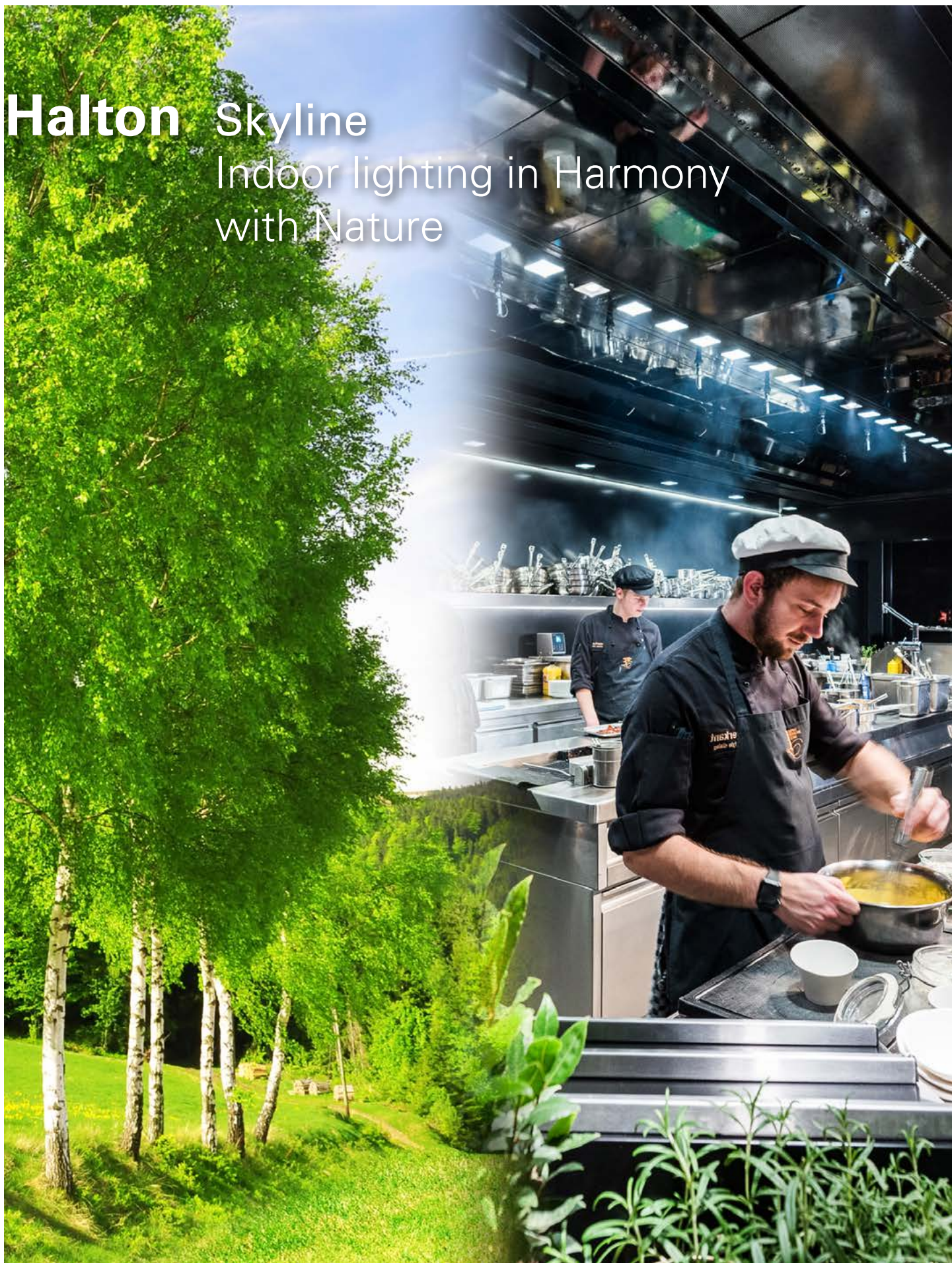



Halton Skyline

Indoor lighting in Harmony
with Nature





Halton Skyline is the first LED based lighting technology specifically developed for professional kitchens. Everyone agrees the light it provides is simply the closest possible to natural light



A Culinary Light that
**remarkably respects the
food colour and plasticity**
from raw ingredients to plated
presentation

A Culinary Light that also
**improves the working
conditions** while playing an
active role **in the kitchen safety**

A Human Centric light that
follows your biorhythm to **further
improve the working conditions
and staff Wellbeing**

A state of the art lighting
technology that, at its core,
**saves significantly on energy
and maintenance**

Halton Skyline brings life to

LEDs in professional kitchens: Yes, but with a purpose beyond illumination and not anyhow!



The impact of lighting in professional kitchens has often been regulated to simply satisfying illumination levels without regard for personal wellbeing.

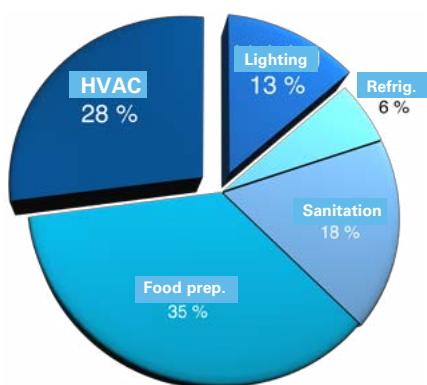
The link between good lighting, better working conditions and productivity, is now widely recognized. However, what often occurs when a kitchen benefits from excellent lighting levels, the staff is dazzled from reflected light. When dazzling does not occur, the kitchen typically suffers from a lack of illumination that is more harmful for the safety of the staff and hygiene of the kitchen.

LED lighting is one of the technologies that evolved most during the last decade. Offers are too numerous to count. They are based on enticing promises on energy savings but they do not necessarily improve the visual comfort and more globally the working conditions and at times degrade them. This can be particularly true in professional kitchens where stainless steel and tiles create reflections.

Whatever the technology used, a lighting system is not just about integrating light sources in a product or ordinary casing.

Lighting is an area of expertise in the same manner as ventilation. Halton engineers designed, hand in hand with the best experts, an innovative lighting technology that fulfils all challenges of lighting in professional kitchens.

Halton Skyline is the first technology combining the benefits of a Culinary Light and a Human Centric Light. Respect of the food colour and plasticity, Wellbeing of the staff and safety are the key benefits!



The significant energy savings may even be viewed as secondary, and yet...

According to PG&E (Foodservice Technology Centre), lighting represents 13% of the energy breakdown in professional kitchens. Together with HVAC, it is at least 41% of the energy bill.

