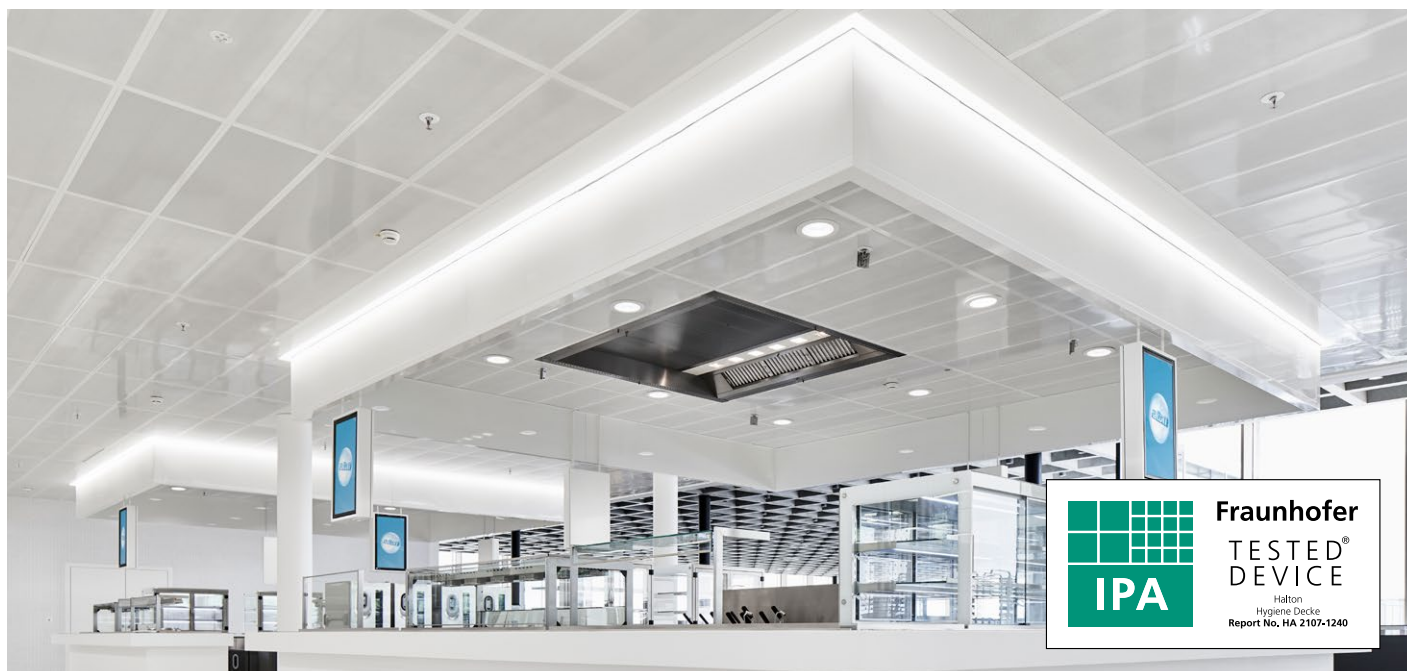


Design "bandrastrer" (flat healds) metal ceiling for applications with strong hygiene demands
 ◦ High cleanability ◦ Acoustic version ◦ Halton Skyline LED lighting ◦ Ease of services integration



Product certification(s)



Pending certification



In brief - The HSC high quality suspended metal ceiling complies with the highest demands in terms of hygiene, maintenance and robustness while keeping its impeccable aesthetics and stability over time.

Safety and hygiene provisions



Highest cleanability
 Design according to HACCP,
 EHEDG, GMP and ISO demands



Lowest particle emissions level
 Tested according to ISO 14644-1



Lowest VOCs & SVOCs emission levels
 Tested according to VDI 2083



Biological and chemical resistant
 Complying with ISO 846



No H₂O₂ adsorption/desorption
 Tested according to VDI 2083
 (sheet 20)



High fire protection
 Material class A2 – s1, d0 according
 to EN 13501-1

Other features & services integration



Halton Skyline LED daylight-similar lighting
 Integrated seamless and flush



Acoustic panels (option)
 Hygienic material with a high
 efficient sound absorption



Integrated low velocity supply solutions
 Better comfort and air quality



Integrated exhaust boxes with filtration
 For isolated and low emission
 equipment



Preparation for other services integration
 Respect for the product and better
 finish



Hygienic wall profile (option)
 Higher cleaning easiness of the
 junctions walls/ceiling



"Lift & Slide"
 Faster access to the ceiling void
 without having to remove the panels

Description and main technologies



In brief - The HSC high quality suspended metal ceiling complies with the highest demands in terms of hygiene, maintenance and robustness while keeping its impeccable aesthetics and stability over time.

Halton's range of so called passive ceiling is an ideal solution for rooms with strong requirements in terms of hygiene and maintenance, such as kitchens, diswashing areas or foodprocessing industry, but also hospitals or laboratories.

HSC ceilings comply with the highest hygiene requirements while offering unique architectural qualities. Its exclusive design is based on components that are all assembled together flush. The wide supporting profiles ("bandraster" or flat healds) enable in addition to increase the ceiling's panels span and width, with no compromise on stability. The number of healds and pannels is reduced. Less components, all mounted flush means less junctions where dirt can builds-up. HSC ceilings are hence easier and faster to clean.

The supporting profiles are designed to allow only few clearly identified panels to be lifted up. As long as they are in place, the other pannels can't be either removed or lifted up unintentionally. This greatly facilitates the cleaning operations, whatever their intensity.

Only few panels marked as such can be lifted up. Thanks to the Halton's "Lift & Slide" feature, they can be easily lifted up and slided on the top of the ceiling, enbaling other panels to be removed the same way. It allows for a large and quick access to the ceiling void for maintenance, without tool and especially without taking up space in the kitchen.

HSC ceilings is equipped with the Halton Skyline light fittings, also integrated flush. In its Human Centric version, Halton Skyline enables creating a lighting cycle close to that of the daylight, to improve the occupants' Wellbeing.

