

CLEAN

Clean-room luminaire

Three-level luminaire concept
for clean-rooms in healthcare settings
and in industry.

[linked](#)

All order numbers in the
PDF are linked to the Zumtobel
online catalogue.





ASTA Elektrodraht GmbH & Co KG, Oed | AT

A doubly inspiring challenge

Light for clean-rooms

Quality factor cleanliness, quality factor light

Clean-rooms probably have their origins in medicine. It was here that the connection between hygiene and successful healing first became evident. Precautions were repeatedly refined, starting with sterilisation of instruments and eventually making sure that operating theatres were as sterile as possible.

The realisation that not just people but also processes and products benefit from cleanliness can be traced back to the early days of nuclear engineering when it first became necessary to solve the problem of the spread of radioactivity through fine dust and airborne particles.

Nowadays, clean-rooms are used in a very wide variety of manufacturing areas ranging from pharmaceuticals through to precision engineering and micromechanics or in biological and genetic research and even in the food industry. Ever more exacting quality requirements are reflected in the constant growth of manufacturing in clean-rooms. Microelectronics in particular is forcing industrial clean-room technology to face up to more and more fresh challenges.

Foodstuff manufacturers are expected to produce products that are free from additives and preservatives but with the longest possible shelf lives. Here, too, clean-room technology offers a broad range of solutions.

All these very different application areas also involve an equally disparate range of visual tasks: from illuminating a circulation zone in an operating area through to extremely high illuminance levels in a laboratory, there is a very diverse range of applications in terms of both lighting and specific to clean-rooms issues.



CLEAN SUPREME was distinguished with the „iF Design Award 2006“.

zumtobel.com/clean



CLEAN SUPREME LED

The clean-room luminaire for areas with **extreme** requirements



CLEAN ADVANCED LED

The clean-room luminaire for areas with **exacting** requirements



CLEAN CLASSIC LED

The clean-room for areas with **increased** requirements

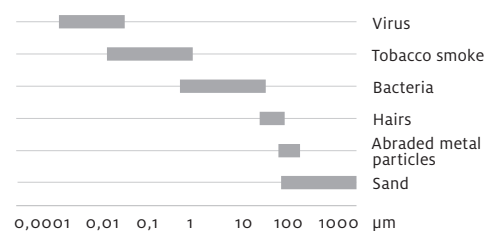
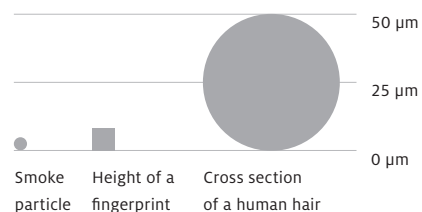
As a luminaire expert, Zumtobel has made good use of the experience of clean-room designers and combined it with the very latest lighting technology. The result is a three-level luminaire concept for clean-rooms, which is geared towards both the dictates of that environment as well as particular visual tasks.

Improved results justify greater investment

Fitting of clean-rooms

Benefits of clean-room technology

The purpose of clean-room technology is to protect patients and processes as well as manufactured products against contamination of any sort. Pollution by organic or inorganic particles of matter classified as contamination is strictly monitored: no matter how small they are, the number of airborne dust particles, pollen, bacteria, viruses and aerosols must be as small as possible.

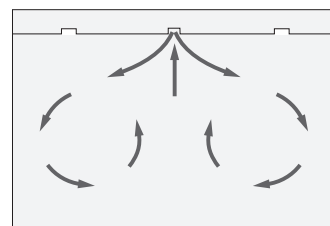


Comparison of particle sizes:

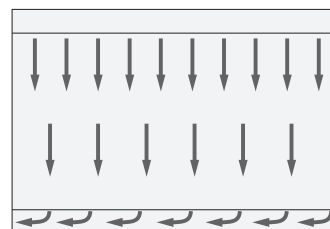
international standards define limit values in terms of the permitted maximum number of particles, depending on particle size.

Airflow systems demand specific construction designs

One of the basic criteria for the requirements placed on equipment in clean-rooms is the nature of the airflow system. The CLEAN luminaire has been designed for use in all clean-room classes with a mixed airflow. In this commonly encountered airflow system, air enters the clean-room with a turbulent flow, thereby causing continuous dilution and “cleaning”. According to Good Manufacturing Practice (GMP) classification, clean-room Classes C to E and ISO Classes 6 to 9 can be achieved using this airflow system. Clean-rooms with low-turbulence displacement flow, which are more expensive to build, allow air to initially enter the clean-room with low turbulence. The laminar flow system minimises contamination and any contaminant is quickly eliminated. Clean-rooms in ISO Classes 1 to 6 and GMP classes A and B are areas where this airflow system is used.



Mixed flow



Laminar flow

Using the number of particles as a yardstick

The strategy in clean-rooms is to minimize the number of particles released by humans and equipment, and eliminate them immediately. Even the slightest contamination may result in loss of function, reliability, medical compatibility or other essential quality characteristics.

Although it sounds simple, in practice this requires an extensive raft of technical and organisational measures: from expensive ventilation and air conditioning systems through to special codes of conduct for employees and extremely exacting quality requirements for equipment and hence lighting.

Nomenclature

Maximum permissible particulate count per cubic metre according to DIN EN ISO 14644-1

DIN EN ISO 14644-1	US Fed. Std.209E*	VDI 2083	EG-GMP Guidelines	0.1 µm/m ³	0.2 µm/m ³	0.3 µm/m ³	0.5 µm/m ³	1.0 µm/m ³	5.0 µm/m ³
ISOClass 1				10	2				
ISOClass 2				100	24	10	4		
ISOClass 3				1 000	237	102	35	8	
	1			1 240	265	106	35,3		
		1		1 500	330	140	45	10	
ISOClass 4				10 000	2 370	1 020	352	83	
	10			12 400	2 650	1 060	353		
		1		15 000	3 300	1 400	450	100	
ISOClass 5				100 000	23 700	10 200	3 520	832	29
	100				26 500	10 600	3 530		
		3			33 000	14 000	3 520	1 000	
			A/B				3 520		20
ISOClass 6				1 000 000	237 000	102 000	35 200	8 320	293
	1 000						35 300		247
		4					45 000	10 000	300
ISOClass 7							352 000	83 200	2 930
	10 000						353 000		2 470
		5					450 000	100 000	3 000
			C				352 000		2 900
ISOClass 8							3 520 000	832 000	29 300
	100 000						3 350 000	124 610	24 700
		6					4 500 000	1 000 000	30 000
			D				3 520 000		29 000
ISOClass 9							35 200 000	8 320 000	293 000

* since withdrawn

The cleanliness classes in German Standard VDI 2083 are comparable with the classifications in International Standard DIN EN ISO 14644-1 and US Federal Standard 290E and the EU GMP Guideline.

Different sector-specific criteria

Fitting of clean-rooms

Suitability for use in clean rooms covers not only measurable quantities such as particle emission, but also a large number of sector-based cleanliness requirements such as resistance to chemicals, surface quality, flow behaviour or electrostatic characteristics. These terms and others are defined in the following standards and codes of practice:

General:

- Classification of air cleanliness – clean-rooms and associated controlled environments according to DIN EN ISO 14644-1 (Federal Standard 209 has since been withdrawn)
- Clean-room technology and clean-room compatibility of equipment VDI 2083
- European Hygienic Engineering & Design Group (EAGDG)

Industrial application areas:

- Good Manufacturing Practice (GMP) Guidelines – pharmaceuticals
- Food and Drug Administration (FDA) – pharmaceuticals and foodstuffs
- Medicinal Product Law
- EU Pharmaceutical Regulation – Good manufacturing practices Volume 4 – (Medicinal products for human and veterinary use)
- Hazard Analysis Critical Control Point (HACCP) Regulations – foodstuffs

Hospital application areas:

- VDI 2167 Building services in hospitals
- DIN 1946-4 Ventilation and air conditioning Part 4 (Ventilation in hospitals)

CLEAN boasts a host of measures to protect against deposits and microbacterial contamination:

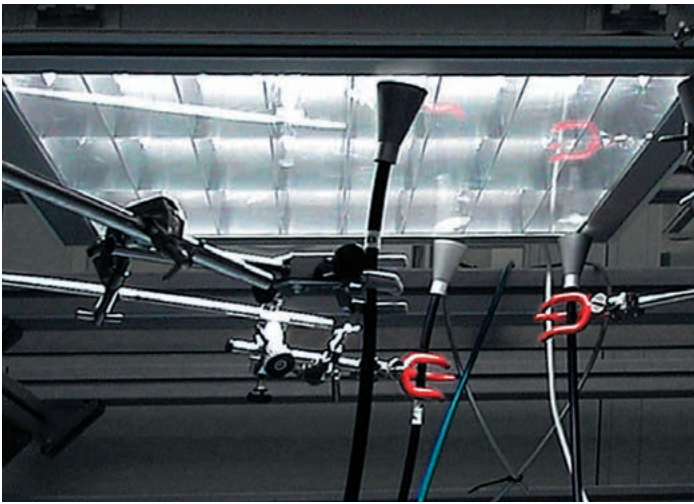
- non-porous, smooth and therefore easy-to-clean surface
- surface is resistant to cleaning agents and disinfectants
- good electrostatic characteristics to prevent attraction of dirt through electrostatically charged surfaces
- resistant to chemicals
- high-grade materials and careful workmanship (apparent in smooth edge-transitions, among other features)
- no re-entrant angles on seams, joints or screws; these may hinder elimination of particles by the flow of air and are difficult to clean

What makes a luminaire a clean-room luminaire?