Traditional lighting consumes more energy but also wastes part of it in heat. Halton Skyline's highly efficient LEDs and design facilitates massive energy savings on lighting, HVAC and electrical systems.

light

Two types of light source receive amazing benefits

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

A broad beam spot:

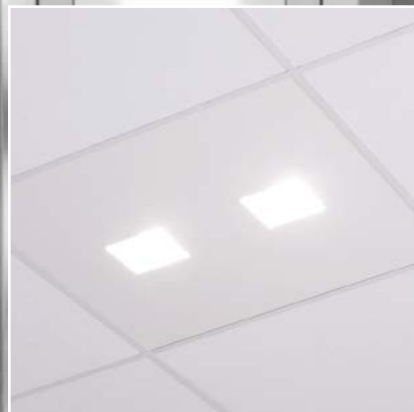
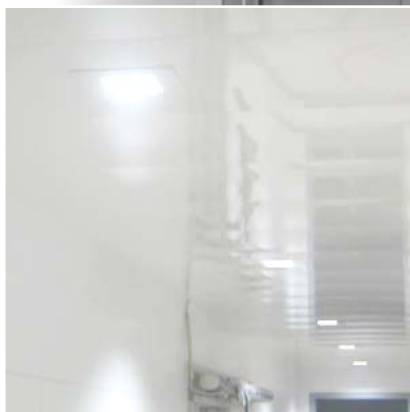
This has been designed to provide a uniform and bright general lighting at a colour temperature of 4000K. In the most advanced Human Centric version, it is equipped with two sets of LEDs enabling varying the colour temperature from 2200 to 6500K.

A focussed beam spot (@ 2800K):

This is used to further improve the lighting level and the colour render of the food in strategic locations, above cutting machines or griddles for instance, or even the plating presentation area.

Flexibility and efficiency are the master words of Halton Skyline design.

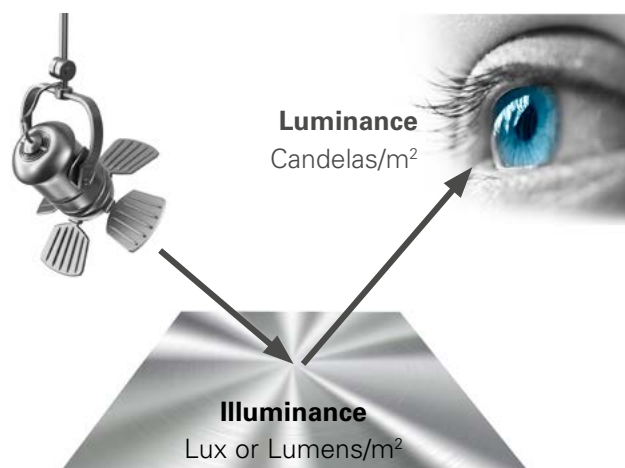
Fitted in Capture Jet™ ventilated ceilings or hoods, installed in the other kitchen areas thanks to additional standalone 600x600 mm modules or downlighters, Halton Skyline brings life to light everywhere.



Halton Skyline provides the best

More light without dazzling the staff

Nothing has been left to chance to provide a «comfortable light». The specially designed and patented mixing chamber, used on the broad beam spots, makes the highly efficient mid-power LEDs fitted behind act as a unique, uniform and powerful luminous surface. The reflector it is combined with, exceeds DIN 12464-1⁽¹⁾ specifications as shown opposite. Dazzling is eliminated.



The so called Luminance (in candela per m²) is one of the factors that gives a reference to the visual comfort level. It describes the quantity of light that passes through, is emitted or reflected from/by the equipment, walls, floors etc to the eye. It is widely considered that a Luminance higher than 3000 cd/m² starts to be very uncomfortable. Big gaps between the lowest and highest Luminances are also inadvisable.

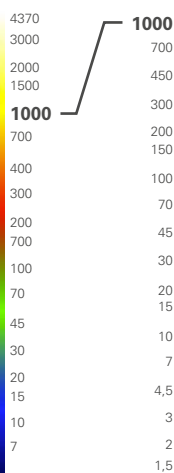
Compared to the traditional T5 fluorescent tubes, the visual comfort Halton Skyline provides has no equal. The luminance tests shown below speak for themselves.

Kitchen equipped with traditional T5 fluorescent tubes

In this “Luminance graph” - depicting a kitchen hospital - the highest luminance is around 4000-6000 cd/m² (on the large luminaire surface), far above the recommended value. And yet, the working surface benefits from a much lower luminance with around 30-40 cd/m². Too bright light sources and extreme luminance variations mean the visual comfort level is unsatisfactory.

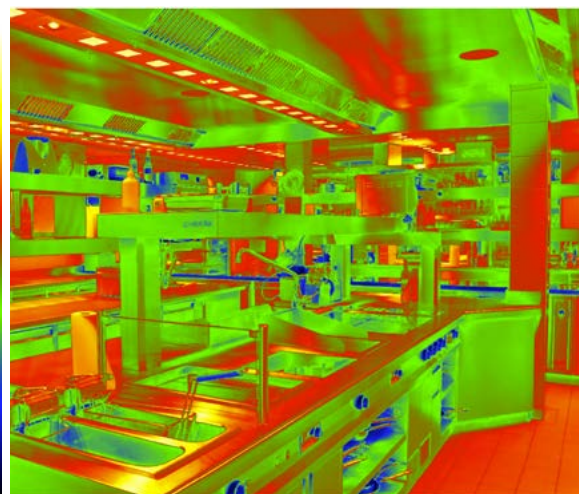


Luminance
[cd/m²]



Kitchen equipped with Halton Skyline

In this commercial restaurant, the highest Luminance is approximately 700-1000 cd/m² (on the very small spots surface) and complies with the recommendations. The working surfaces generate a higher and uniform Luminance which means that Halton Skyline provides more light and of a better quality thus improving the working conditions.

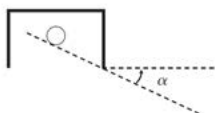


(1) Light and lighting - Lighting of work places - Part 1: Indoor work places

visual comfort for the staff

Halton Skyline exceeds the official shielding specifications

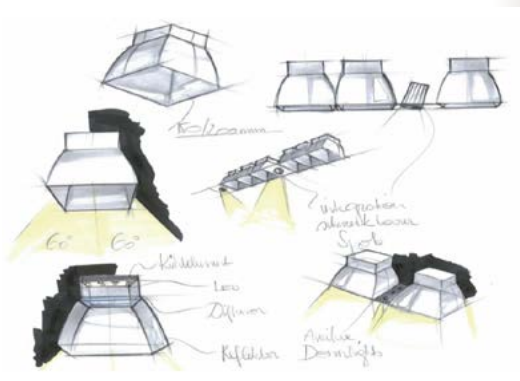
Light sources must observe a minimum shielding angle to prevent the source of light being directly seen by the occupiers of a building.



