LED LINEAR™

A Fagerhult Group Company

LINEAR LIGHTING SOLUTIONS

FROM Λ ALPHA TO Ω OMEGA

ABOUT US

LIGHT IS OUR PASSION

Founded in May 2006, our enterprise supplies high quality linear LED lighting solutions based on flexible printed circuit boards worldwide. Our offer is a cost effective, unique modular LED tool kit for interior or exterior linear lighting solutions – from mood to general lighting – with an ingress protection of up to IP67.

Our international awards and reference projects, including exquisite lighting solutions for decorative or architectural applications, stand as proof of our high quality manufacturing philosophy. Based on this philosophy and the depth of our LED knowledge we are constantly working on improving products for your lighting requirements. Throughout the following pages, we invite you to familiarize yourself with the LED Linear™ world of experience.

LINEAR

Continuous illumination without any breaks. Linear lighting can be smartly integrated intoarchitectural details. Lighting then appears well thought of, seamless and unobstrusive. It increases the quality of life in cities, makes intelligent factories more efficient, it strengthens well-being and productivity in the office and in education, it increases guest comfort in the hospitality industry and creates new shopping experiences in shopping areas.

MODULAR

Modular stands for versatile combinations. Our product portfolio is based on a modular construction toolkit. Configure your individual lighting solution according to your wishes. You select: mounting type, protection grade, color rendition, color temperature, luminosity, wattage, optic and profile – we offer your desired product!

INFINITE

You can look forward to more than 30 million standard variations, which will leave endless lighting solutions for your lighting task. Whether you would like to provide contour lighting for a 300 meter high facade, illuminate a waterscape, equip an office complex with efficient light, or create mood light in the private sector – and your imagination inspires us!

HOW TO FIND THE RIGHT PRODUCT?

With this catalogue you have many possibilities
to find the right product for your desired application.

Search by:

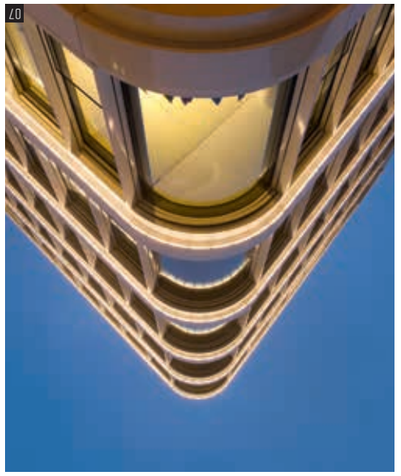
- **Lumen** and size 14 – 17
- **Optics** and **light distribution** 18 – 21
- Portfolio Overview **attached at the end of the catalogue**

As usual you can find all technical information and
reference pictures of our luminaires on our website.
www.led-linear.com

CONTENT

! THE PAGE NUMBERS DO NOT MATCH THE PRINTED 2019/2020 CATALOG.


08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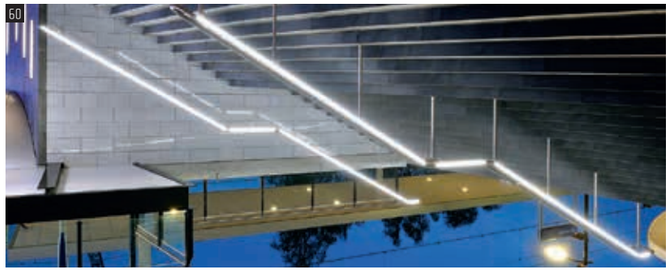
02


01

OUTDOOR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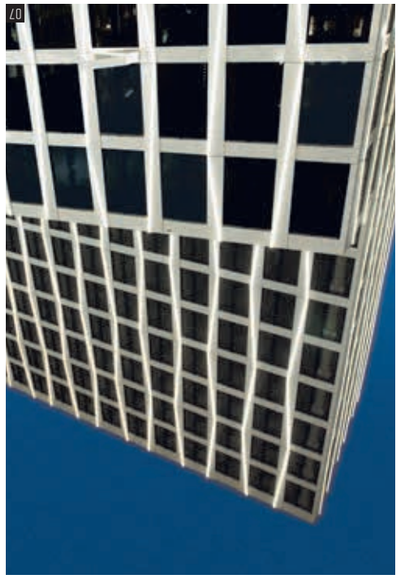
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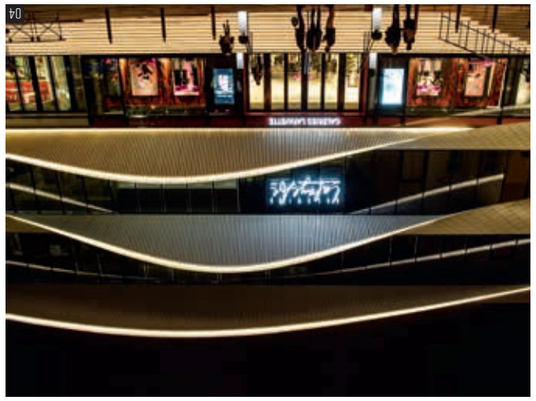
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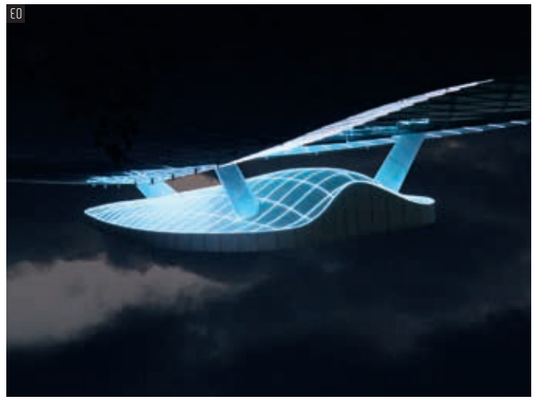
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01

