. The filters must be UL- and NSF-certified. Baffle filters cannot be selected.

Double capture jets

Double capture jets shall be used to increase capture efficiency and the ceiling's containment volume. Capture Jet modules must be completely integrated into the ceiling and be equipped with two sets of aerodynamic nozzles, one vertical and one horizontal. The nozzle's output speed will be at least 8 m/s. The capture jets used determine the extent of the cooking area covered and will not generate draughts, so as not to disperse convective flows from the cooking equipment. Linear slot system types cannot be chosen.

Laminar-flow supply modules

The air supply modules must have a streamline flow (provided via a patented system). They will consist of a distribution cylinder to cut the flow speed and distribute air uniformly through the module. Convective flows will be streamlined through the combination of a honeycomb structure and perforated front. Fresh air will be spread at low velocity to avoid draught and thus eliminate disturbance to the capture and confinement of vapours.

Arched design

The cover panels between plenums will be arched, in AISI 304 stainless steel, 320 grain, of 1 mm thickness. They will be designed to fit together with an overlap to allow the panels to be serviced during cleaning operations and to prevent cooking vapours from moving through them. The panels must be able to be dismantled without tools, in order to allow easy access for maintenance in the area above the ceiling. The height of the arches will be calculated and dimensioned to match the total volume of vapour to be removed.

Lighting

As standard, the ceiling will have integrated lights with high-frequency fluorescent tubes, 2 x 58 W, 230 V / 50 Hz, with electronic ballast (electronic control gear). Power will be supplied via a three-phase power rail system (Siteco), making it possible to adjust the number of lights switched on and the lighting location. The protection glass will be equipped with a seal, providing IP54 protection. The entire fitting shall be resistant to temperatures above 90 °C.

Port for pressure testing

The kitchen ceiling must be equipped with a TAB plug for pressure testing and balancing. The flow extracted through the KSA filters and the flow used by Capture Jet units can be controlled via comparing pressure measurements against the curves delivered with the ceiling.