Minimum shielding angle α specified by DIN EN 12464-1⁽¹⁾ for Halton Skyline

Lamp luminance in cd/m ²	Minimum shielding angle α
20 000 to < 50 000 Typically also applicable to fluorescent lamps (high output) and compact fluorescent lamps, other LEDs systems	15°

Thanks to its reflector, Halton Skyline's shielding angle is more than two times higher than the official 15° demand, thus guaranteeing not to dazzle the staff.



(1) Light and lighting - Lighting of work places - Part 1: Indoor work places

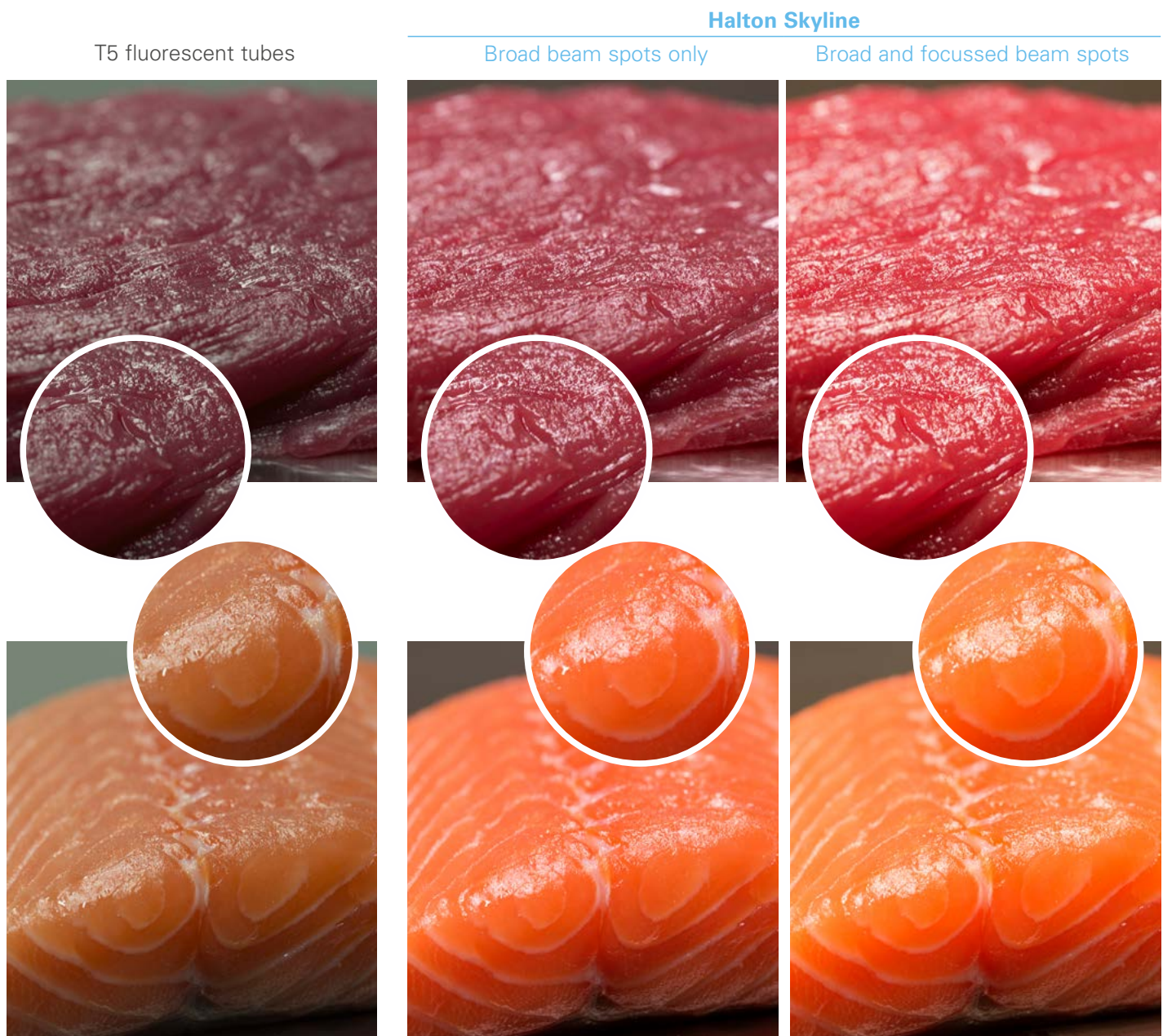
A colour rendering and plasticity

Halton Skyline respects the colour of the food

The Colour Rendering Index CRI⁽¹⁾ is a quantitative measure of the ability of a light source to reveal the colours of various objects faithfully. With an index of 100, the natural light is the reference.

The two spot models used for Halton Skyline technology have a CRI⁽¹⁾ Colour Rendering Index of 83 and 95. Halton Skyline greatly improves the control of the freshness of the ingredients, the cooking of the food and also the important final touch to the plating.

From raw ingredients to plating through to



(1) The CRI is defined by the International Commission on Illumination / CIE 13.3-1995.

close to the one of daylight

Halton Skyline also respects the food plasticity

In contrast, the vast majority of the LED spots, the diffuser and specific reflector designed for the broad beam spots provide a uniform light, with a good balance between the direct and diffuse components.

These geometrical and diffusion provisions limit the creation of shadows. The relief and shapes of the ingredients and food being prepared are clearer. They become even clearer when the broad beam spots are combined with a couple of focussed beam spots.

preparation, the difference is amazing

T5 fluorescent tubes



Halton Skyline

Broad beam spots only



Broad and focussed beam spots



Providing more light where and is also a question of safety and



There's an increasing acceptance that the minimum lighting level of 500 lx actually demanded in most countries is too low.

Halton recommends to increase the general lighting level to 750 lx and to further increase it to 1250 lx above targeted equipment or areas.

More light for sensitive foodstuffs or ingredients

What better example than the preparation of Fugu blowfish! Better not to make any mistake during its cutting. Benefiting from more light is also key when preparing sensitive ingredients that quickly deteriorate.

More light for sensible equipment and operations

Cutting machines, for instance, are potentially dangerous and yet, they are often located close to walls, where the lighting level typically decreases. All cutting operations should benefit from a higher lighting level by using more broad beam spots.