OUTDOOR

INDOOR


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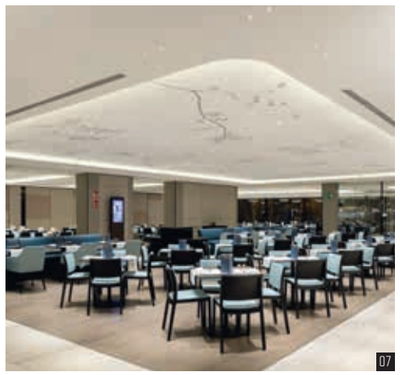
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INDOOR


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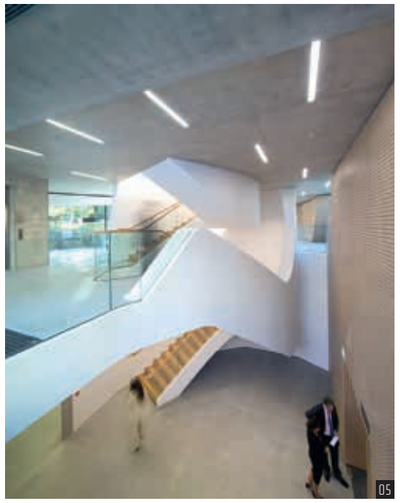
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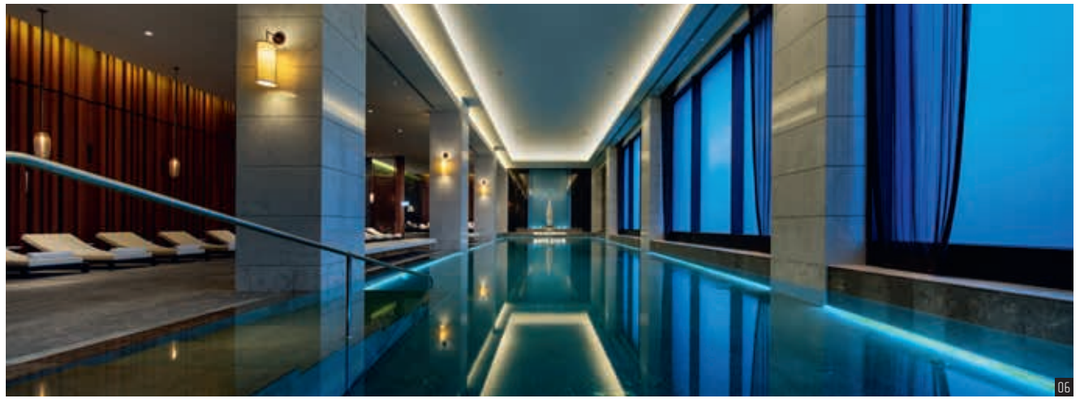
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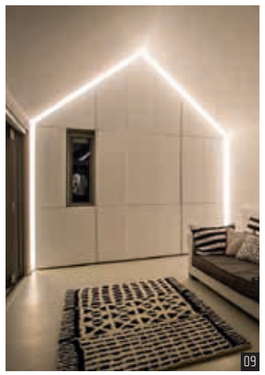

09

OUR CORE TECHNOLOGY

Premium LEDs and R2R production process

One of our Reel-to-Reel tape production line at our production site in Germany.