As an option, the ceilings' panels can be also equipped with an encapsulated acoustic insulation that directly contributes to significantly reducing the sound pressure level. The panels then improve the working conditions in noisy spaces while keeping the hygiene at the highest level.

HSC ceilings allow for the integration of multiple services such as HVAC components, emergency signs, smoke detectors, speakers etc from factory directly or on site by third parties. They are therefore equally suitable to all projects' spaces requiring a high quality suspended ceiling.

Hygiene certification

- HSC ceiling's components passed a wide variety of tests, carried out in the laboratories of the the Fraunhofer Institute IPA in Stuttgart.
- Suitable to all type of spaces and requirements, from commercial kitchens to clean rooms.

Services integration

- Halton's Laminar Flow Units (LFU) that contribute to better working conditions and better air quality.
- Halton's Extraction Box (KBO) with FC aerosol separators for isolated low duty cooking appliances in kitchens. Other extraction solutions available.
- Halton Skyline (HCL) light fittings equally efficient as a culinary ligthing or as Human Centric lighting, or both.
- The bandrasters (wide flat healds) can be used as cable trays.
- Other services or preparation for site services integration on request.

Other main features

- Constructed from stainless steel or aluminium, anodised or painted.
- Low height ceiling with supporting of bandraster-type (wide flat healds) for the highest stability. No need of reinforcement profiles.
- No traditional support profiles excepting for the connection to the walls. Optional wall connection profile of "cove" type.
- All components mounted flush.
- Easy to clean. Quick access to the ceiling void for maintenance.
- Earthquake-proof quick connectors.
- Multiple customization possibilities on shapes and finishes.



Highest hygiene and design standard

Suitable for kitchens and foodprocessing up to cleanrooms



Together with the metal ceilings' design specification, the material used and its surface properties are of great importance in areas with strong hygiene requirements. HSC metal ceiling has been developed according to the directives and rules of the GMPs (Good Manufacturing Practices) and the recommendations of EHEDG foundation's (European Hygienic Engineering and Design Group).

The HSC metal's ceiling design and manufacturing provisions first greatly limit the build-up of contaminants on its surface. To reach that goal, all its components, including the wide flat supporting healds, are assembled metal-to-metal and in a flush way. The whole visible surface is flat, without any protruding connecting elements (such as T profiles, rivets

or screws) which represent a risk of dirt build-up, difficult to remove during cleaning. By using wider panels of greater span, the proportion of joints is significantly lower compared to classic ceilings.

The metal used for HSC ceilings' manufacturing, and its surface properties, are the second key point to match the strongest hygiene requirements. It should not only facilitate regular cleaning operations but also to not be itself a source of contaminants. The paint has been carefully selected to get a smooth and homogeneous surface with a high resistance, mechanical and chemical for an efficient and safe use of common cleaning and disinfectant agents. The paint itself should also not release particles or gas, neither favor the proliferation of fungi or bacteria.

Certification

Halton HSC ceiling underwent and passed a wide variety of tests, which were carried out in the laboratories of the Fraunhofer Institute IPA in Stuttgart as shown below. HACCP International certification is pending.

Till clean rooms

Designed to match the hygiene requirements of kitchens, dish washing areas or food processing industries, HSC ceiling is suitable to any other application with architectural or hygiene challenges, till clean rooms. In that case, the only difference is that the components' junction have to be treated with a specific sealant.

Test	Standard	Category	Classification/Rating	
Particles emission	ISO 14644-1	-	Air cleanliness class	1 (lowest emissions)
Gas emission	ISO 14644-8	VOC SVOC Amines Organophosphates Siloxanes Phthalates	ISO-ACC _m class	Undetectable Undetectable Undetectable Undetectable Undetectable Undetectable
Chemical resistance	VDI 2083, sheet 17	Formalin 37% Ammonia 25% Hydrogen peroxide 30% Sulfuric acid 5% Phosphoric acid 30% Peracetic acid 15% Hydrochloric acid 5% Isopropanol 100% Sodium hydroxide 5% Sodium hypochlorite 5%	Classification after 24h exposure time	Excellent Excellent Excellent Excellent Excellent Good Excellent Excellent Excellent Excellent
Biological behaviour	ISO 846	Fungi (Method A) Bacteria (Method C)	Classification	None Excellent
Hydrogen Peroxide absorption & desorption	VDI 2083, sheet 20	H ₂ O ₂	ø k-value [min]	Non-absorptive

HSC

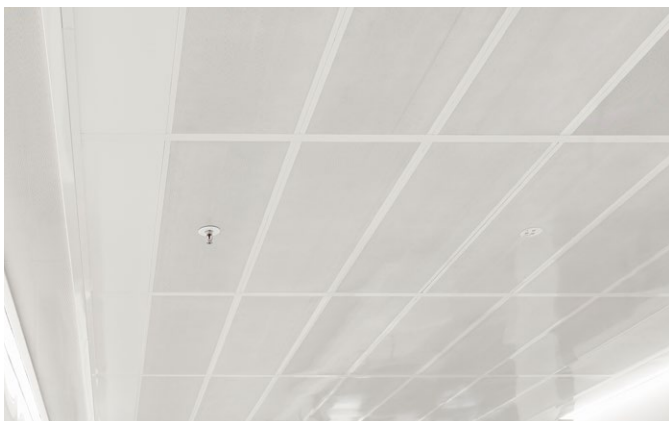
Design "bandraster" (flat healds) metal ceiling for applications with strong hygiene demands
 • High cleanability • Acoustic version • Halton Skyline LED lighting • Ease of services integration

Halton



Acoustic ceiling

Improved acoustic comfort and discussions' intelligibility



- Sandwich construction for all parts to be easy to dismantle and clean.
- Detergents resistant.
- B1 class fire protection.
- Option for consistent wall panels to increase the absorption surface.
- No breeding ground for microorganisms.

How does it work?