More light for specific cooking appliances

Grills, woks, kettles etc, in general all cooking processes for which completion of cooking is to be watched through colour control, the lighting level should be increased with focus-type spots.

More light for the plating area

Precision of the plates presentation, tracking of traces, final quality control through food colour, the plating counter is key and requires also more light, based on more focus-type spots.

More light for a better control quality in dishwashing areas

Efficient dirt tracking at the outlet of the dishwashing machines is key for hygiene and yet, these areas suffer most of the time from very poor lighting. Increasing the broad beam spots in all areas where visual quality control is carried out looks like a must.

Every Halton Skyline system is designed specifically for you. That's Halton's philosophy!

Halton carefully determines the number of broad-beam spots and the specific locations of the complementary focussed-beam spots to reach the lighting level required and boost the colour render where needed.

When it comes to the lighting levels, a correct design shall take into account the lighting power decrease of the LEDs over time. Limited to 15% after 50,000 hours for its high efficient LEDs, Halton considers for instance 880 lx as starting lighting level thus guaranteeing 750 lx over time where you need it.

No compromise on design. That's Halton's philosophy.



when needed hygiene

Lack of staff and down times are two of the major challenges in catering business

The low appeal of the work in catering is largely due to unpleasant Indoor Environment Quality (IEQ). Halton Solutions greatly improve the lighting quality and thermal comfort (air temperature and speed, heat radiated by the cooking appliances, humidity etc) that are two of the main key action points to restore the reputation of the catering business. Enabling Wellbeing in demanding environments is what Halton provides above all else.

Did you know?

The highest working disability numbers in the Netherlands are observed in 1/ catering 2/ butchery 3/ garbage collection 4/ construction segments (Dutch government, UWV department 2002).

A flesh cut leads, in catering segment, to an average layoff of six days.



The first Culinary and Human

Since the dawn of time, our biological rhythm is driven by the alternating of day and night that controls complex physical, hormonal, mental, behavioural changes and adjusts the sleep and energy cycles. These changes and cycles make up the Circadian rhythm whose importance has recently even gained more attention by the 2017 Nobel prize for medicine. More concretely, Scientists at the Lighting Research Centre (Troy, N.Y.) have reported, as many other studies, that daylight-similar environments improve occupant productivity and comfort. These are some of the benefits of so called Human Centric Light systems.

Imagine combining a Culinary and Human Centred light with a highly efficient ventilation solution, all designed by Halton. The best expression of Wellbeing in professional kitchens!



Halton Skyline^{HC} contributes to a better mood and productivity

When night gives way to dawn, our body starts secreting "day hormones". Serotonin is the most prominent of them. There is increasing acceptance that this neurotransmitter plays an important role in maintaining the mood balance, feeling alert and revitalised.

Halton Skyline^{HC} favours the activation of Serotonin secretion and its benefits. Combined with the psychological effects of a daylight-similar lighting conditions, it improves Wellbeing and productivity.

If you didn't know any better, you would think you were outside!

As an option, Halton Skyline is equipped with two sets of LEDs, with different colour temperatures (2200 and 6500K), and whose intensity can be adjusted independently. This enables creating daylight-similar sequences depending on the kitchen activity. You would think you were outside! Feeling all the more appreciable that many kitchens do not have windows and that we spend 90% of our time indoors.

Halton Skyline^{HC} creates lighting conditions that are Circadian rhythm-friendly with recognised biological and proven psychological benefits.



Halton Skyline^{HC} contributes to recovery nights

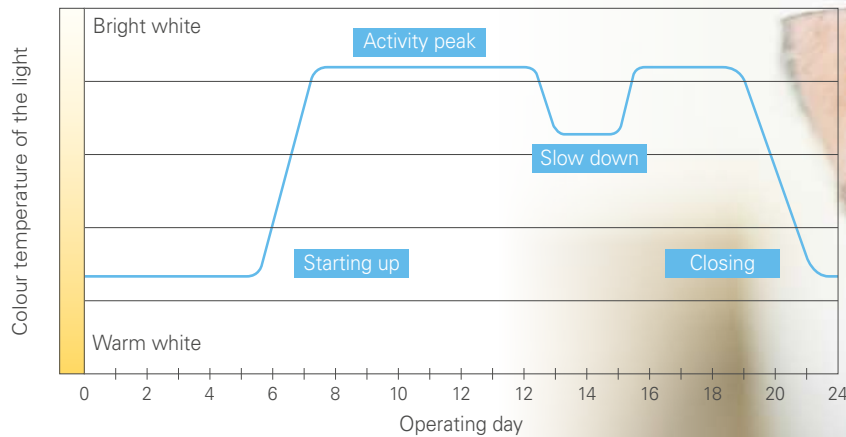
In the evening, the natural light becomes warmer and its intensity decreases. Day hormones are then taken over by night hormones, Melatonin being the most prominent of them. Melatonin is recognised as playing an important role in sleep quality.

Halton Skyline^{HC} favours Melatonin secretion before the staff leaves in the evening or in the night thus helping them to benefit from recovery nights. Melatonin is also a powerful antioxidant.

Centric light

How does Halton Skyline^{HC} work?

Principles of a Human Centric Light applied to kitchens



Serotonin activation in the morning requires more light than the actual standards demand. Halton Skyline^{HC} is designed to provide 1000 lx on the working surface. At kitchen start-up, a "bright white" is used and kept during all active phases of the kitchen.

Melatonin secretion takes time. That's why having a Circadian rhythm-friendly lighting system in kitchens represents a real benefit. In the evening, Halton Skyline^{HC} provides a much warmer light. It helps the staff to fall asleep faster when going back home without affecting their productivity.



About night work and Melatonin

A research project on shift work⁽¹⁾ showed that the use of a warmer light during shift work periods has "no deleterious effects on sustained attention, working memory and subjective alertness". It may even "have a positive impact on cardiac physiology".

On the other hand, several serious studies have shown that there's a link between Melatonin secretion disturbances and an increased risk of developing type 2 diabetes⁽²⁾ and different types of cancer⁽³⁾.

(1) Bartenbach academy

(2) "Diabetes Risk Linked to Melatonin Secretion During Sleep," Medical News Today, April 19, 2013

(3) Blask, David E., "Melatonin, sleep disturbance and cancer risk," Elsevier, Sleep Medicine Reviews 13, 2009.

The first Culinary and Human

The psychological positive effects of a good lighting design have been proven, especially in professional kitchens

“If you were to imagine the ideal office workplace for you, what would you consider particularly important?”⁽¹⁾

The most popular answer is light/lighting/bright rooms. Agreeable climate/air-conditioning arrives at the third position. As shown opposite, better lighting significantly decreases fatigue problems and complaints.