As trivial as it sounds, a great luminaire starts with a great light source. We, at LED Linear™, consider this aspect to be the key to a unique lighting experience. We carefully select the best LED packages available in terms of quality and reliability. Using our state-of-the-art Reel-to-Reel (R2R) process production lines, these LEDs are soldered automatically in a precise manner with numerous in-line inspections. This production process offers LED tapes without stairway-high loss-effect between cut lengths and improved mechanical stability due to homogeneous flexible material compared to sheet-to-sheet or rigid PCB light modules.

IP67

Luminaire encapsulation

Polyurethane potting stations allowing the production of IP67 light lines up to 10 m in length. PU shows superior test performance compared to silicone and is more water-proof as others. It also outperforms other encapsulation technologies in terms of chemical resistance.

NANO RAY

NanoRay technology

NanoRay is a new **technology** enabling the engineering and the production of nano structured optics. The size of the structures is comparable to 1/10 of a human hair which enables an absolute control of the lighting distribution, as well as the color over angle.
In order to get these new optics to work at their best, the smallest possible light source is needed. LED manufacturers offered the perfect solution: Chip Scale Package LEDs (CSP). This new generation of LEDs is only 1 x 1 mm and offers many advantages such as better thermal management. That means a better lifetime and an outstanding color rendition performances compared to previous technologies. With the newest generation of LED – CSP which have a better CRI and R9 value we could start to use these optics. Thanks to this combination LED Linear™ was able to shrink the footprint of their luminaires while improving its performances.

True Color

TrueColor technology

The world's first fully encapsulated flexible homogeneous light line VarioLED™ VENUS IP67 family was originally available in two bending directions – horizontal plane (SV) and vertical plane (TV). Besides the bending direction they also differed from each other by geometry, effective color temperature and lumen output. We upgraded our lighting pioneer product by introducing our new VarioLED™ VENUS True Color IP67 range which is again available in the bending direction vertical plane (TV), and now also able to bend in all 3 directions (3D). The **TrueColor technology** allows to combine both these fixtures in a single application or even a single line thanks to no difference in their CCT, the same geometry and the same lumen output.

ICON OVERVIEW

OUTDOOR / INDOOR

You will find these icons on every product page referring to the different features of the product.

Feature

- True Color — NanoRay technology
- NANO RAY — NanoRay technology 2.0
- NANO RAY 2.0 — Low glare
- UGR <13 — Tool free installation
- Continuous row
- Drive over
- Stainless steel housing — Stainless steel housing

- Recessed
- Surface-mounted / Ceiling
- Pendant
- Two flames
- Ground surface-mounted
- In-ground
- Wall-mounted
- Recessed (under water)
- Surface-mounted (under water)

Technical Data / Performance

- White — Tunable White
- IQ White — Color
- Color — RGBW
- RGB — Reel-to-reel (R2R) production
- RGBW — Electronic design
- IC — Thermal management

- IP00 — IP00
- IP20 — IP20
- IP20/ IP40 — IP20 / IP40
- IP40 — IP40
- IP67 — IP67
- IP68 — IP68

- L90/B10 › 60,000 h — Lifetime White / IQ White
- L80/B10 › 60,000 h — Lifetime White / IQ White
- L80/B10 › 50,000 h — Lifetime White / IQ White
- L80 › 30,000 h
- IK10 — Impact resistant

Download "Icon Overview"

EASY TO SPECIFY

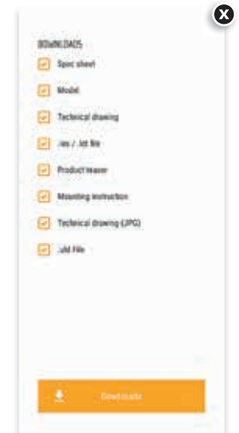
Customize your own luminaire with the LED Linear™ online configurator on our website www.led-linear.com

Choose your right product with 3 options.

- by product type
- by application type
- directly to the product section

After selecting the right luminaire family you can customize the product to your individual needs in the final configuration.

All data information of the configured product is available for download e.g. data sheet, photometric files (ies/ldt), mounting instructions etc.



At the end of your configuration process you will get your custom made spec sheet with all relevant information related to your configurated luminaire, accessories in appropriate quantities, PSU controls, wiring and maximal feed length.