Zumtobel lighting experts turned to the internationally recognised skill centre of competence for ultra-high-purity production and microproduction – the Fraunhofer Institute IPA in Stuttgart/Germany.

The German VDI 2083 Guideline forms the basis of the measurements made during the course of IPA qualification. It describes a standardised procedure for all equipment used in a clean-room.

The common criterion for the clean-room compatibility of luminaires and all other equipment is their particle emission behaviour. “Airborne particle emission” is used as a classification criterion in all international standards (see page 6). The relevant maximum value for the permissible concentration of particles of a specific particle size constitutes the class limit.

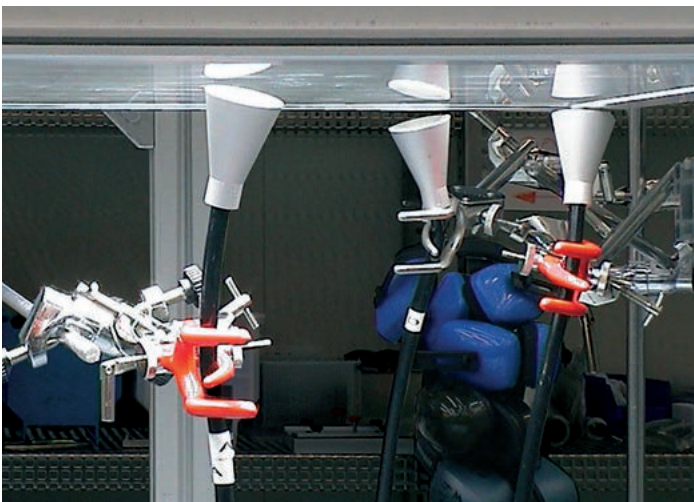


IPA qualification in accordance with VDI 2083

To simulate representative stress on the CLEAN ADVANCED and CLEAN SUPREME fittings, and measure the emission of airborne particles, each luminaire was placed in a specially designed laboratory setup.

Test setup:

A defined volume of air is aspirated by an air sampling probe and fed into a test chamber. The particles inside this test chamber are monitored and recorded appropriately. In order to unambiguously locate and qualify particle sources and the main causes of contamination, localisation measurements are made. Individual measurements are made at critical points to achieve this. Exceeding the relevant limit values is decisive in order to classify the luminaires. If a limit value is not exceeded with a certainty of at least 95 %, the respective item of equipment may be regarded as suitable for use in this air cleanliness class.



Fraunhofer IPA clean-room experts defined a total of eight measurement points for measuring the emission of airborne particles by the CLEAN range.

Besides metrological investigations, the suitability of an item of equipment for clean-room use is evaluated and documented in terms of the compatibility of its design with hygiene in particular. Important standards and regulations such as GMP and FDA Guidelines lay down corresponding design specifications relating to the technical implementation and workmanship of equipment.



Fraunhofer
TESTED®
DEVICE
 Beleuchtungssysteme
 Clean Advanced/Clean Supreme
 Report No. ZU 0503-320

Fraunhofer IPA confirms clean-room compatibility

Based on extensive measurements and expert assessments at the Fraunhofer Institute IPA, the experts declare that:

“The CLEAN SUPREME clean-room luminaire meets the requirement for clean-rooms in ISO Classes 3 to 9 (according to DIN EN ISO 14644-1) and for clean-room environments in GMP Classes C to F (Good Manufacturing Practice). The CLEAN ADVANCED clean-room luminaire is also suitable for clean-rooms in ISO Classes 3 to 9.”

Health & care

Light for health



Medical progress needs excellent lighting

Hygiene and purity are a firm part of daily work in the health sector. The utmost concentration is very often demanded of doctors and medical staff. Excellent lighting conditions are a must to perform the difficult visual tasks. Luminous intensities of up to 2000 lx are recommended for the operating environment and up to 1000 lx have to be available on call on intensive care wards. Even the thorough cleaning of clean rooms assumes 500 lx.

Red, green and blue light in the operating theatre

Monochromatic, coloured light supports the personnel in their work and helps to calm patients down.

Benefits for patients: The soothing effect of the colour green helps to reduce the sensation of pain in humans. The blue light method kills bacteria in burns and thus combats infections, as has been proven by researchers at the Harvard Medical School.

Benefits for the medical staff: Light with a high blue share in the operating theatre promotes concentration. The luminous efficiency for night vision is highest with blue and green wavelengths. This makes these ideal for minimally invasive surgery. Monochromatic light is also used for contrast media examinations. In the examination area, reddish to blueish-whitish colour temperatures ensure strong contrasts depending on the task and type of tissue.

Industry & engineering

Light for innovating



Modern technologies make tough demands on cleanliness and light

Increasingly, more exacting industrial requirements are paving the way for new technologies and process engineering methods. The use of clean-rooms enables new, more effective and more accurate production methods. The food industry is also waking up to the benefits of clean-room production. A growing number of sectors of industry are carrying out research and manufacturing in clean-rooms. These include, among others, microelectronics and micromechanics as well as the pharmaceutical and biogenetic industries. Mass production is gathering pace and quality standards are constantly being raised. Manufacture under controlled conditions helps improve production quality and reduce rejects.

From operating theatre through to medical practice

A suitable CLEAN clean-room luminaire for every area

Application area



Technical requirements

Areas with **extreme requirements**

Operating theatres, laboratories, areas surrounding the operating theatre (air locks)

- Installation: flush with ceiling or surface mounted
- Protection rating IP65
- Clean-room compatibility
- Resistant to cleaning agents and disinfectants
- Hygienic, easy to clean
- Operates in rooms with positive pressure and negative pressure containment
- Easy to maintain
- Highly reliable and operationally dependable



Areas with **exacting requirements**

Areas surrounding the operating theatre, intensive care units, accident and emergency wards, examination and treatment rooms, ...

- Recessed installation
- Protection rating IP65 from below
- Clean-room compatibility
- Resistant to cleaning agents and disinfectants
- Glass or plastic diffuser (depending on application)
- Hygienic, easy to clean
- Operates in rooms with positive pressure and negative pressure containment
- Easy to maintain
- Highly reliable and operationally dependable



Areas with **increased requirements**

Examination and treatment rooms, recovery wards, corridor and circulation areas, administrative areas, laundries and kitchens, medical practices, health and rehabilitation centres, ...

- Recessed installation
- Increased protection
- Hygienic, easy to clean
- Highly reliable and operationally dependable

The solution



CLEAN SUPREME LED

- Surface-mounted luminaire, recessed luminaire when used in combination with mounting frame
- Consistent IP65 protection rating
- Fraunhofer IPA Certificate for clean-room compatibility in clean-rooms in ISO Cleanliness Classes 3 to 9
- High-grade surface coating with anti-static effect is resistant to cleaning agents and disinfectants
- Frameless, all-round glass diffuser
- Dependable operation with positive pressure and negative pressure containment
- Luminaire is easy to install
- ENEC mark, rugged, durable design



CLEAN ADVANCED LED

- Recessed luminaire, 600 and 625 modules
- Protection rating IP65, IP54 in the ceiling
- Fraunhofer IPA Certificate for clean-room compatibility in clean-rooms in ISO Cleanliness Classes 3 to 9
- High-grade surface coating is resistant to cleaning agents and disinfectants
- Diffuser made of high-grade anodised aluminium
- Version with toughened safety glass or shatterproof PMMA acrylic glass
- Dependable operation with positive pressure and negative pressure containment
- Luminaire is easy to install
- ENEC mark, rugged, durable design



CLEAN CLASSIC LED

- Recessed luminaire, 600 and 625 modules
- Protection rating IP54, IP20 in the ceiling
- Surface coating is resistant to cleaning agents and disinfectants
- Diffuser made of anodised aluminium
- Version with PMMA acrylic glass
- ENEC mark, rugged, durable design