Who would think a better light has less positive psychological impact on the working conditions in professional kitchens if correctly designed?

In fact, the positive impacts are all the more important as lighting has been neglected for longer than some other issues. Light, noise and thermal comfort would inevitably compete together for the top rank among the criteria for an ideal workplace in catering business.

Halton Skyline provides a state of the art and high quality lighting. Together with other aspects that make up good Indoor Environment quality (IEQ), it contributes to boost staff motivation and performance, thus reducing the down times due to sick leave or accidents.

Halton Skyline^{HC} combines these psychological aspects with the biological aspect making it the most beneficial lighting system.

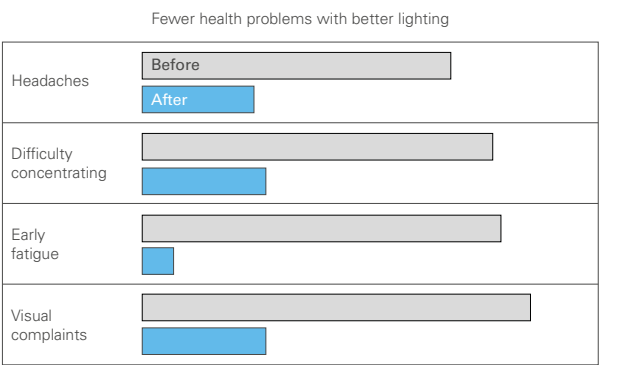
On top of the biological and psychological benefits, Halton Skyline^{HC} also enables the creation of different lighting moods for show kitchens

Halton Skyline^{HC} - in the same way as the Culinary version only - is equipped with dimmable DALI LED drivers. This enables creating several lighting scenario depending on the design of the kitchen and the time. Typically, a bright white during the day and a warmer and softer white in the evening, to create a soft and relaxing atmosphere.

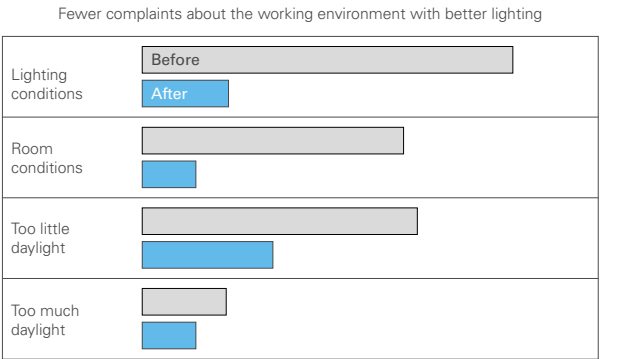


(1) Source: Union Investment, survey to 3145 office workers in Germany, February 2011. Also shown in Licht Wissen guide book 04 from licht.de.

Centric light



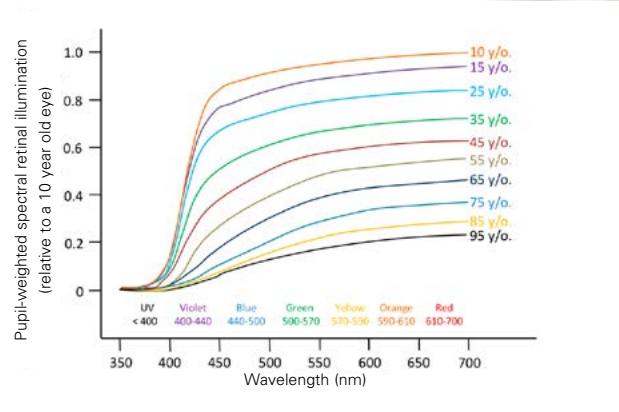
Source: Ergonomic Institut Berlin, also shown in Licht Wissen guide book 04 from licht.de.



Source: Ergonomic Institut Berlin, also shown in Licht Wissen guide book 04 from licht.de.

Pupil aging plays an important role in light perception

Did you know that at 45 years we lose around 40% of our sensibility to light compared to a 10-year-old child? Pupil aging is also a factor to be considered when designing a Human Centric light system.



Halton Skyline sets new standards for energy and maintenance savings

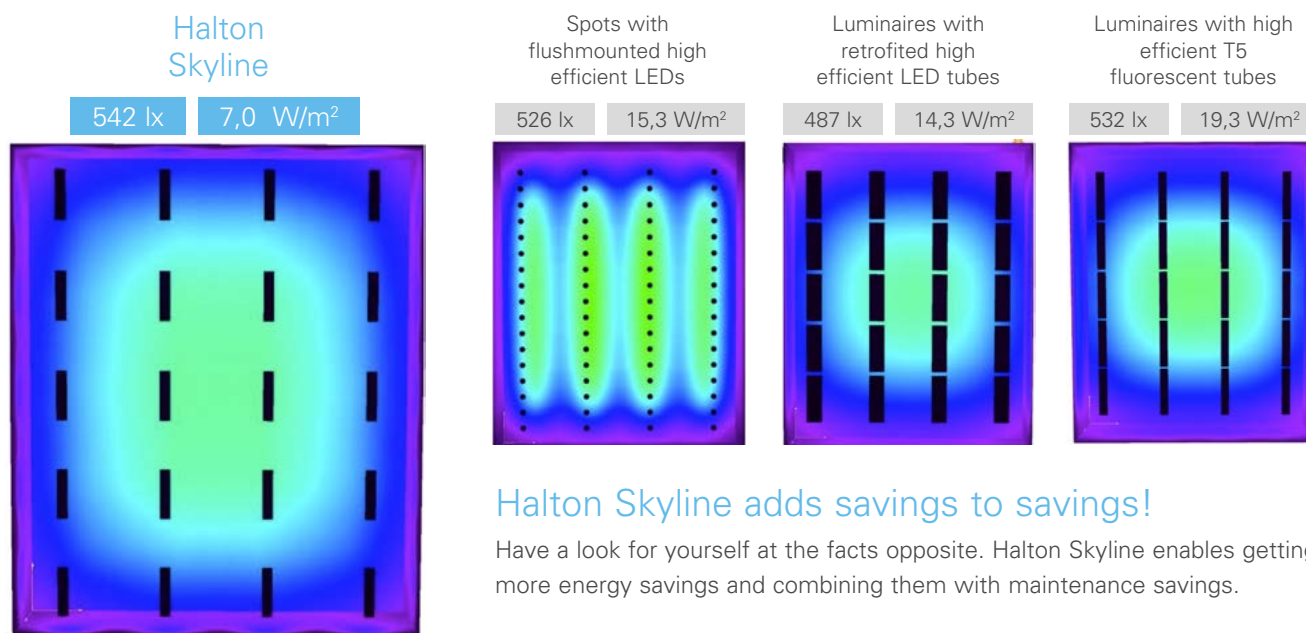
Halton Skyline is equipped with the latest generation of high quality LEDs. Extended lifetime, Improved Colour Rendering Index, lowest energy consumption and highest colour temperature consistency are the main benefits of this generation.