OUTDOOR IP67

All dimensions in the scale 1: 1

Brightness

Color temperature 2,700 K

4,000 lm

3,000 lm

2,000 lm

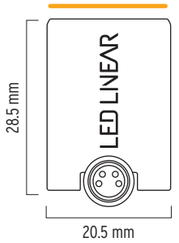
1,000 lm

500 lm

0 lm

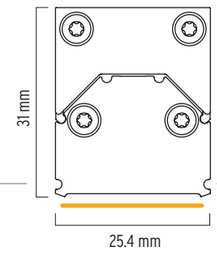
ADONIS ARCHTECTURAL Optics IP67

3,520 lm/m | 32 W/m | Page 50



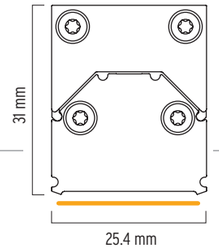
XOOLUM™ R IP67

3,060 lm/m | 25 W/m | Page 62



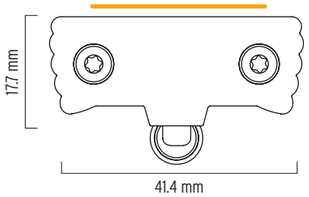
XOOLUM™ R Wall Wash IP67

2,930 lm/m | 25 W/m | Page 66



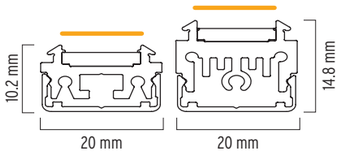
XOOLUX™ NANO IP65

2,745 lm/m | 40 W/m | Page 86



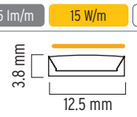
VarioLED™ IP67

2,500 lm/m | 25 W/m | Page 74



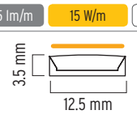
Vario LED™ Flex IP67

2,025 lm/m | 15 W/m | Page 40



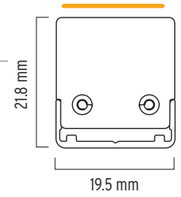
HYDRALUX™ IP67

2,025 lm/m | 15 W/m | Page 44



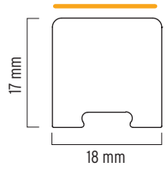
XOOLINE™ IP67

1,930 lm/m | 25 W/m | Page 54



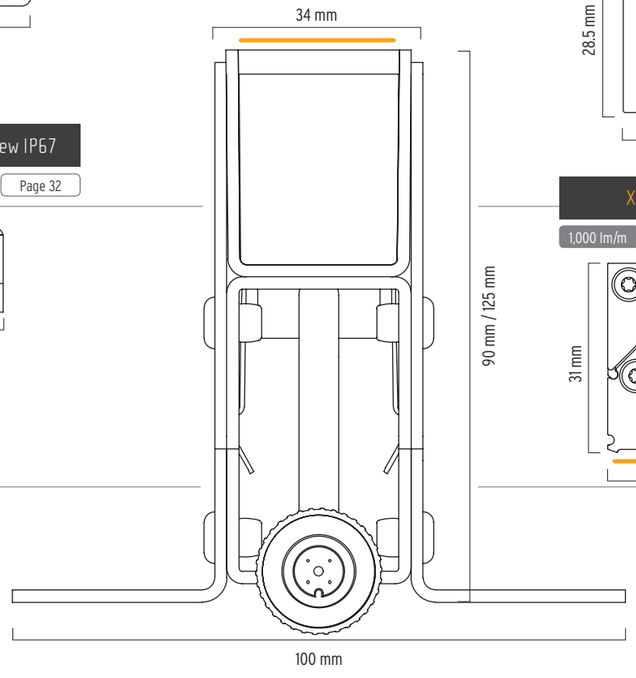
VENUS True Color Family IP67

1,520 lm/m | 15 W/m | Page 28



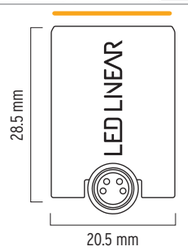
VarioLED™ OCEANOS IP67

1,765 lm/m | 15 W/m | Page 80 / 90



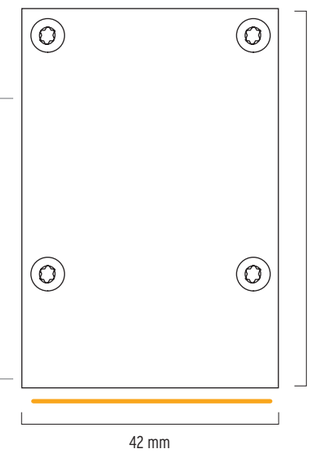
ADONIS ARCHTECTURAL Opal IP67

1,320 lm/m | 32 W/m | Page 50



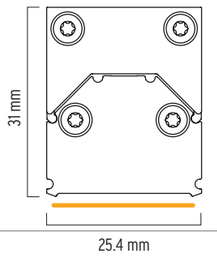
XOOLIGHT™ IP67

1,170 lm/m | 25 W/m | Page 70



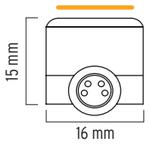
XOOLUM™ IP67

1,000 lm/m | 25 W/m | Page 58



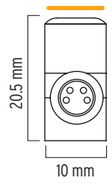
VENUS Family Top View IP67

1,125 lm/m | 15 W/m | Page 32



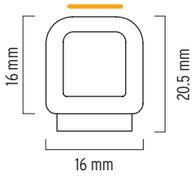