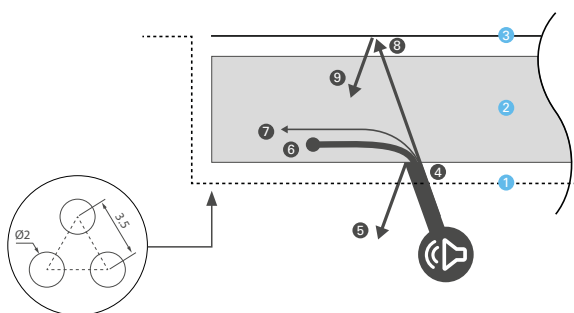
- The acoustic insulation is made of closed-cell, low-density polyethylene foam. It is specifically for humid environment or steam exposures.
- The sound waves penetrate the insulation through the pannels perforated front. The acoustic energy then largely convert into heat.
- The pannels' back plate reflects what remains of the sound waves back into the foam, to further increases its absorption.
- The higher the degree of absorption of the acoustic insulation, the higher the sound absorption

In areas with strong hygiene demands, the surfaces of the walls, floors and ceilings are usually very hard and smooth, in order to efficiently prevent contaminants settling on it and make them easier to remove during cleaning operations. The inconvenience is that it creates a very reflective space for the noise. Porous and open-pored materials and surfaces are indeed required to get a good acoustic comfort.

The HSC ceiling's optional acoustic panels combine hygiene with efficient sound attenuation properties and directly contribute to a better acoustic comfort.

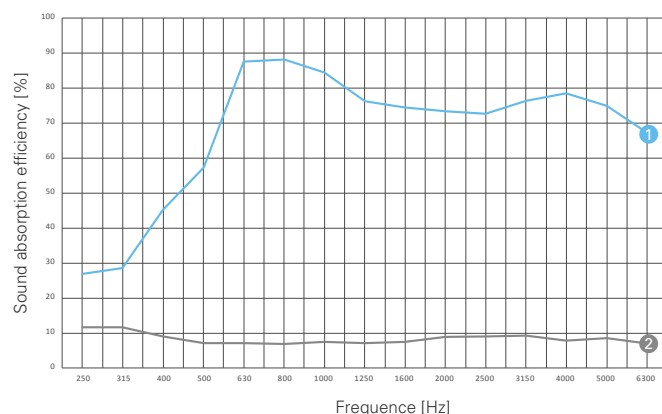
Benefits

- Significant improvement of the sound absorption by the ceiling and reduction of the reverberation time.
- Improvement of speech intelligibility and acoustic quality of rooms Max use temperature of up to +100°C.



(1) Panels' perforated front (2) Acoustic insulation (3) Reflection plate

When reaching HSC acoustic panel, the energy of the incident sound wave (4) is split into the following components: the reflected sound (5), the absorbed sound (6), the sound transmitted by conduction (7) and the transmitted sound (8). The transmitted sound is reflected back to the acoustic insulation (9) thanks to the panel's back plate.

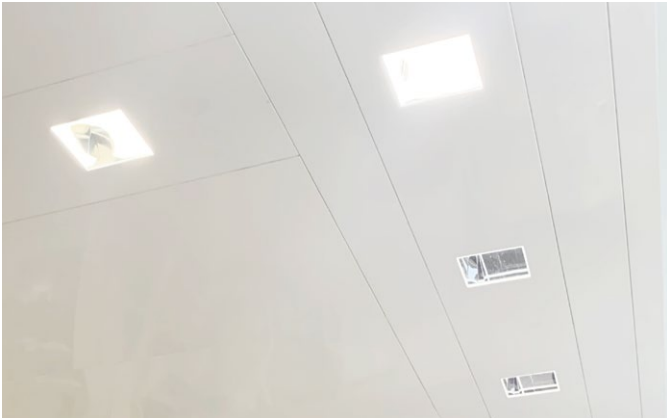


Sound absorption efficiency per octave according to ISO 354 of the HSC ceiling with acoustic insulation (1) and without (2)



Halton Skyline (HCL)

Human Centric effective lighting

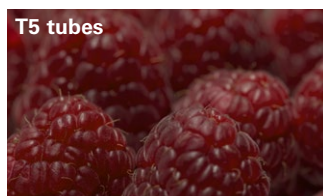


The link between a good lighting, better working conditions and teams' productivity is now widely recognized. Halton Skyline is the first LED lighting system specially developed for commercial kitchens and, in general, all spaces with strong visual comfort or safety requirements. Its Human Centric version is an asset for people's Wellbeing.

How does it work?

Halton Skyline is based on the use of two types of light sources, both equipped with highly efficient LEDs.

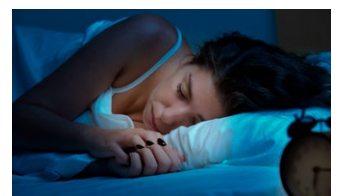
A broad beam spot with a fixed light color temperature of 3000 or 4000K. It is equipped with a specific light diffuser and reflector. It provides a uniform and bright general lighting without dazzling risk. The Human Centric version of this spot is equipped with two sets of LEDs to allow for adjusting the light color temperature from 2200 to 6500K. This enables creating daylight-similar sequences to offer lighting conditions that are Circadian rhythm-friendly, to improve people's Wellbeing. For the most natural and true color rendering as possible, Halton Skyline's standard Ra/CRI (Color Rendering Index) is 80 (up to 90 if required).



T5 tubes



Halton Skyline



A focussed beam spot (2800K - CRI of 95) - It is used to locally further improve the lighting quality and level on areas with stronger demands due to sensible visual tasks.

Both spot models are dimmable with a swiych or any DALI compatible control system. In that case, advanced zoning and programing functions can be implemented.