From pizzas to microchips

CLEAN can handle application-specific needs

Application area



Technical requirements

Areas with **extreme requirements**

Electronics, electrical engineering, micromechanics, biogenetics, pharmaceutical and chemical companies, laboratory technology, genetic engineering, food technology, extremely critical areas of food production

- Installation: flush with ceiling or surface-mounted
- Protection rating IP65
- Clean-room compatibility
- Resistant to cleaning agents and disinfectants
- Hygienic, easy to clean
- Operates in rooms with positive pressure and negative pressure containment
- Easy to maintain
- Highly reliable and operationally dependable



Areas with **exacting requirements**

Electronics, electrical engineering, micromechanics, biogenetics, pharmaceutical and chemical companies, laboratory technology, genetic engineering, food technology, extremely critical areas of food production

- Recessed installation, Protection rating IP65 from below
- Operation not adversely affected by vapour, heat, dust or corrosive atmospheres
- Clean-room compatibility
- Resistant to cleaning agents and disinfectants
- Glass or plastic diffuser (shatter protection)
- Hygienic, easy to clean
- Suitable for rooms with relatively high ceilings
- Operates in rooms with positive pressure and negative pressure containment
- Easy to maintain
- Highly reliable and operationally dependable



Areas with **increased requirements**

Food industry, corridor and circulation areas, laundries and large-scale catering establishments

- Recessed installation
- Increased protection
- Operation not adversely affected by vapour, heat or dust
- Suitable for rooms with relatively high ceilings
- Version with shatter protection
- Hygienic, easy to clean
- Highly reliable and operationally dependable

The solution



CLEAN SUPREME LED

- Surface-mounted luminaire, recessed luminaire when used in combination with mounting frame
- Consistent IP65 protection rating
- Fraunhofer IPA Certificate for clean-room compatibility in clean-rooms in ISO Cleanliness Classes 3 to 9
- High-grade surface coating with anti-static effect is resistant to cleaning agents and disinfectants
- Frameless, all-round glass diffuser
- Dependable operation with positive pressure and negative pressure containment
- Luminaire is easy to install
- ENEC mark, rugged, durable design



CLEAN ADVANCED LED

- Recessed luminaire, 600 and 625 modules
- Protection rating IP65, IP54 in the ceiling
- Very strong materials, meticulous workmanship
- Fraunhofer IPA Certificate for clean-room compatibility in clean-rooms in ISO Cleanliness Classes 3 to 9
- High-grade surface coating is resistant to cleaning agents and disinfectants
- Diffuser made of high-grade anodised aluminium
- Version with toughened safety glass or shatterproof PMMA acrylic glass
- Dependable operation with positive pressure and negative pressure containment
- Luminaire is easy to install
- ENEC mark, rugged, durable design



CLEAN CLASSIC LED

- Recessed luminaire, 600 and 625 modules
- Protection rating IP54, IP20 in the ceiling
- Very strong materials, careful workmanship
- Surface coating is resistant to cleaning agents and disinfectants
- Diffuser made of anodised aluminium
- Version with PMMA acrylic glass
- ENEC mark, rugged, durable design

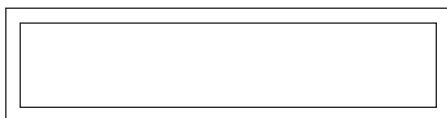
CLEAN SUPREME LED

Clean-room luminaire for areas with extreme requirements

The unique feature of the top-of-the-range model in the CLEAN product line is a continuous smooth safety glass diffuser. Cleaning a luminaire does not get any simpler than this. The 4 mm thick toughened safety glass does not need a frame nor is it interrupted by fasteners. The innovative magnetic fasteners combine safety with functionality.

- A high-quality, continuous, precision-formed foam seal makes the joint between the diffuser and luminaire housing perfectly tight – a breather valve inside the luminaire ensures the necessary pressure equalisation when operating in rooms with positive and negative pressure containment, thereby guaranteeing IP65 protection.
- The frameless, continuous, smooth toughened safety glass diffuser is fixed by magnetic fasteners. At a distance of just 20 cm, their magnetic field is weaker than that of the earth and therefore has no adverse electromagnetic effects of any kind.
- All CLEAN surface-mounted luminaires are installed with standard 4-point fixing. The same fixing points are also used for installation flush with the ceiling using a mounting frame. These accessories can be used to implement both individual luminaire solutions as well as continuous row systems and right-angled configurations in suspended ceilings.
- CLEAN SUPREME, which is compatible with all standard ceiling systems, is available as a linear luminaire with LEDs.
- Continuous, non-ageing seals are resistant to chemicals and precision-formed to ensure a high degree of protection of the clean-room luminaire, enhanced stability and underline the luminaire's overall high quality.
- Special anti-static coating resistant to cleaning agents and disinfectants eliminates the attraction of dirt and dust particles.

Designs:

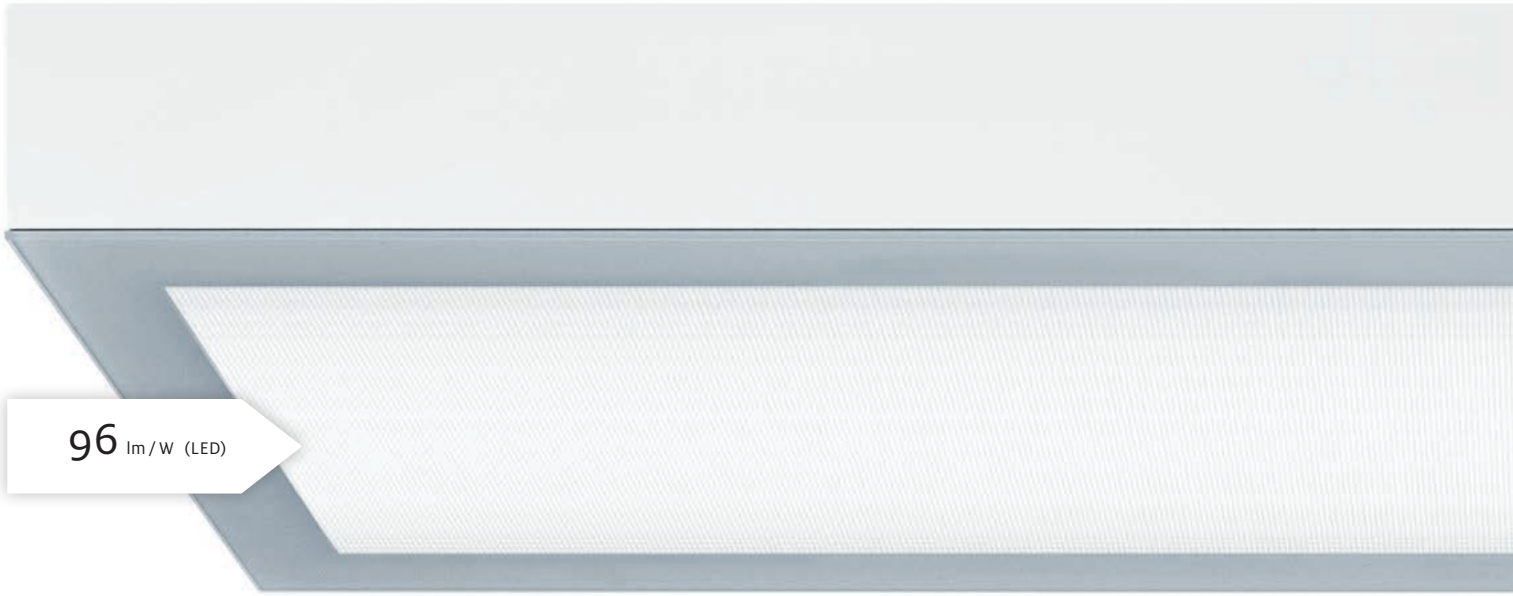


Linear



The Fraunhofer IPA Test Institute confirms the suitability of CLEAN SUPREME for clean-rooms in ISO Classes 3 to 9 (according to DIN EN ISO 14644-1) and states that:

“This lighting system is impressive thanks to its high-quality design and the workmanship of all its components.”



96 lm/W (LED)

CLEAN SUPREME LED

Technical data

Light sources:	LED
2 sizes (LWH):	1550 x 350 x 96 mm 1250 x 350 x 96 mm
Colour rendering:	Ra 90 or Ra 80
UGR:	< 19 at Ra 90, < 22 at Ra 80
Luminous flux:	up to 10 400 lm (Ra 80) or 9100 lm (Ra 90)
Colour temperature:	4000 K (intermediate white)
Models:	linear version



Continuously smooth diffuser made of safety glass with extremely simple magnetic opening mechanism. A foam gasket ensures a perfectly tight joint.