VENUS Family Side View IP67

705 lm/m | 15 W/m | Page 32



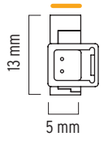
NEPTUNE IP68

750 lm/m | 15 W/m | Page 96



VarioLED™ Flex AMOR 5V IP67

635 lm/m | 10 W/m | Page 36



Small size — Large size

= Light surface

LED Linear™ GmbH

INDOOR IP20 / IP40

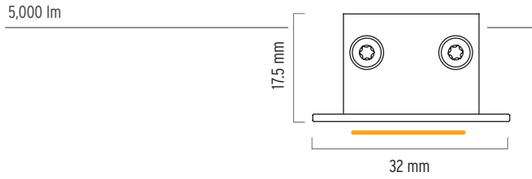
All dimensions in the scale 1: 1

Color temperature 2,700 K

Brightness

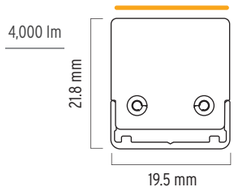
LUNA IP40

5,100 lm/m | 42 W/m | Page 130



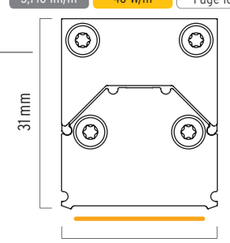
XOOLINE™ IP40

3,820 lm/m | 42 W/m | Page 118



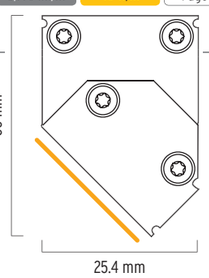
XOOLUM™ R IP20

3,710 lm/m | 40 W/m | Page 160



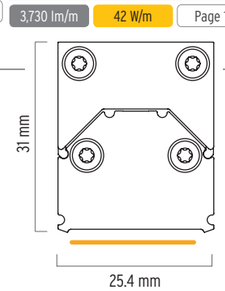
XOOLUM™ R Wall Wash IP20

3,770 lm/m | 40 W/m | Page 176



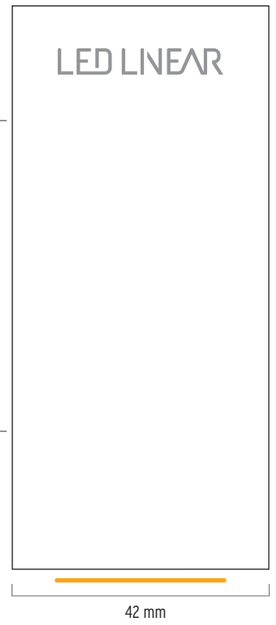
XOOLUM™ IP40

3,730 lm/m | 42 W/m | Page 126



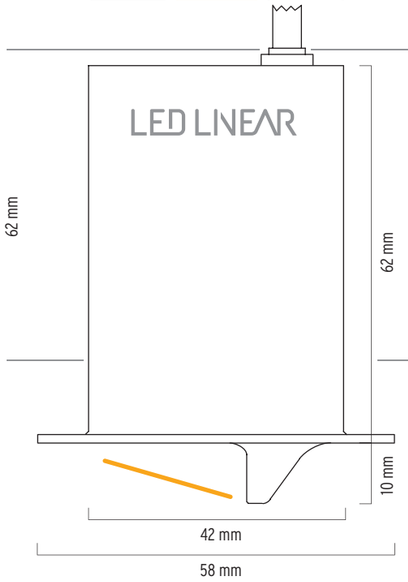
XOOMINAIRE™ 4292 IP20/IP40

4,120 lm/m | 40 W/m | Page 152



MARS Wall Wash IP20

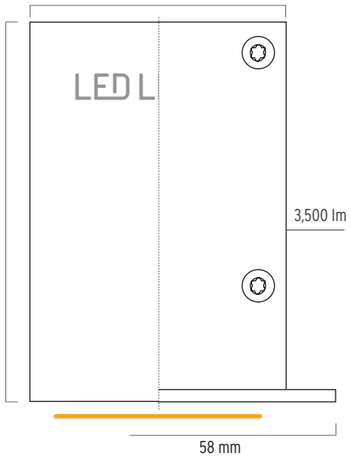
3,490 lm/m | 46 W/m | Page 172



MARS ARCHITECTURAL Type 62

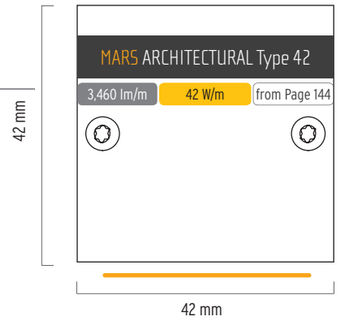
Surface / Pendant | Recessed

3,460 lm/m | 42 W/m | from Page 140



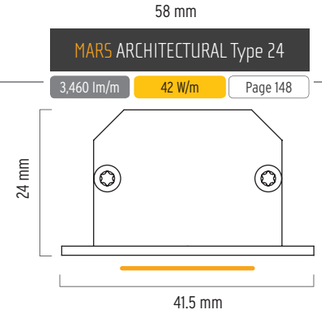
MARS ARCHITECTURAL Type 42

3,460 lm/m | 42 W/m | from Page 144



MARS ARCHITECTURAL Type 24

3,460 lm/m | 42 W/m | Page 148

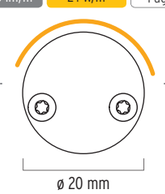


LYRA IP40

2,800 lm/m | 25 W/m | Page 122

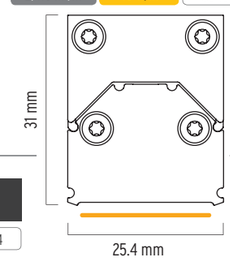
XOOCOVE

2,490 lm/m | 24 W/m | Page 166