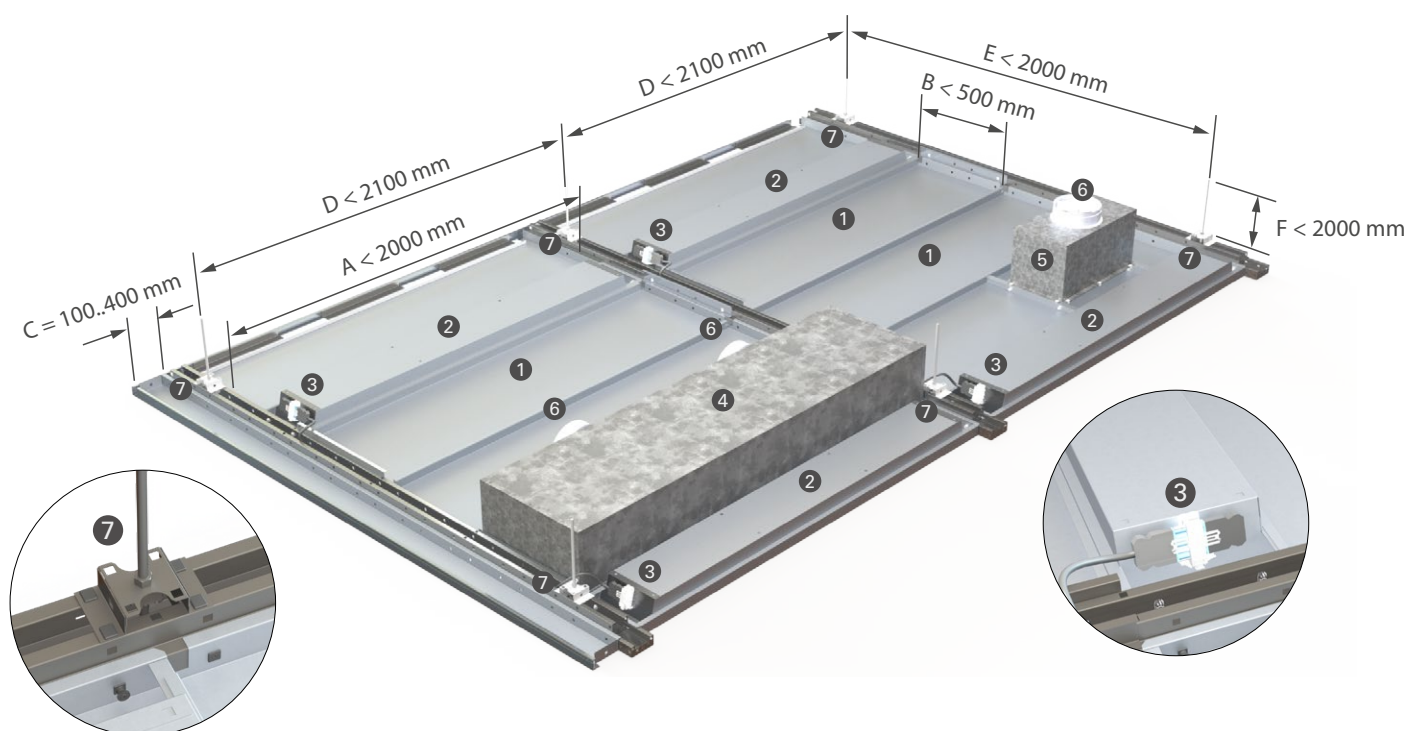
Benefits

- Very good illuminance levels and uniform light, with a good balance between the direct and diffuse components.
- Remarkabe color and texture render.
- Up to 80% energy savings compared to T5 tubes.
- Long life time of at least 50,000 hours.
- The spot's protection glass is mounted flush on the light beams for a better hygiene and cleaning easyness ease.
- Protection rating of IP54 against water spray from below.
- "Plug & play" with keyed connection sockets.

Demographic change contribute to longer careers.

To preserve at best our visual comfort and acuity, the lighting system's requirement must also be reinforced to propose light intensities and protection against glare both higher. On request, we target average illuminance levels (in visual task areas) of 500lx, 750lx or over 1000lx to match these requirements.

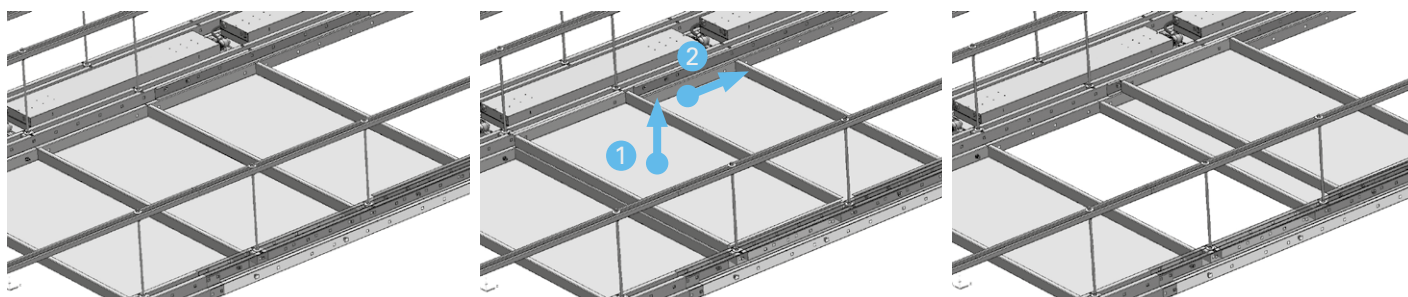
Description and dimensions



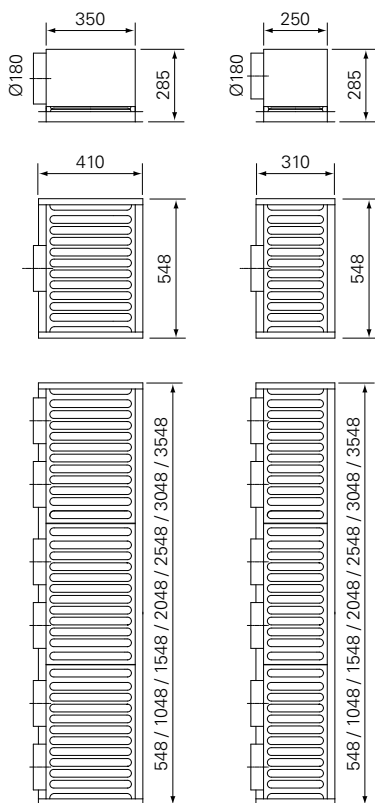
- 1 Panel or acoustic panel
- 2 Halton Skyline light fittings (500 / 750 / 10000 lx)
- 3 Light fitting connector (possibility of through wiring for the next light fitting)
- 4 Make-up air with Laminar Flow Units (LFU) (with honeycomb structure to prevent internal air recirculation)
- 5 Extraction Box (KBO) with high efficient FC filters
- 6 Connections to the ductwork
- 7 Suspension bracket / Threaded rods