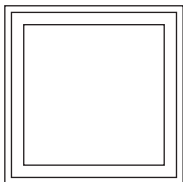
CLEAN ADVANCED LED

Clean-room luminaire for areas with exacting requirements

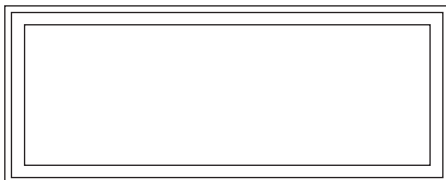
A cover with a high-quality anodised aluminium frame and toughened safety glass insert is distinctive of the mid-range CLEAN clean-room luminaire model.

- A continuous, precision-formed foam seal between the cover and luminaire housing as well as between the luminaire and ceiling ensures a perfectly tight joint. Trouble-free operation in rooms with positive and negative pressure containment systems is ensured, as is IP65 protection from below.
- Internal catch locks are used in order to prevent particles from accumulating on external fastener components. The high-quality toughened safety glass panel in an anodised aluminium frame is easy to clean, and the luminaire is opened by using a suction cup.
- The standard prefitted mounting kit ensures extremely easy but nevertheless precise installation.
- The CLEAN ADVANCED, compatible with all common ceiling systems, is available as a linear luminaire or as a square version with LED.
- Resistance to chemicals and non-ageing seals ensure a high degree of protection of clean-room luminaires. Cleanly mitred corners, precisely welded joints and precision workmanship are other signs of top quality.
- The surface is resistant to cleaning agents and disinfectants. Smooth transitions between glass and frame, and frame and housing make cleaning easier.

Designs:



Square

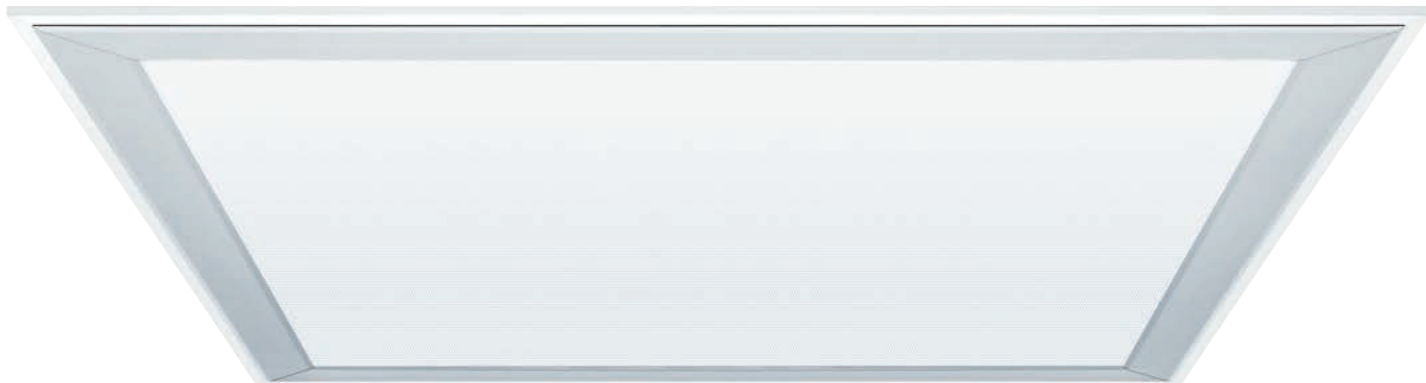


Linear



The Fraunhofer IPA Test Institute confirms the suitability of CLEAN ADVANCED for clean-rooms in ISO Classes 3 to 9 (according to DIN EN ISO 14644-1) and states that:

“The coating has a smooth texture, and workmanship is generally high quality.”



120 lm/W (LED)



CLEAN ADVANCED LED

Specifications

Light sources:	LEDs
Luminous flux:	3900 lm and 6000 lm
Colour temperature:	3000 K (warm white) and 4000 K (intermediate white)
Colour rendering:	Ra 80
Models:	linear and square
UGR:	< 19

Available on request

- Inspection opening from above
- Emergency lighting variants

Diffuser

The special micro-prism optic ensures both glare control in conformity with relevant standards at shallow angles (EN 12464) and reduced luminance at steep angles.

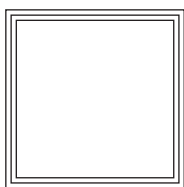
CLEAN CLASSIC LED

Clean-room luminaire for areas with increased requirements

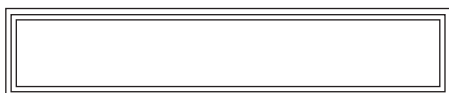
The classic version of the CLEAN luminaire focuses on basic clean-room requirements such as good hygiene and ease of cleaning. The PMMA acrylic glass panel enclosed by a high-quality, anodised aluminium frame ensures a high level of shatter protection as required in the production of foodstuffs for example.

- Continuous, precision-formed foam seal between the cover and luminaire housing, and the luminaire and ceiling ensures a perfect joint (protection rating IP54).
- The diffuser, which consists of aluminium-framed PMMA acrylic glass and a high-quality aluminium frame with smooth transitions for easy cleaning, can be opened very quickly by using the spring-clip mechanisms.
- CLEAN CLASSIC is compatible with all common ceiling systems and is used as a lay-in luminaire as well as a recessed luminaire. The mounting kit which is available as an accessory snaps into the luminaire housing and makes recessed installation simpler.
- The classic model is available in a hygienic design as a linear luminaire and as a square version with LED.
- High-quality materials and meticulous workmanship ensure durability and stability.
- The coating of both the housing and cover is resistant to cleaning agents and disinfectants.

Designs:



Square



Linear



Thanks to the levelling kit, installation effort is reduced to just a few simple steps.



CLEAN CLASSIC LED

Technical data

Light sources:	LED
Colour rendering:	Ra 90 or Ra 80
Luminous flux:	4600–5800 lm
UGR:	< 22
Colour temperatures:	3000 K (warm) and 4000 K (intermediate)
Models:	linear and square

Locking system

- Inner spring clips

Available on request

- Inspection opening from above
- Emergency lighting variants



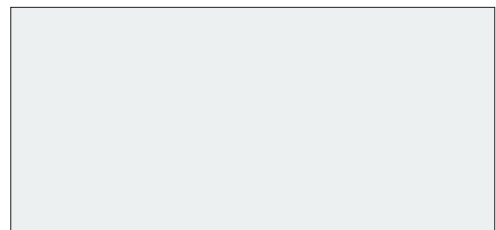
High-quality lighting

ensures process safety and reduces frequency of mistakes

Clean-rooms are built to meet exceptionally demanding expectations. They are very often used to accomplish difficult visual tasks, and great importance is therefore attached to lighting. Surgical operations, for instance, present the greatest challenges of all for physicians and medical staff, particularly in terms of visual performance. Good light ensures reliable, fast perception of important details. Adaptation problems for the human eye are an additional challenge in lighting terms. Excessive differences in illuminance levels when lines of sight switch between the operating field and the surrounding area may result in adaptation problems. The solution is to graduate the lighting level in the room. CLEAN's response to the ever growing number of visual display terminals in clean-rooms is optics that are in conformity with relevant standards and eliminate annoying reflections on screen surfaces. The entire CLEAN product range incorporates state-of-the-art LED-technologies and electronic ballasts. Luminous flux and thermal performance are perfectly matched to make CLEAN luminaires significantly more efficient than fluorescent fittings in clean-room applications.

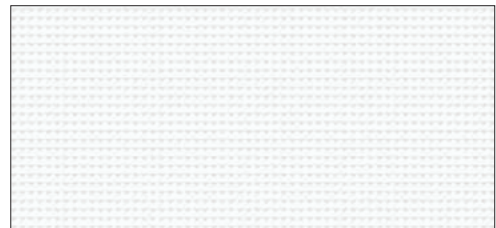
Opal optics

Uniform light distribution is the top priority in many areas such as circulation and general-purpose areas. Opal optics provide pleasant, uniform light distribution, and the light source remains concealed from direct view.



MPO (micro-pyramidal optic)

The patented innovative micro-pyramidal optic reduces luminance levels and ensures glare-free light. MPO not only provides exceptionally brilliant lighting quality, but also cuts direct and reflected glare for all types of VDTs (glare limitation $L < 1000 \text{ cd/m}^2$ at 65 degrees).



Which optics are best for specific application areas?