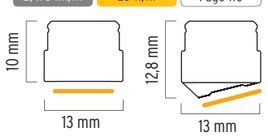
XOOLUM™ Opal Continuous IP40

2,410 lm/m | 40 W/m | Seite 156



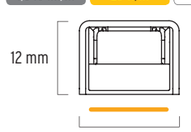
ULTIMA-S NANO / AS IP40

2,470 lm/m | 25 W/m | Page 110



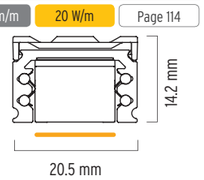
ULTIMA-P NANO IP40

1,840 lm/m | 25 W/m | Page 136



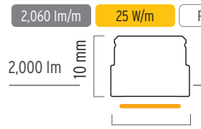
ULTIMA-T NANO IP40

2,160 lm/m | 20 W/m | Page 114



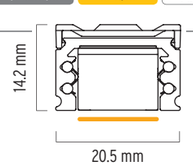
ULTIMA-S Opal IP40

2,060 lm/m | 25 W/m | Page 110



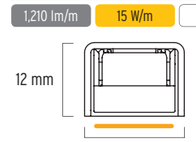
ULTIMA-T Opal IP40

1,120 lm/m | 15 W/m | Page 114



ULTIMA-P Opal IP40

1,210 lm/m | 15 W/m | Page 136



5,000 lm

4,000 lm

3,500 lm

3,000 lm

2,000 lm

500 lm

Small size — Large size

= Light surface

LED Linear™ GmbH

OUTDOOR IP67

Optics combinations

	10°	15°	20°	25°	30°	60°	65°	120°	220°	15° x 40°	Wall Wash	Opal Ecapsu-lation	Clear Encapsu-lation	Opal Cover (L^2)	Diffuse Cover (L^2)	Clear Cover	Page
 VENUS True Color family IP67			✓					✓				✓					28
VENUS family IP67								✓				✓					32
 VarioLED™ Flex AMOR IP67												✓					36
 VarioLED™ Flex IP67													✓				40
 HYDRALUX™ IP67													✓				44
 ADONIS ARCHITECTURAL IP67	✓				✓	✓						✓					50
 XOOLINE™ IP67								✓				✓		✓	✓	✓	54
 XOOLUM™ IP67												✓					58
 XOOLUM™ R IP67							✓										62
 XOOLUM™ R Wall Wash IP67											✓						66
 XOOLIGHT™ IP67												✓					70
 VarioLED™ IP67								✓					✓				74
 VarioLED™ OCEANOS IP67	✓				✓							✓	✓				80 / 90
 XOOLUX™ NANO IP67		✓		✓						✓							86
 NEPTUNE IP68									✓								96