But everything is not just a question of LEDs. As for any type of light fitting, the final quality and efficiency of Halton Skyline is based on all that surrounds the LEDs, especially the diffuser in front of the LEDs and the reflector used after. In that respect, nothing has been left to chance. When it comes to energy and maintenance savings, the goal is, needless to say, to give back into the kitchen as much light emitted by the LEDs as possible, in a sustainable way and with the best visual comfort and render as shown before.

Intrinsic energy savings far ahead of any other lighting system

DIALux is a reference in the field of lighting calculations. In a rectangular 80 m² kitchen, equipped with a Halton Skyline ventilated ceiling installed at 2,75 m from the floor, Dialux results speak for themselves.

Halton Skyline light fittings consume up to 2,8 times less energy per m² compared to fluorescent tubes while providing a more uniform light on the working surfaces... and this is just the first round!



Halton Skyline adds savings to savings!

Have a look for yourself at the facts opposite. Halton Skyline enables getting more energy savings and combining them with maintenance savings.

Benefit from reduced payback times



When considering all energy and maintenance savings, the average payback time of Halton Skyline is around 5 to 6 years for a typical kitchen. This figure does not factor the productivity improvements and reduction of staff down times that are difficult to evaluate, but that can contribute significantly to savings.



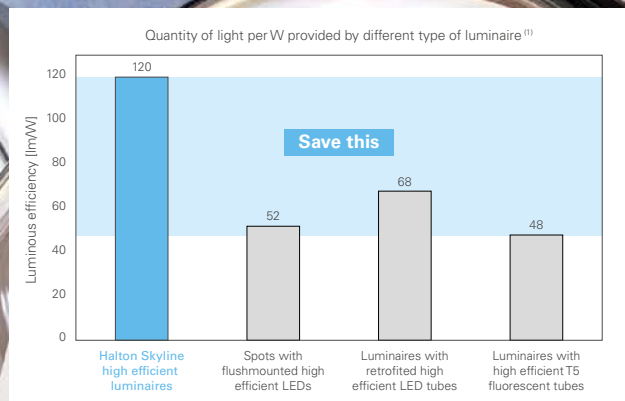
Savings

Focus on facts

Halton Skyline luminaires provide up to 2,5 times more light per Watt into the kitchen compared to high efficiency T5 fluorescent tubes.

This is the fact that explains why **Halton Skyline consumes up to 2,8 times less than fluorescent tubes**.

SAVE even more!



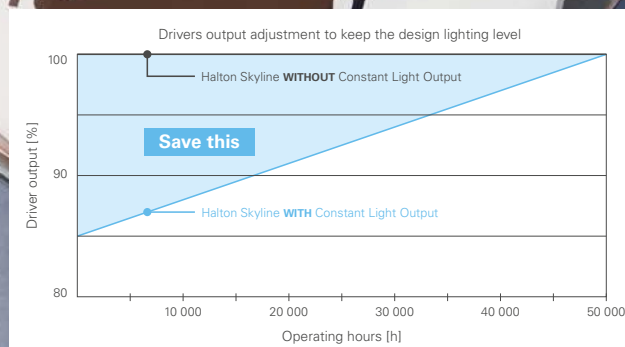
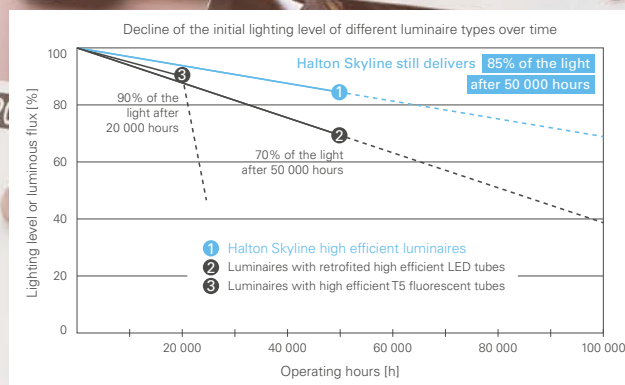
Savings

Halton Skyline still provides 85% of the initial lighting level after 50,000 hours operation. If the T5 fluorescent tubes could last so long, they would deliver 12% less light. In other words, Halton Skyline requires less luminaires to keep the targeted lighting over lifetime. **This reduces the initial investment and increases a first time the energy savings.**

During the same 50,000 hours period, Halton Skyline also saves the replacement of up to 125% of the fluorescent tubes, **adding significant maintenance savings** to the energy savings.

Halton Skyline's drivers have the same lifetime as the LEDs. As an option, they are also able to compensate for the lighting intensity decrease over time and this, to always keep the targeted lighting level (Constant Light Output CLO). **Halton Skyline energy savings are then increased a second time.**

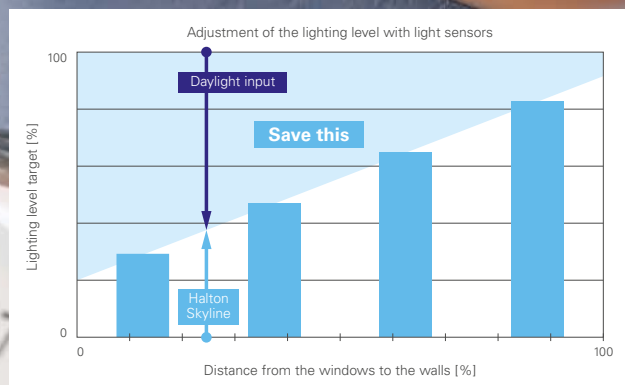
SAVE even more!



Savings

Halton Skyline controls can be equipped with light sensors as an option. They are particularly interesting for kitchens that benefit from daylight. Halton Skyline provides much less light close to the windows and progressively increases the light intensity when moving away from them.