Light in healthcare settings	Mean E in lux	UGR	Colour rendition index (RA)	Recommended optic(s)
Circulation areas in healthcare settings	200 lx	22	80	Opal optic, MPO
General lighting in operating theatre	1000 lx	19	90	MPO
Immediate surroundings of operating table	Target is 2000 lx	19	90	MPO
Pre-op and recovery rooms (adjacent areas)	500 to 1000 lx	19	90	MPO
Intensive care units	100 to 1000 lx	19	90	MPO
Sterile rooms	300 lx	22	80	Opal optic, MPO
Laboratories	500 to 1000 lx	19	80/90	MPO
Examination rooms (general)	500 to 1000 lx	19	90	MPO
Treatment rooms (general)	300 to 500 lx	19	80/90	MPO
Light in clean-room industry				
Chemical industry: manufacture of medicaments	500 lx	22	80	Opal optic, MPO
Chemical industry: precision measurement rooms, laboratories	500 lx	19	80	MPO
Chemical industry: inspection work, rework	750 lx	19	80	MPO
Electrical industry: fine and extra-fine assembly work	750 to 1000 lx	16 to 19	80	MPO
Electrical industry: electronic workshops, testing, adjusting	1500 lx	16	80	MPO
Metal working and processing: extra-fine assembly work	750 lx	19	80	MPO
Metal working and processing: precision engineering and micromechanics	1000 lx	19	80	MPO
Food industry				
Food industry: sorting and washing products, milling, mixing and packing	300 lx	25	80	Opal optic, MPO
Food industry: laboratories	500 lx	19	80	MPO
Food industry: production of fine foods and foods	500 lx	22	80	Opal optic, MPO
Increased requirements				
Laundry and dry cleaning: washing and dry cleaning	300 lx	25	80	Opal optic, MPO
Laundry and dry cleaning: inspection and repairs	750 lx	19	80	MPO
Large-scale catering premises	500 lx	22	80	Opal optic, MPO

Excerpt from EN 12464-1

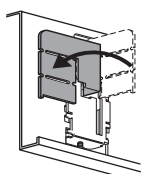
Surface-mounted or recessed:

CLEAN is properly equipped for either type of installation

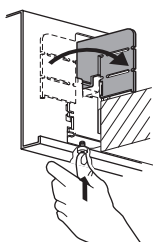
CLEAN ADVANCED LED and CLASSIC LED

Recessed installation with mounting kit

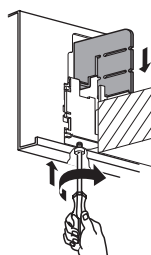
The mounting kit prefitted in the CLEAN ADVANCED recessed luminaire and available as an accessory for the CLEAN CLASSIC lay-in and recessed luminaire allows installation with effortless ease.



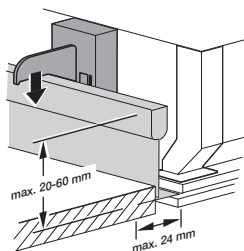
1. Flip mounting pad parallel to housing



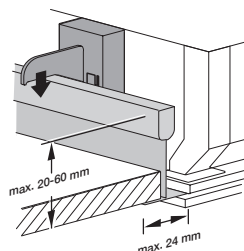
2. Push screw head upwards to automatically flip mounting pad out



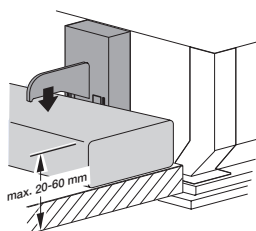
3. Level the luminaire and fix



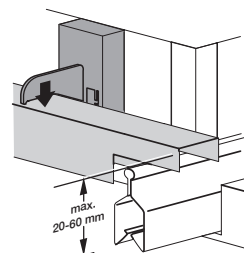
Ceiling systems with concealed carriers



Ceiling systems with exposed carriers



Ceiling systems with sawn cut-out



Ceiling systems with concealed carriers and metal coffering

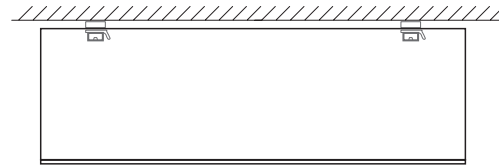
CLEAN SUPREME LED

Surface-mounted on ceiling or recessed with mounting frame

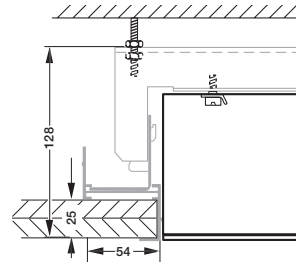
The luminaire is surface mounted on the ceiling by 4-point fixing as standard. The luminaire is supplied complete with an installation kit. A mounting frame that fits all CLEAN SUPREME versions turns the surface-mounted luminaire into a recessed luminaire. The luminaires are flush with the ceiling.

Mounting frame on bare ceiling:

The mounting frame is fixed by means of threaded rods that are fixed to the bare ceiling. To fix ceiling panels, there is a version with a flange (support for ceiling panel – cut ceiling panels) or without a flange (plasterboard can be screwed straight onto the frame).



Surface-mounted on ceiling

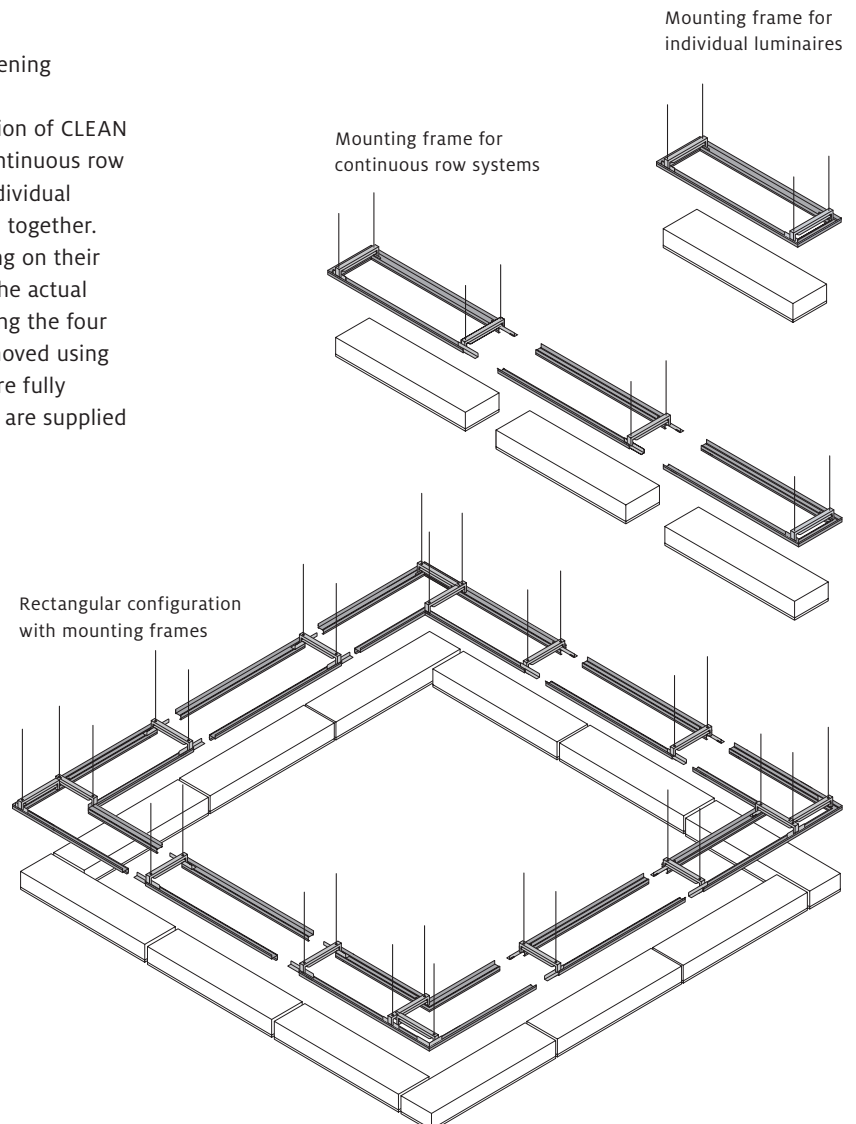


Recessed installation, mounting frame with flange: ceiling modules or cut ceiling panels are laid in

Installation flush with ceiling

Using mounting frame: configuring, connecting and tightening

The mounting frame can be used to obtain flush installation of CLEAN SUPREME as individual luminaire solutions, as well as continuous row or rectangular configurations. During initial fixing, the individual frame modules are placed side by side and then fastened together. Threaded rods fix the frame to the bare ceiling. Depending on their design, the ceiling panels are laid in or screw-fastened. The actual luminaire is simply fastened into the mounting frame using the four standard fixing points. All components are fitted and removed using normal, commercially available tools. Individual frames are fully assembled at the factory. Right-angled mounting frames are supplied as pre-installed component parts.



Suitable for use in clean-rooms

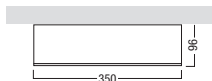
Corrosion protection and white coating make the mounting frame resistant to oil vapours, chemicals, disinfectants and cleaning agents.