INDOOR IP20 / IP40

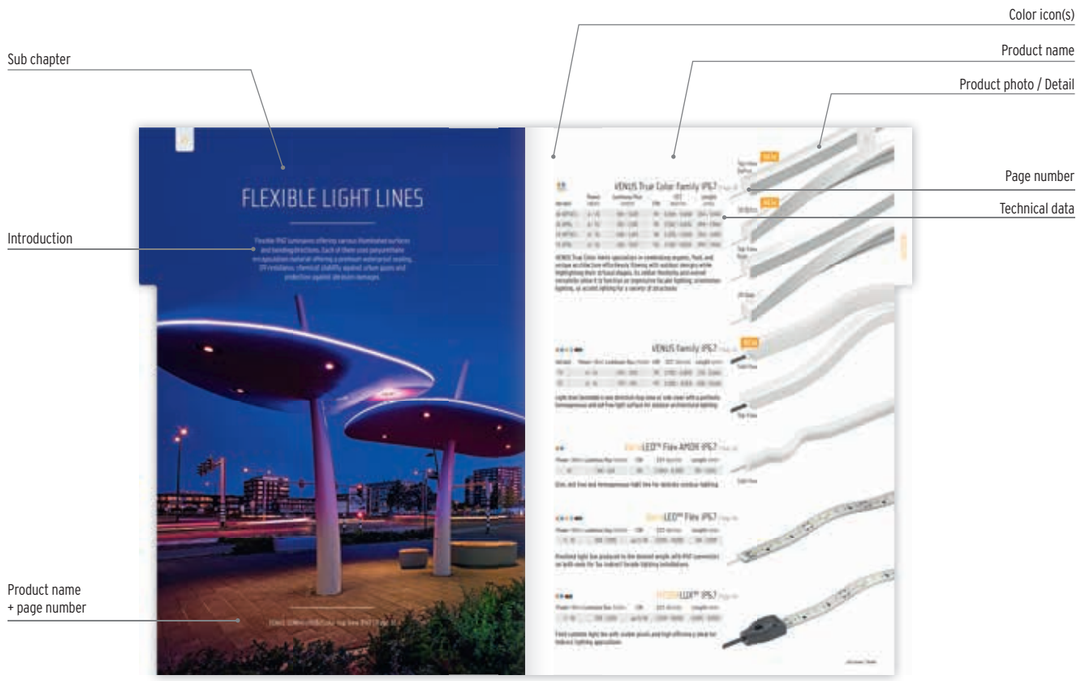
Optic combinations

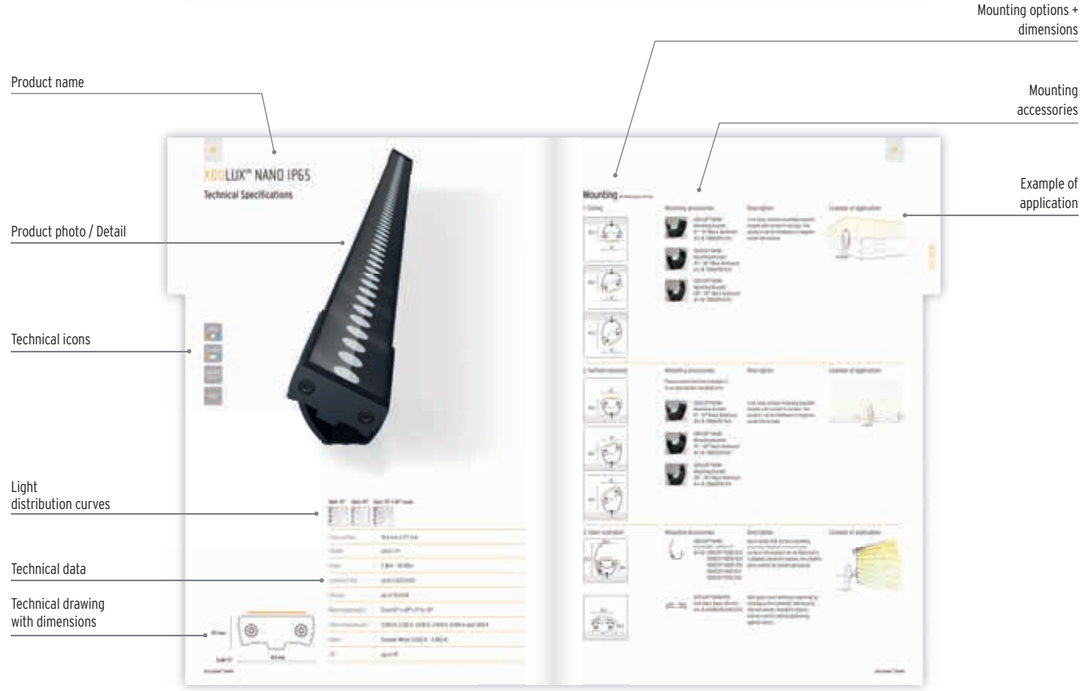
		10°	15°	25°	30°	40°	60°	65°	Wall Wash	Batwing	Asym-metric	Opal Cover (120°)			Diffuse Cover (120°)			Clear Cover (120°)		Opal Ecapsu-lation	Clear Encapsu-lation	Page
												L^2	H^2	R	L^2	H^2	R	L^2	R			
	ULTIMA family IP40		✓	✓		✓	✓			✓	✓	✓										108
	XOOLINE™ IP40	✓			✓		✓					✓	✓	✓	✓	✓	✓	✓	✓			1118
	LYRA IP40	✓			✓		✓							✓			✓		✓			122
	XOOLUM™ IP40											✓			✓			✓				126
	LUNA IP40	✓			✓		✓					✓	✓	✓	✓	✓	✓	✓	✓			130
	ULTIMA-P IP40					✓	✓													✓		136
	MARS ARCHITECTURAL family IP40		✓	✓		✓		✓														140
	XOOMINAIRE™ 4292 IP20/IP40			✓				✓				✓										152
	XOOLUM™ OC IP40											✓										156
	XOOLUM™ R IP20							✓														160
	XOOCOVE						✓										✓					166
	MARS Wall Wash IP20								✓													172
	XOOLUM™ R Wall Wash IP20								✓													176