In such cases, **Halton Skyline energy savings are then increased a third time.**



Halton Skyline does not fear the

Standard solutions

Fluorescent tubes LED tubes (retrofit)

General		
Average lighting level on the working surface [Illuminance in Lux]	500 lx	500 lx
Average lighting level considered to design the hoods or ventilated ceilings [Illuminance in Lux]	Commonly 500 lx	Commonly 500 lx
Vertical light perceived at eye level by the staff [Vertical Illuminance in Lux, Human Centric friendly criteria]	200 lx	200 lx
Variation of the light colour temperature [from cold to warm white, as for the daylight, Human Centric friendly criteria]	×	×
Halton Skyline provides the best light		
More light on specific equipment [such as griddles, cutting machines, dishwashing machines output...]	×	×
Good lighting level perception kept over time by the staff [Constant Light Output (CLO) i.e. ability to compensate the light loss over lifetime]	✓	×
Good visual conditions for older staff	×	×
Reduction of the glare and of the reflections on the equipment [Unified Glare Rating UGR according to DIN EN 12464-1]	×	×
Respect of the ingredients and dishes colour [CRI Colour Rendering index according to CIE 13.3-1995, 100 = render of daylight]	80	80
Natural appearance of the food and ideal visual comfort	×	×
Working performance increase and Wellbeing improvement	×	×
Halton Skline is Human Centered		
Biological activation for the Circadian rhythm-friendly day hormones secretion [such as serotonin, adrenaline or cortisol that help to feel alert]	×	×
Biological activation for the Circadian rhythm-friendly night hormones secretion [such as melatonin, adenosine or orexins that help having recovery nights]	×	×
Psychological benefits of daylight-similar light sequences	×	×
Wellbeing improvement and Circadian rhythm	×	×
Halton Skyline contributes to hygiene		
More efficient hygiene hazards (dirt) tracking through better lighting	×	×
Light fixture cleanliness and hygiene friendly manufacturing practices	×	×
HACCP certified	×	×
Contribution to hygiene hazards prevention	×	×
Halton Skyline combines huge savings and quality		
Energy efficiency [or average Luminous efficiency in Lumens per Watt lm/W, includ. the power supply]	40	60
Average lifetime of the tubes or LEDs [hours]	20 000	25 000 to 60 000
Remaining lighting level at the end of the lifetime	90%	70% (L70)
Defective lamps at the end of the lifetime	50%	0%
LEDs efficiency and colour temperature consistency stable over time	✓	Uncertain
Additional savings from light dimming and light sensors	✓	×
Additional savings from Constant Light Output (CLO) system	●○	×
Approved quality (retrofit quality standard, sustainable drivers...)	✓	Uncertain
Global money saving on energy and maintenance	●○○	×





competition

Halton Skyline

Halton Skyline^{HC}

Culinary Light

Culinary & Human Centric Light

			
4000K	4000K	4000K 2800K	2200..6500K 2800K
500 lx	Recommended 1000 lx	Recommended 1000 lx	Recommended 1000 lx
Calculated to keep the Illuminance constant over the life cycle and depending on the average age of the staff (pupil aging)			
200 lx	500 lx	500 lx	500 lx
x	x	x	2200 to 6500 K

x	x	✓	✓
✓	✓	✓	✓
●○○○	●●○○	●●●○	●●●●
✓	✓	✓	✓
83	83	83 to 95	83 to 95
●○	●○	●●	●●
●○○	●○○	●●○	●●●

x	✓	✓	✓
x	x	x	✓
x	x	✓	✓
x	●○	●○	●●

x	✓	✓	✓
✓	✓	✓	✓
✓	✓	✓	✓
●○	●○	●●	●●

120	120	<120 depending on the number of focussed beam spots @ 56 lm/W	
50 000 (same for the driver)	50 000 (same for the driver)	50 000 (same for the driver)	50 000 (same for the driver)
85% (L85)	85% (L85)	85% (L85)	85% (L85)
0% ⁽¹⁾	0% ⁽¹⁾	0% ⁽¹⁾	0% ⁽¹⁾
✓	✓	✓	✓
✓ DALI	✓ DALI	✓ DALI	✓ DALI
●●	●●	●●	●●
✓	✓	✓	✓
●●●	●●○	●●○	●●○

(1) Fault rate of the electronic drivers <10%.

Global leader in designing High

A global presence

With 8 of our own factories, a further 3 under license and 5 R&D centres dedicated to ventilation for professional kitchens, Halton Foodservice is the world leader in ventilation solutions for all types of professional kitchens.

We develop solutions which combine energy efficiency, safety, indoor air quality and respect for the environment. Based on a genuine passion for innovation and simplicity, our know-how and expertise are recognised by professionals all over the world.

Focussed on service

Halton's High Performance Kitchens provide a unique set of benefits that rely inevitably on advanced technologies.

Initial design and commissioning are therefore key to reaching all the performances for which our solutions are designed.

Maintenance is also key to keeping these performances to their highest level over time.

Who better than Halton for Halton products?

Halton cares for you throughout the entire life cycle of your projects: from the initial concept through to solution development, manufacturing, on-site installation, commissioning and maintenance phases.

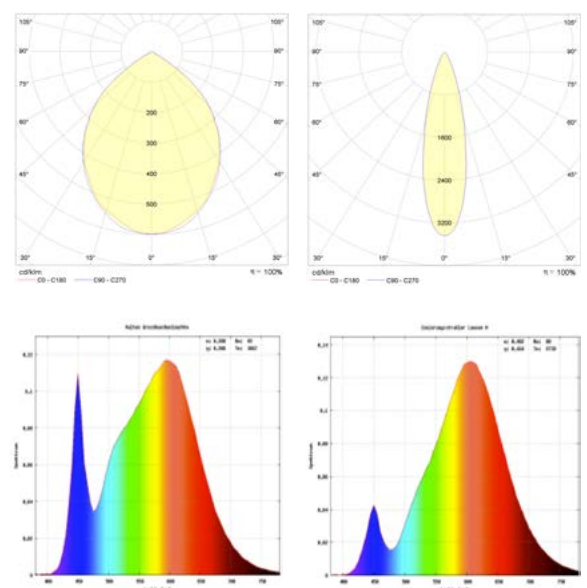


As for all our other solutions, we design your lighting system for you.

Halton Skyline spots have been tested and characterised to be integrated in DIALux. It is one of the world's leading softwares for planning, calculating and visualizing light, for single rooms, whole floors, buildings or outdoor scenes.