	CLEAN SUPREME linear	CLEAN ADVANCED linear	CLEAN ADVANCED square	CLEAN CLASSIC linear	CLEAN CLASSIC square
Distribution characteristics					
Wide-angle	■	■	■	■	■
Installation					
Surface-mounted	■				
Recessed		■	■	■	■
Mounting frame with flange	■				
Optics					
MPO	■	■	■		
Opal				■	■
Dimensions					
1250 x 350 x 96 mm	■				
1550 x 350 x 96 mm	■				
1250 x 400 x 96 mm	■				
1550 x 400 x 96 mm	■				
1198 x 298 x 101 mm				■	
1198 x 298 x 101 mm				■	
1198 x 298 x 106 mm		■			
1498 x 298 x 106 mm					
1248 x 310 x 106 mm		■			
598 x 598 x 106 mm			■		
623 x 623 x 106 mm			■		
598 x 598 x 126 mm			■		■
623 x 623 x 126 mm			■		■
LED					
3800 lm – 4800 lm / 3000 K / 4000 K / Ra80 / Ra90		■	■		
5000 lm – 6200 lm / 3000 K / 4000 K / Ra80 / Ra90		■	■		
8000 lm – 11 000 lm / 4000 K / Ra80 / Ra90	■				
4600 lm / 3000 K / Ra90				■	■
4800 lm / 4000 K / Ra90				■	■
5000 lm / 3000 K / 4000 K / Ra80 / Ra90				■	■
5200 lm / 3000 K / 4000 K / Ra80 / Ra90				■	■
5400 lm / 3000 K / 4000 K / Ra80 / Ra90				■	■
5800 lm / 3000 K / 4000 K / Ra80				■	■
RGB					
4600 lm – 4800 lm / 4000 K / Ra90		■			
6200 lm / 4000 K / Ra90			■		
8000 lm – 10 000 lm / 4000 K / Ra90	■				

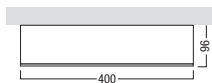
CLEAN SUPREME

Installation CLEAN SUPREME

LED



RGB



- Possible feed-in point (luminaire)
- Installation points (ceiling)

	L	B	H	L1	B1
LED	1250/1550	350	96	1190/1490	290
RGB	1250/1550	400	96	1190/1490	290

CLEAN S-MP SUPREME LED microprismatic optic



- Housing made of welded sheet steel, with white antistatic coating (resistant to oil vapours, chemical substances, disinfectants and cleaning agents)
- LED cleanroom luminaire for maximum requirements
- Specially developed micro-prismatic optic delivers high efficiency and standards-compliant glare-control (UGR < 19 with colour rendering Ra > 90)
- LED service life: 50 000 h before luminous flux is reduced to 90 % of the initial value
- Colour rendering: Ra > 80 or Ra > 90
- Colour temperature 4000 K (intermediate)
- Chromaticity tolerance between multiple luminaires of up to 4 MacAdam ellipses
- Always check in advance the suitability of the cleaning conditions and cleaning agents used
- Fastening mechanism: convenient magnetic catch
- Diffuser made of 4 mm safety glass
- Installation: 4-point fixing using mounting kit (included in luminaire supply)
- Certified according to Fraunhofer Institute - purity class suitable for clean rooms according to DIN EN ISO 14644-1 - Class 3 to 9, conforms with rules set out in GMP (good manufacturing practice)
- Luminaire pre-wired using halogen-free leads
- Luminaires also available as emergency lighting versions on request

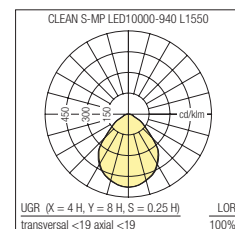
LED luminaires

	L/W/H	kg	Order no.
LED8000-940 L1250	1250/350/96	16,8	42 183 021
LED8000-RGB L1250	1250/400/96	17,0	42 184 825
LED9000-840 L1250	1250/350/96	16,8	42 182 675
LED10000-940 L1550	1550/350/96	20,5	42 183 022
LED10000-RGB L1550	1550/400/96	21,0	42 184 826
LED11000-840 L1550	1550/350/96	20,5	42 182 676

Accessory

Suction cup

20 935 455



CLEAN SUPREME

Installation CLEAN SUPREME mounting frame

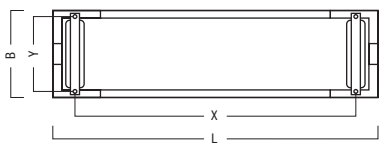
CLEAN Supreme LED 8000, LED 9000		L	B	X	Y	X1	Y1	L1
1	Frame for individual installation	CLEAN S EREZ(S)	1359	460	1129.5	393	-	-
2	Frame for initial luminaire	CLEAN S ERA(S)	1305	460	1190.3	393	-	-
3	Frame for central luminaire	CLEAN S ERM(S)	1251	460	1251.0	393	-	-
4	Frame for end luminaire	CLEAN S ERE(S)	1305	460	1190.3	393	-	-
5	Frame for right corner	CLEAN S ERR(S)	1305	460	1190.3	393	1190.8	432.7
6	Frame for left corner	CLEAN S ERL(S)	1305	460	1190.3	393	1190.8	432.7

CLEAN Supreme LED 10 000, LED 11 000		L	B	X	Y	X1	Y1	L1
1	Frame for individual installation	CLEAN S EREZ(S)	1659	460	1429.5	393	-	-
2	Frame for initial luminaire	CLEAN S ERA(S)	1605	460	1490.3	393	-	-
3	Frame for central luminaire	CLEAN S ERM(S)	1551	460	1551.0	393	-	-
4	Frame for end luminaire	CLEAN S ERE(S)	1605	460	1490.3	393	-	-
5	Frame for right corner	CLEAN S ERR(S)	1605	460	1490.3	393	1490.8	432.7
6	Frame for left corner	CLEAN S ERL(S)	1605	460	1490.3	393	1490.8	432.7

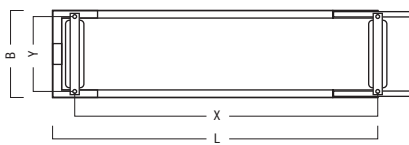
CLEAN Supreme LED 8000 RGB+W		L	B	X	Y	X1	Y1	L1
1	Frame for individual installation	CLEAN S EREZ(S)	1359	510	1129.5	443	-	-
2	Frame for initial luminaire	CLEAN S ERA(S)	1305	510	1190.3	443	-	-
3	Frame for central luminaire	CLEAN S ERM(S)	1251	510	1251.0	443	-	-
4	Frame for end luminaire	CLEAN S ERE(S)	1305	510	1190.3	443	-	-
5	Frame for right corner	CLEAN S ERR(S)	1305	510	1190.3	443	1190.8	482.7
6	Frame for left corner	CLEAN S ERL(S)	1305	510	1190.3	443	1190.8	482.7

CLEAN Supreme LED 10 000 RGB+W		L	B	X	Y	X1	Y1	L1
1	Frame for individual installation	CLEAN S EREZ(S)	1659	510	1429.5	443	-	-
2	Frame for initial luminaire	CLEAN S ERA(S)	1605	510	1490.3	443	-	-
3	Frame for central luminaire	CLEAN S ERM(S)	1551	510	1551.0	443	-	-
4	Frame for end luminaire	CLEAN S ERE(S)	1605	510	1490.3	443	-	-
5	Frame for right corner	CLEAN S ERR(S)	1605	510	1490.3	443	1490.8	482.7
6	Frame for left corner	CLEAN S ERL(S)	1605	510	1490.3	443	1490.8	482.7

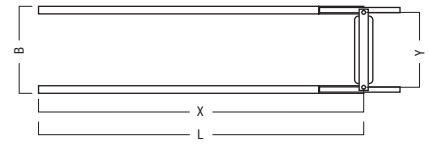
1 Frame for individual installation / CLEAN S EREZ(S)



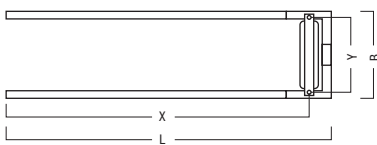
2 Frame for initial luminaire / CLEAN S ERA(S)



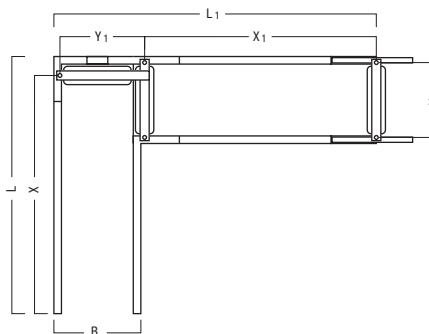
3 Frame for central luminaire / CLEAN S ERM(S)