- A Panel length max 2000 mm
- B Panel width max 500 mm
- C Flat healds width 100..400 mm
- D Suspension grid (X) max 2100 mm
- E Suspension grid (Y) max 2000 mm
- F Threaded rods height max 2000 mm

"Lift & Slide"



Extraction box (KBO) integration

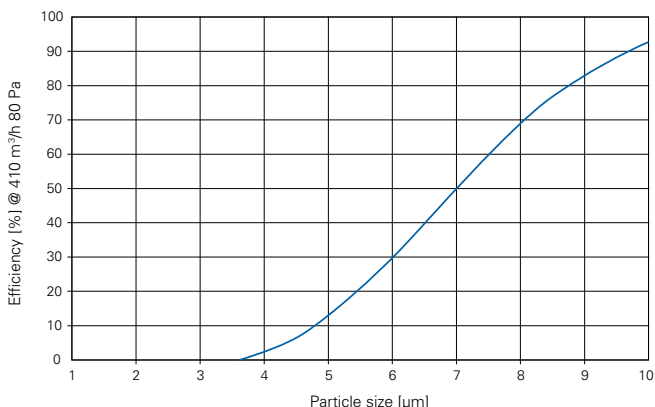


Extraction boxes are designed to deal with low emission, steam or heat based, appliances located outside the cooking areas (for example coffee machines, glass washers, temperature holding equipment etc). They complement the Capture Jet™ hoods and Capture Jet™ ventilated ceilings.

- Plenum in galvanised steel. Peripheral profiles in anodised aluminium.
- High efficiency FC filters constructed from AISI 304 stainless steel, mirror polished, 1 mm thickness. Constant pressure loss.
- Two filter sizes available :
FC 500 x 350 mm
FC 500 x 250 mm
- Up to 7 filters per extraction box.
- Filter washable in dishwasher.
- Compatible with a kitchen equipped with M.A.R.V.E.L.

Options:

- Other diameter connections;
- Special finishings.



FC filter's efficiency curve according to the VDI 2052 method
(Part 1) «Kitchen ventilation units. Determining the degree of separation of aerosol separators in kitchen exhaust air»

Suggested specifications

HSC Hygienedecke

The hygienic metal ceiling shall be Halton brand - range HSC. It shall be of the Bandraster (wide flat healds) type, specifically designed for areas with strong hygiene requirements such as commercial kitchens, dish washing areas, food processing industries, hospitals, laboratories or clean rooms.

Installation shall be carried out by the manufacturer or a duly trained and authorised partner.

The ceilings shall be supplied ready to be installed. The light fittings and any other service delivered by the manufacturer shall be delivered fully pre-wired. If applicable, the services installed by third parties, shall be according to the manufacturers instructions and recommendations.

The following specifications shall be fully observed.

Hygiene constructive provisions

- The wide flat healds design shall enable increasing the ceiling's panels width and span to reduce the proportion of components junctions on the ceilings' surface.
- All ceilings components shall be mounted flush, with vertical metal-to-metal junctions, to facilitates their cleaning.
- T profiles and protruding fixing or assembling means, such as rivets or screws, shall not be used.
- L profiles shall be used for the ceiling's junction to the walls only.
- [Alternative] The junction of the ceiling with the walls shall be based "cove" type profile to make it easy to clean.
- The non-removable components shall be fixed to the ceiling's structure with quick "click-type" connectors, resistant to shaking and vibrations. This provision shall also reinforce the flat healds grid's stability and correct alignment, to reduce the gaps at all components' junction and, in fine, the risk of particle or germ accumulation.
- The paint shall enable to get a smooth and homogeneous surface with a high resistance, mechanical and chemical for an efficient and safe use of common cleaning and disinfectant agents.
- The paint shall not release particles or gas, neither favor the proliferation of fungi or bacteria.

Hygiene certification

- The ceiling shall be HACCP certified (or pending).
- The ceiling's behaviour to mechanical, chemical or bacteriological exposure shall be tested by an independent laboratory.

- The particles and gas emission tests shall comply with ISO 14644 standard. The ceiling's particle emission shall correspond to the ISO1 clean room air purity class.
- The chemical resistance and hydrogen peroxide H_2O_2 absorption and desorption shall be tested according to the VDI 2083. The ceiling shall not absorb hydrogen peroxide.
- The biological behavior shall be tested according to ISO 846 standard.
- The ceiling shall be is non-absorptive to H_2O_2 and the particle emission corresponds to ISO1 clean room air purity class according to ISO 14644-1.

Material and additional constructive provisions

- [Option 1] 1 mm thick aluminum, coated with GSB approved polyester powder, paint thickness 80µ, RAL 9010 as standard, other RAL on demand.
high resistance to a large number of cleaning agents and disinfectants
 - [Option 2] 1 mm thick aluminium, AlMg1 semi-hard, natural color anodized E6/EV1, with a high resistance to a large number of cleaning agents and disinfectants
 - [Option 3] 1 mm thick chrome-nickel steel, material no. 1.4301, treated on one side by Duplo process (with 320 Grain ground and brushed), with a high resistance to a large number of cleaning agents and disinfectants.
 - The panels and flat healds that compose each area shall be suspended by threaded rods and protected against vertical and lateral movements.
 - The healds' suspension brackets shall be horizontally and vertically adjustable to facilitate the installation and assembly.
 - The connection profiles to the wall shall be on the same material as the ceiling excepting when the "cove" type profile is used.
 - The flat healds shall be wide enough and designed to enable the installation of sprinklers, emergency lights, motion detectors or to be used as cable trays if needed.
 - The ceiling shall enable the panels identified as removable for inspection to be lifted up and slid on top of the ceiling ("Lift & Slide" design). Once removed it shall enable the next panel(s) to be removed the same way.
 - During cleaning, the panels not identified as removable shall remain fix to facilitate the operations.
- Fire protection class: A1 (non-flammable) according to EN 13501-1
- General dimensions:
Construction height: 90 mm
Bandraster width: 100 mm
Panel width: 500 mm
Panel length: max. 2100 mm

[Option] Sealant for clean rooms

- The junctions between the ceilings' components shall be filled with a sealant, including the panels identified as removable.
- The sealant shall be resistant to detergents and disinfectants.