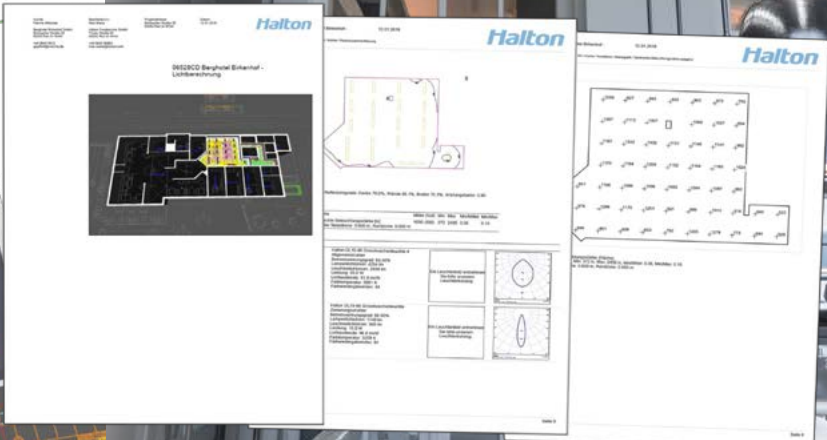
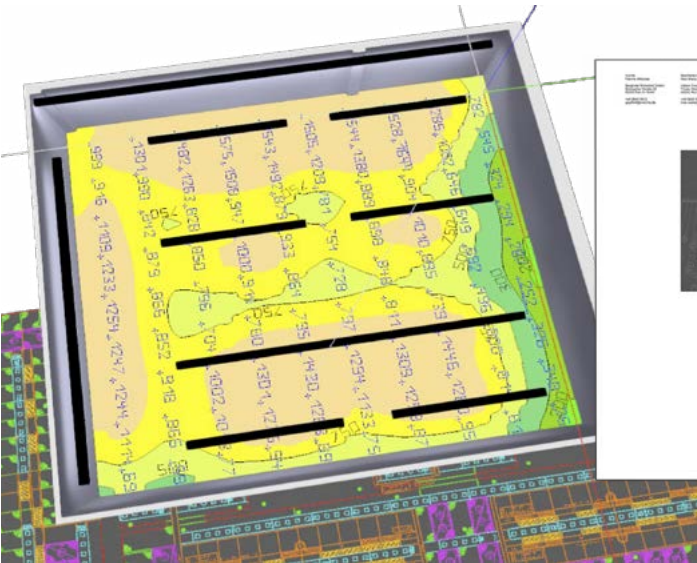
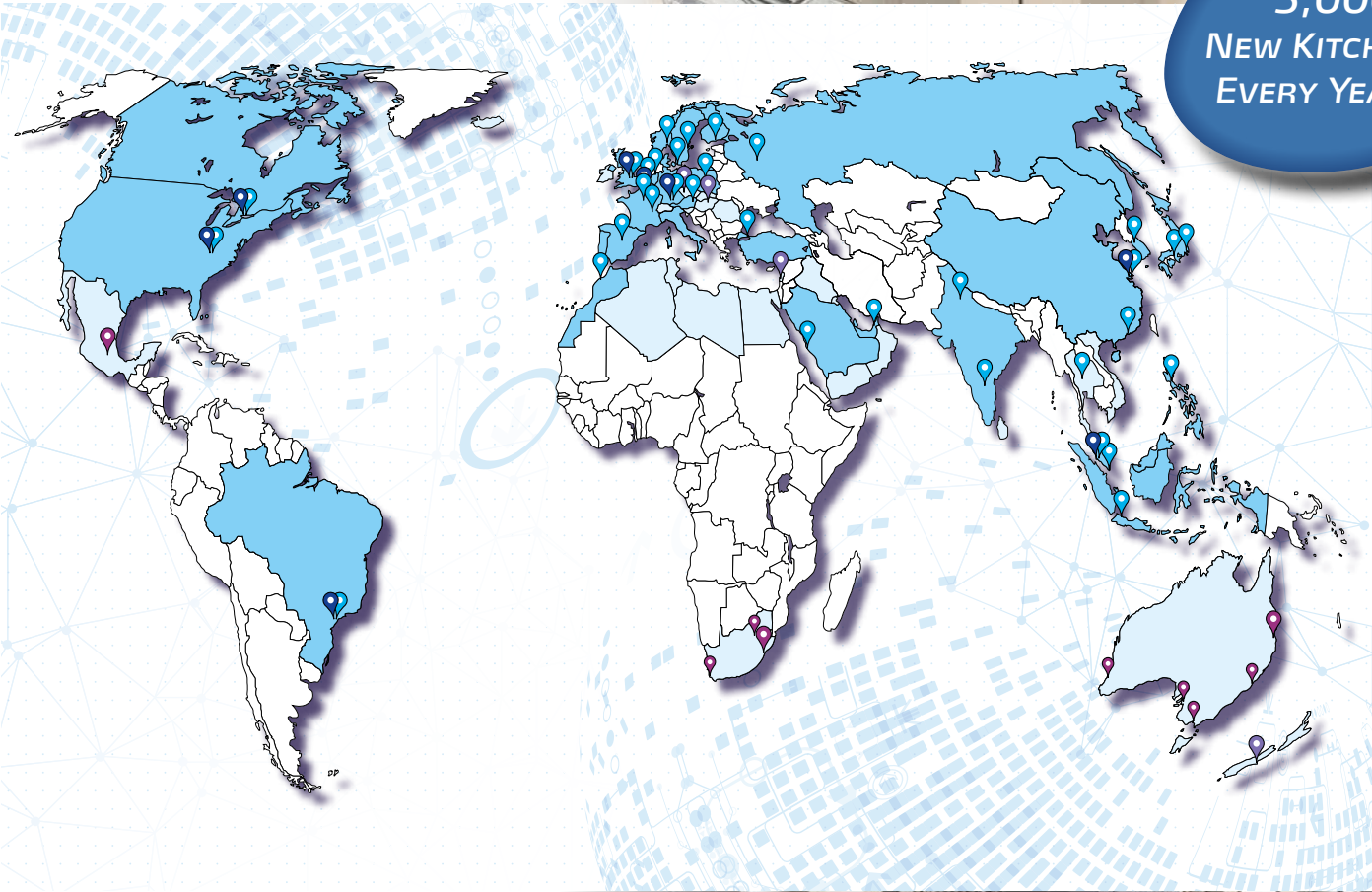
For global lighting projects and after having clearly defined the requirements depending on the regulations and/or the end user demands, our customer services carry out a study to simulate as precisely as possible the end result.

We design it for you!



Performance Kitchens

5,000
New Kitchens
Every Year





Santo Service (Holzkirchen, Germany)



Die Speisemeisterei (Stuttgart, Germany)



Wago (Minden, Germany)



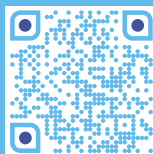
Waterkant (Hamburg, Germany)



Schloss hotel (Fleesensee, Germany)



Wago (Minden, Germany)



www.halton.com/foodservice

Halton Manufacturing Facilities

France

Halton Foodservice
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