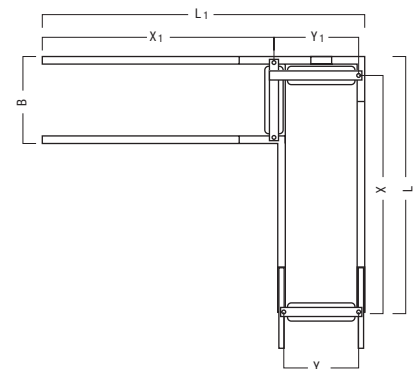
4 Frame for end luminaire / CLEAN S ERE(S)



5 Frame for right corner / CLEAN S ERR(S)



6 Frame for left corner / CLEAN S ERL(S)



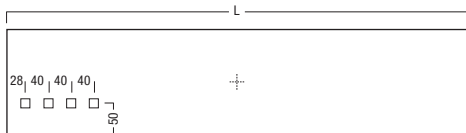
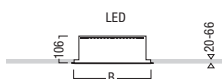
X, Y ...fastening points
B, L ...external dimensions

Calculation of ceiling cut-out dimensions for frame modules without web:
Total of frame length dimensions or frame width dimensions MINUS 94 mm

CLEAN ADVANCED

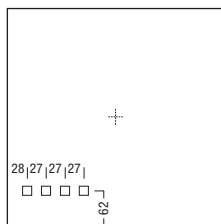
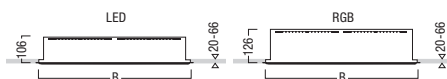
Installation CLEAN ADVANCED

Linear



□ Possible feed-in point (luminaire)

Square



□ Possible feed-in point (luminaire)

Module 600



minimum dimensions

	L	B	H	L/DA	B/DA
LED	1198	298	106	1184	277
LED Q	598	598	106	584	577
RGB Q	598	598	126	584	577

Module 625



minimum dimensions

	L	B	H	L/DA	B/DA
LED	1248	310	106	1234	289
LED Q	623	623	106	609	602
RGB Q	623	623	126	609	602

[...] Shared properties CLEAN ADVANCED

- Specially developed microprismatic optic delivers high efficiency and standards-compliant glare-control (UGR < 19 with colour rendering Ra > 90)
- LED service life: 50 000 h before luminous flux is reduced to 90 % of the initial value
- Colour rendering: Ra > 80 or Ra > 90
- Colour temperature 4000 K, optionally 3000 K
- Chromaticity tolerance between multiple luminaires of up to 4 MacAdam ellipses
- Housing made of welded sheet steel, with white coating (resistant to oil vapours, chemical substances, disinfectants and cleaning agents)
- Always check in advance the suitability of the cleaning conditions and cleaning agents used
- Fastening mechanism: internal catch locks
- Diffuser made of anodised aluminium section with 4 mm safety glass insert
- Installation: 4-point fixing using mounting kit (included in luminaire supply)
- Certified according to Fraunhofer Institute - purity class suitable for clean rooms according to DIN EN ISO 14644-1 - Class 3 to 9
- Luminaire pre-wired using halogen-free leads
- Top inspection opening for accessible ceilings available on request
- Luminaires are also available on request in dimmable version or as emergency lighting model

CLEAN A-MP ADVANCED LED linear



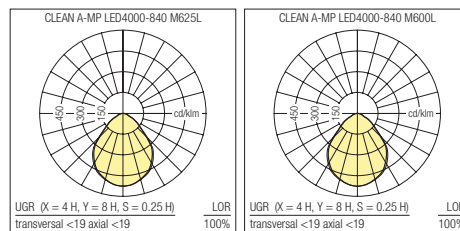
■ [...]

	L/W/H	kg	Order no.
LED luminaire for module 625			
<i>dimnable Dali only</i>			
LED3800-830	1248/310/106	12,0	42 182 865
LED4000-840	1248/310/106	12,0	42 182 683
LED4800-930	1248/310/106	12,0	42 183 020
LED4800-940	1248/310/106	12,0	42 183 019
LED4800-RGB	1248/310/106	12,0	42 184 824
LED5800-830	1248/310/106	12,0	42 182 867
LED6000-840	1248/310/106	12,0	42 182 679
LED luminaire for module 600			
<i>dimnable Dali only</i>			
LED3800-830	1198/298/106	12,0	42 182 861
LED4000-840	1198/298/106	12,0	42 182 681
LED4600-940	1198/298/106	12,0	42 183 015
LED4600-RGB	1198/298/106	12,0	42 184 823
LED4800-930	1198/298/106	12,0	42 183 016
LED5800-830	1198/298/106	12,0	42 182 863
LED6000-840	1198/298/106	12,0	42 182 677

Accessory

Suction cup

20 935 455



CLEAN ADVANCED

CLEAN A-MP ADVANCED LED square

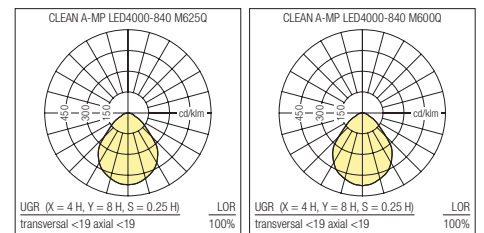


▪ |...|

	L/W/H	kg	Order no.
LED luminaire for module 625			
<i>dimnable Dali only</i>			
LED3800-830	623/623/106	12,0	42 182 864
LED4000-840	623/623/106	12,0	42 182 684
LED5800-830	623/623/106	12,0	42 182 866
LED5800-930	623/623/106	12,0	42 183 018
LED6000-840	623/623/106	12,0	42 182 680
LED6200-940	623/623/106	12,0	42 183 017
LED6200-RGB	623/623/126	12,0	42 184 822
LED luminaire for module 600			
<i>dimnable Dali only</i>			
LED3800-830	598/598/106	12,0	42 182 860
LED4000-840	598/598/106	12,0	42 182 682
LED5800-830	598/598/106	12,0	42 182 862
LED5800-930	598/598/106	12,0	42 183 014
LED6000-840	598/598/106	12,0	42 182 678
LED6200-940	598/598/106	12,0	42 183 013
LED6200-RGB	598/598/126	12,0	42 184 821

Accessory
Suction cup

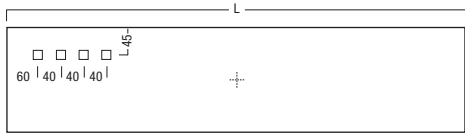
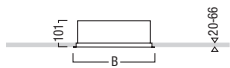
20 935 455



CLEAN CLASSIC

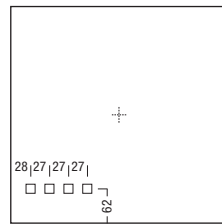
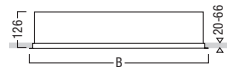
Installation CLEAN CLASSIC

Linear



□ Possible feed-in point (luminaire)

Square



□ Possible feed-in point (luminaire)

Module 600



minimum dimensions

	L	B	H	L/DA	B/DA
LED	1198	298	101	1176	277
LED Q	598	598	126	577	577

Module 625



minimum dimensions

	L	B	H	L/DA	B/DA
LED	1248	310	101	1226	289
LED Q	623	623	126	602	602

[...] Shared properties CLEAN CLASSIC

- Housing made of welded sheet steel, with white coating (resistant to oil vapours, chemical substances, disinfectants and cleaning agents)
- Colour rendering index: Ra > 80, optional Ra > 90
- Colour temperature 4000 K, optionally 3000 K
- Chromaticity tolerance between multiple luminaires of up to 3 MacAdam ellipses
- LED service life: 50 000 h before luminous flux is reduced to 90 % of the initial value
- Always check in advance the suitability of the cleaning conditions and cleaning agents used
- Fastening mechanism: turn lock fastener
- Diffuser made of anodised aluminium section with 3 mm PMMA panel insert
- Diffuse distribution PMMA panel for high glare reduction (UGR < 22)
- Installation: 4-point fixing using mounting kit
- Top inspection opening for accessible ceilings available on request
- Luminaires also available as emergency lighting versions on request
- Luminaire pre-wired using halogen-free leads

CLEAN C-O CLASSIC LED linear



■ [...]

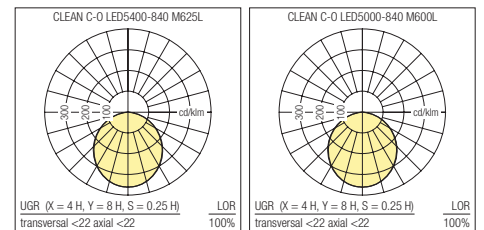
	L/W/H	kg	Order no.
LED luminaire for module 600			
<i>dimnable Dali only</i>			
LED4600-930	1198/298/101	5,6	42 183 189
LED4800-940	1198/298/101	5,6	42 183 187
LED5000-830	1198/298/101	5,6	42 183 181
LED5000-840	1198/298/101	5,6	42 183 179
LED luminaire for module 625			
<i>dimnable Dali only</i>			
LED4600-930	1248/310/101	7,0	42 183 190
LED4800-940	1248/310/101	7,0	42 183 188
LED5400-830	1248/310/101	6,9	42 183 182
LED5400-840	1248/310/101	6,9	42 183 180

Accessory

Ceiling fixing kit

22 062 229

Please order fixing kit separately.