Halton Skyline Lighting system

- The light fittings shall be constructed from aluminium. They shall be equipped with Halton Skyline flush-mounted broad beam spots.
- [Option] The broad beam spots shall be combined with focussed beam spots to locally increase the lighting level and Color Rendering Index (CRI), according to the manufacturer's recommendations.
- Refer to the specific description.

[Option] Combination with a ventilated ceiling for commercial kitchens

- The low or medium duty cooking appliances, necessarily isolated and located under the hygienic ceiling shall be treated with extraction boxes.
- The extraction boxes shall be Halton Brand, KBO range. Its plenum shall be constructed from 1.0 mm galvanized steel.
- The exhaust plenums shall be equipped with twin FC aerosol separators complying with the standard DIN 18869-5.
- Size, location and number of connections of the extraction boxes upon manufacturer's recommendations.
- The makeup air design, especially the diffusers type, size, and location as well as the means to get a correct balance between exhaust and supply, shall be entrusted to the manufacturer. It impacts the exhaust airflow rates, the capture efficiency and is also key to preventing cross-contaminations.
- The makeup-air shall be managed by way of low velocity diffusers, of laminar flow type.
- The diffusers shall be Halton brand, LFU range. Its plenum shall be constructed from 1.0 galvanized steel.
- They shall be equipped with a perforated aluminium front, combined with a honeycomb structure to streamline the air and prevent the recirculation of ambient air inside the diffuser.
- Size, location and number of connections of the diffusers upon manufacturer's recommendations.

[Option] Third parties' services integration

- The cut-outs and provisions required for the integration the services not delivered by the manufacturer shall be prepared by the manufacturer.
- The third parties shall provide to the manufacturer all information required for the preparation and shall follow the manufacturer's instructions and recommendation for a proper installation on the ceiling.

Installation provisions and conditions

- The hygienic ceiling installation shall be carefully coordinated with all parties involved so that it is installed without interruption.
- Specific lifting equipment for rooms above 4.50 m, tools, expenses and accommodation for the installation team shall be taken into account.
- Crushing and power supplies for the equipment integrated on the ceiling and any substructure required for the ceiling's suspension if there is no load-bearing ceiling are not in the manufacturer's scope of responsibility.
- The assembly shall take place within the legal normal working hours.

Surface

- The ceilings surface area shall take into account the integrated components, the cut-outs above 2.5 m² and the LED light fittings.

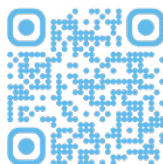
HSC

Design "bandraster" (flat healds) metal ceiling for applications with strong hygiene demands
◦ High cleanability ◦ Acoustic version ◦ Halton Skyline LED lighting ◦ Ease of services integration