CLEAN CLASSIC

CLEAN C-O CLASSIC LED square

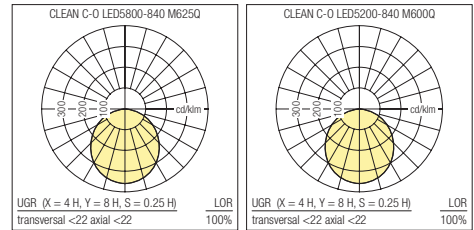


■ |...|

	L/W/H	kg	Order no.
LED luminaire for module 600			
			<i>dimnable Dali only</i>
LED5000-930	598/598/126	6,1	42 183 185
LED5200-830	598/598/126	6,1	42 183 177
LED5200-840	598/598/126	6,1	42 183 175
LED5200-940	598/598/126	6,1	42 183 183
LED luminaire for module 625			
			<i>dimnable Dali only</i>
LED5000-930	623/623/126	2,6	42 183 186
LED5200-940	623/623/126	5,7	42 183 184
LED5800-830	623/623/126	4,5	42 183 178
LED5800-840	623/623/126	6,6	42 183 176

Accessory
 Ceiling fixing kit 22 062 229

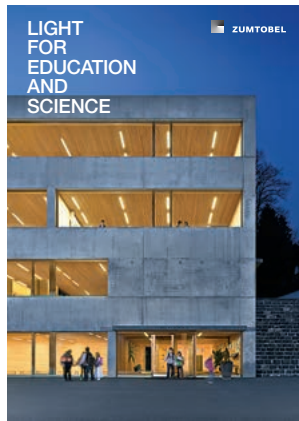
Please order fixing kit separately.



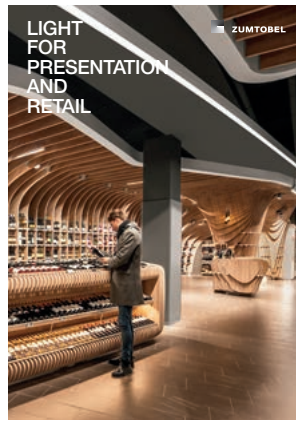
Zumtobel, a company of the Zumtobel Group, is an internationally leading supplier of integral lighting solutions for professional indoor and outdoor building lighting applications.



zumtobel.com/office



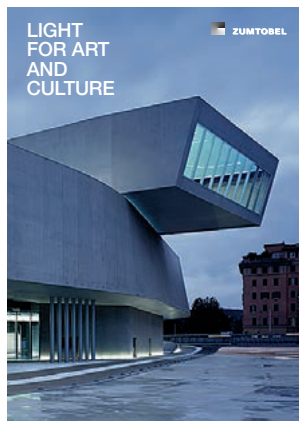
zumtobel.com/education



zumtobel.com/shop



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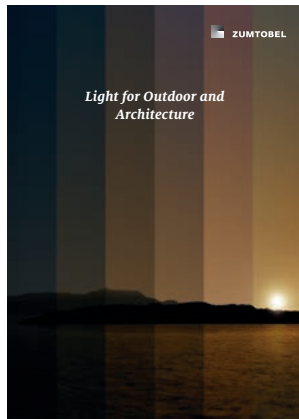
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- *Offices and Communication*
- *Education and Science*
- *Presentation and Retail*
- *Hotel and Wellness*
- *Art and Culture*
- *Health and Care*
- *Industry and Engineering*
- *Outdoor and Architecture*
- *Living*

We provide unique customer benefits by integrating technology, design, emotion and energy efficiency. We combine the best possible ergonomic lighting quality for an individual's wellbeing with the responsible use of energy resources. The company's own sales organisations in twenty countries, as well as commercial agencies in fifty other countries, form an international network of experts and design partners providing professional lighting consulting, design assistance and comprehensive services.

Lighting and sustainability

In line with our corporate philosophy "We want to use light to create worlds of experience, make work easier and improve communications and safety while remaining fully aware of our responsibility to the environment", Zumtobel offers energy-efficient high-quality products, while at the same time making sure that our production processes based on the considerate use of resources are environmentally compatible.

zumtobel.com/sustainability



Top quality – with a five-year guarantee.
As a globally leading luminaire manufacturer, Zumtobel provides a five year manufacturer's guarantee on all Zumtobel branded products in accordance with the terms of guarantee at zumtobel.com/guarantee.

Order no. 04 797 635-EN 10/16 © Zumtobel Lighting GmbH
Technical data was correct at time of going to press.
We reserve the right to make technical changes without notice. Please contact your local sales office for further information.





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Surface-mounted and pendant luminaires

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zumtobel.cn

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zumtobel.se



Free-standing and wall-mounted luminaires

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Continuous-row systems and individual batten luminaires

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Luminaires with extra protection



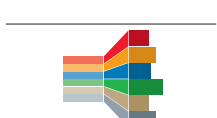
Façade, media and outdoor luminaires



Lighting management systems



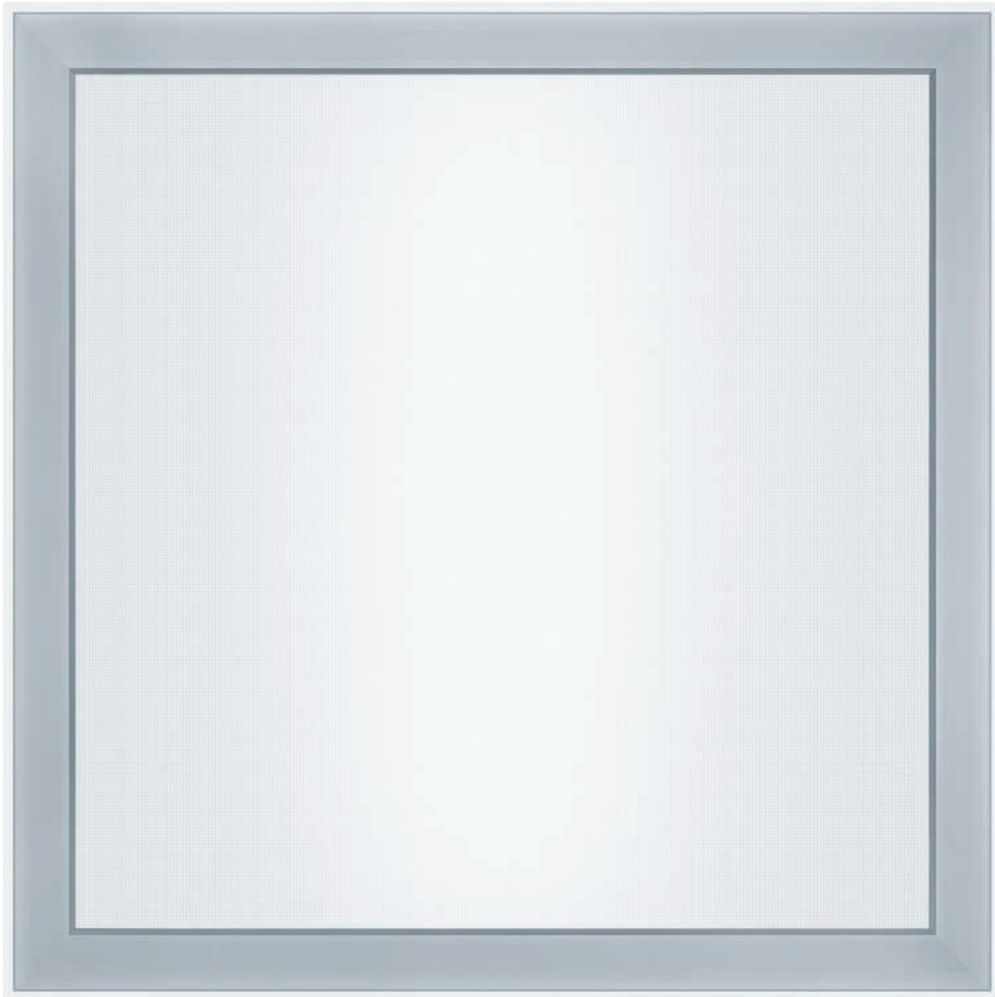
Emergency lighting



Lighting Services



Medical supply systems



CLEAN

Clean-room luminaire

Three-level luminaire concept
for clean-rooms in healthcare settings
and in industry.