Halton

Notes

halton.com

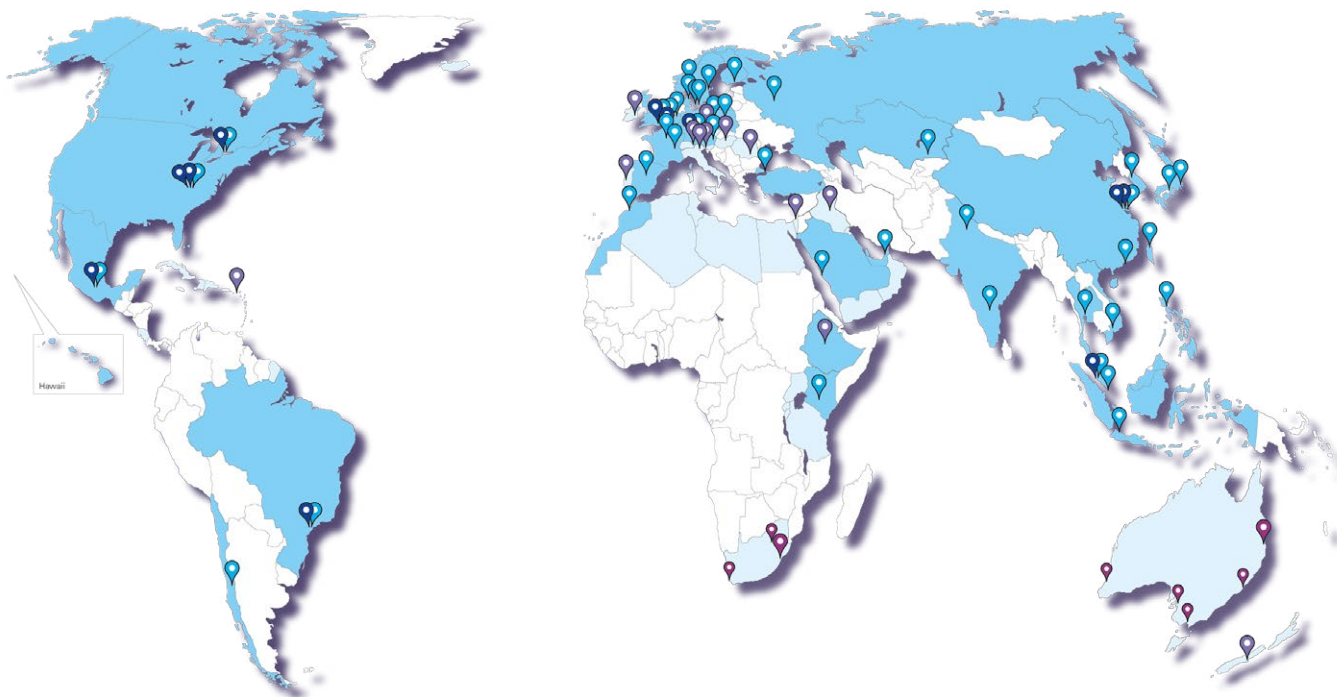


Halton Produktions- und Vertriebsstätten in der ganzen Welt

 Vertriebs- und Servicezentren

 Vertreter

 Fabriken

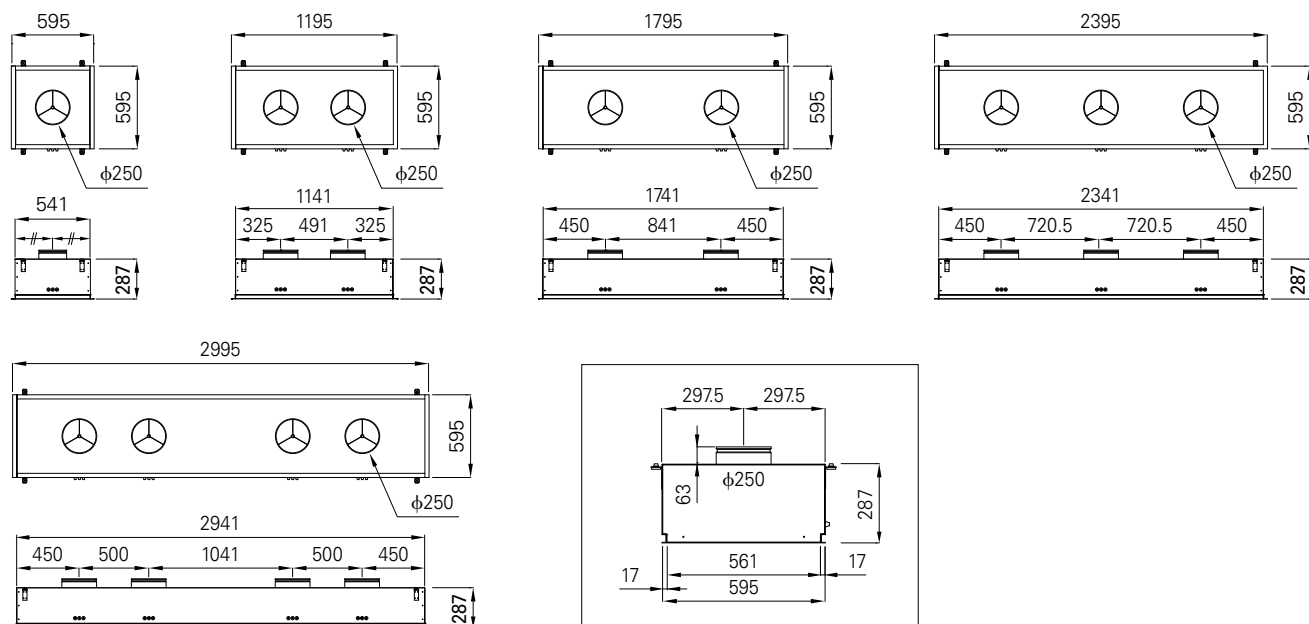
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Verdrängungsluftdurchlässe Typ LFU

LFU-SA / Dimensionen der Standardelemente mit Anschlüssen oben

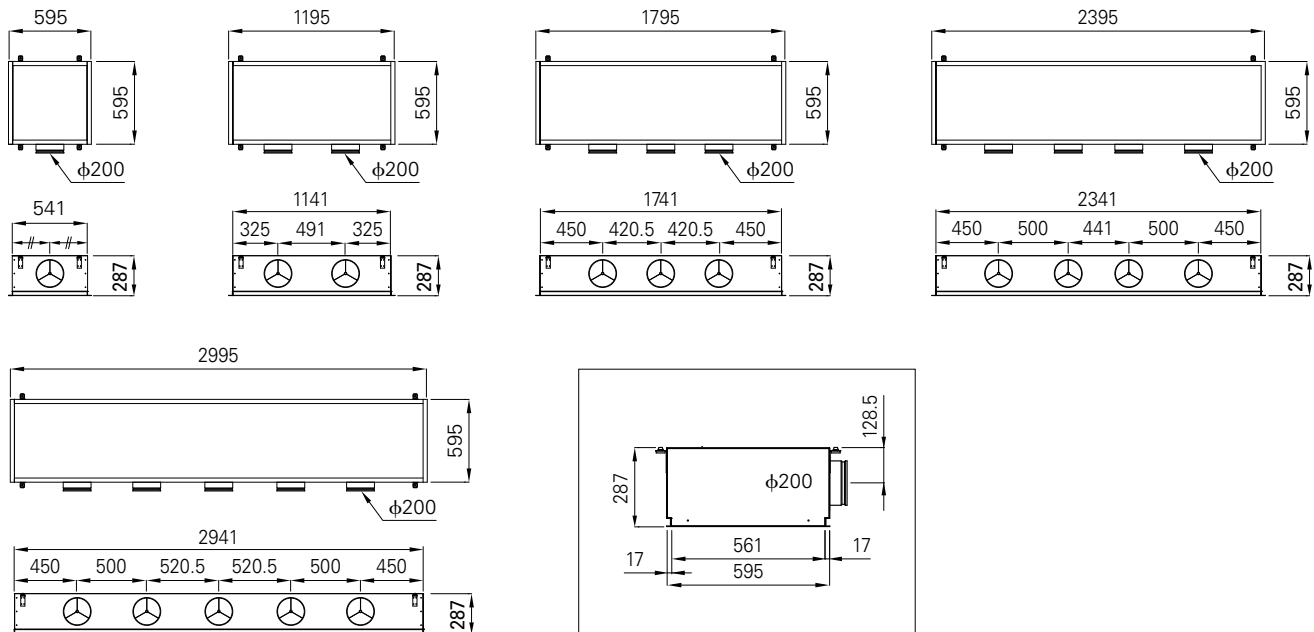


Qv		595 x 595 mm 1 x Ø250 mm				1195 x 595 mm 2 x Ø250 mm				1795 x 595 mm 2 x Ø250 mm				2395 x 595 mm 3 x Ø250 mm				2995 x 595 mm 4 x Ø250 mm				
		V (1) [m/s]	ΔPst (2) [Pa]	LwA (3) [dB(A)]	LpA (4) [dB(A)]	V (1) [m/s]	ΔPst (2) [Pa]	LwA (3) [dB(A)]	LpA (4) [dB(A)]	V (1) [m/s]	ΔPst (2) [Pa]	LwA (3) [dB(A)]	LpA (4) [dB(A)]	V (1) [m/s]	ΔPst (2) [Pa]	LwA (3) [dB(A)]	LpA (4) [dB(A)]	V (1) [m/s]	ΔPst (2) [Pa]	LwA (3) [dB(A)]	LpA (4) [dB(A)]	
[m³/h]	[l/s]																					
400	111	2.3	8	<25	<25																	
600	167	3.4	18	30	26																	
800	222	4.5	32	38	34	2.3	8	<25	<25	2.3	8	<25	<25									
1000	278	5.7	50	45	41	2.8	13	27	<25	2.8	13	27	<25	1.9	6	<25	<25					
1200	333	6.8	73	51	47	3.4	18	33	29	3.4	18	33	29	2.3	8	<25	<25					
1400	389	7.9	99	55	51	4.0	25	37	33	4.0	25	37	33	2.6	11	27	<25	2.0	6	<25	<25	
1600	444	9.1	129	59	55	4.5	32	41	37	4.5	32	41	37	3.0	14	31	27	2.3	8	<25	<25	
1800	500	10.2	163	63	59	5.1	41	45	41	5.1	41	45	41	3.4	18	35	31	2.5	10	27	<25	
2000	556					5.7	50	48	44	5.7	50	48	44	3.8	22	38	34	2.8	13	30	26	
2200	611					6.2	61	51	47	6.2	61	51	47	4.1	27	41	37	3.1	15	33	29	
2400	667					6.8	73	54	50	6.8	73	54	50	4.5	32	43	39	3.4	18	36	32	
2600	722					7.4	85	56	52	7.4	85	56	52	4.9	38	46	42	3.7	21	38	34	
2800	778					7.9	99	58	54	7.9	99	58	54	5.3	44	48	44	4.0	25	40	36	
3000	833					8.5	113	60	56	8.5	113	60	56	5.7	50	50	46	4.2	28	43	39	
3200	889					9.1	129	62	58	9.1	129	62	58	6.0	57	52	48	4.5	32	44	40	
3400	944													6.4	65	54	50	4.8	36	46	42	
3600	1 000													6.8	73	55	51	5.1	41	48	44	
3800	1 056													7.2	81	57	53	5.4	46	50	46	
4000	1 111													7.5	90	58	54	5.7	50	51	47	
4300	1194													8.1	104	61	57	6.1	58	53	49	
4600	1278													8.7	119	63	59	6.5	67	55	51	
4900	1361																	6.9	76	57	53	
5200	1444																	7.4	85	59	55	
5500	1528																	7.8	95	61	57	
5800	1611																	8.2	106	62	58	
6100	1694																	8.6	117	64	60	

(1) Luftgeschwindigkeit am Stutzen
(4) Schalldruckpegel bei Lr = 4dB(A)

(2) Statischer Druck am Stutzen
Empfohlene Werte

(3) Schallleistungspegel



		595 x 595 mm 1 x Ø200 mm				1195 x 595 mm 2 x Ø200 mm				1795 x 595 mm 3 x Ø200 mm				2395 x 595 mm 4 x Ø200 mm				2995 x 595 mm 5 x Ø200 mm			
Qv		V	ΔPst	LwA	LpA	V	ΔPst	LwA	LpA	V	ΔPst	LwA	LpA	V	ΔPst	LwA	LpA	V	ΔPst	LwA	LpA
[m³/h]	[l/s]	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
		[m/s]	[Pa]	[dB(A)]		[m/s]	[Pa]	[dB(A)]		[m/s]	[Pa]	[dB(A)]		[m/s]	[Pa]	[dB(A)]		[m/s]	[Pa]	[dB(A)]	
200	56	1.8	5	<25	<25	1.8	5	<25	<25												
400	111	3.5	20	38	34	3.5	20	41	37	4.4	31	46	42	2.2	8	32	28				
600	167	5.3	44	48	44	2.7	11	34	30	2.4	9	33	29	1.8	5	27	<25				
800	222	7.1	78	55	51	3.5	20	41	37	2.9	14	38	34	2.7	11	37	33				
1000	278	8.8	122	60	56	4.4	31	46	42	3.5	20	43	39	2.2	8	32	28				
1200	333					5.3	44	51	47	4.1	27	46	42	2.7	11	37	33				
1400	389					6.2	60	54	50	3.1	15	41	37	3.1	15	41	37	2.5	10	36	32
1600	444					7.1	78	58	54	4.7	35	50	46	3.5	20	44	40	2.8	13	39	35
1800	500									5.3	44	52	48	4.0	25	47	43	3.2	16	42	38
2000	556									5.9	54	55	51	4.4	31	49	45	3.5	20	45	41
2200	611									6.5	66	57	53	4.9	37	52	48	3.9	24	47	43
2400	667									7.1	78	59	55	5.3	44	54	50	4.2	28	49	45
2600	722									7.7	92	61	57	5.7	52	56	52	4.6	33	51	47
2800	778									8.3	107	63	59	6.2	60	57	53	5.0	38	53	49
3000	833									8.8	122	65	61	6.6	69	59	55	5.3	44	55	51
3200	889									9.4	139	66	62					5.7	50	56	52
3400	944																	6.0	57	58	54
3600	1 000																	6.4	63	59	55

(1) Luftgeschwindigkeit am Stutzen
(4) Schalldruckpegel bei Lr = 4dB(A)

(2) Statischer Druck am Stutzen
Empfohlene Werte

(3) Schallleistungspegel