LED Linear™ GmbH

PAGE EXPLANATION

The catalogue is divided into two main chapters: OUTDOOR and INDOOR.
For each main chapter there are sub chapters such as “Light lines”. In every sub chapter suitable luminaires are initially presented as an overview.
Then the lights are explained in more detail with technical information and mounting options.
Small icons at the edge of the pages show features of the specific product. With it, different luminaires can be compared well and easily.





OUTDOOR

Turn common landscapes, facades or outdoor areas to unique spaces.

VarioLED™ OCEANOS White/IQ White/RGB IP67 | Page 76 and 90

Photo: Suldal Foto

FLEXIBLE LIGHT LINES

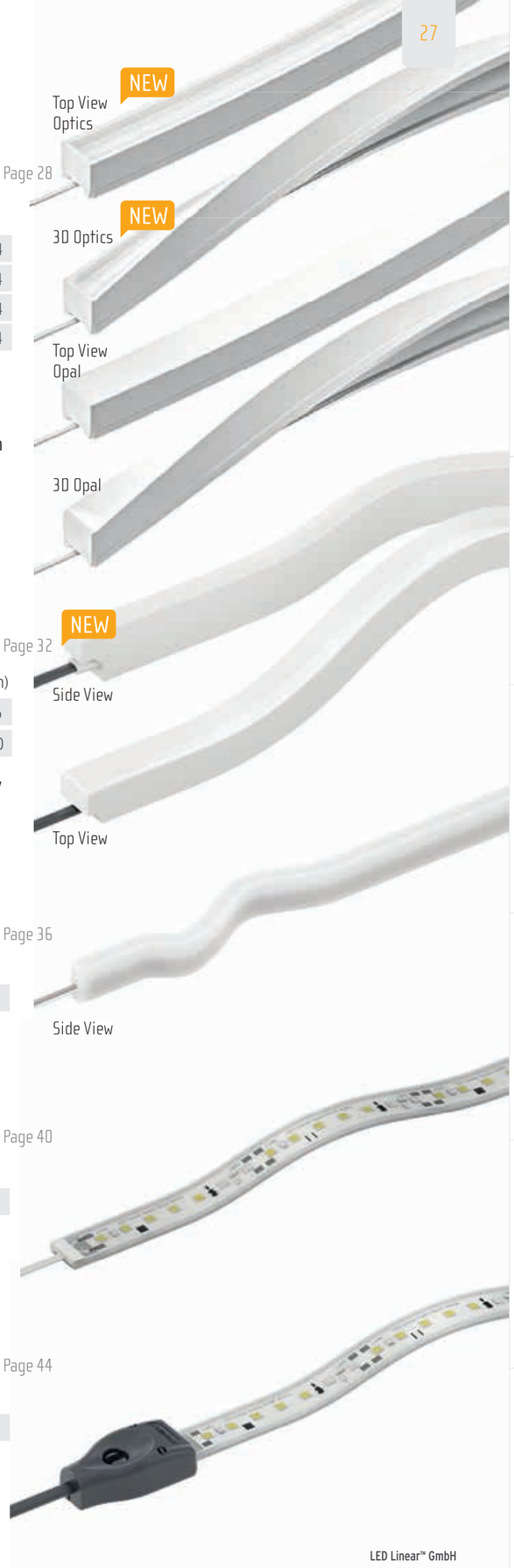
Flexible IP67 luminaires offering various illuminated surfaces and bending directions. Each of them uses polyurethane encapsulation material offering a premium waterproof sealing, UV resistance, chemical stability against urban gazes and protection against abrasion damages.

VENUS IQ White/RGB/Color Top View IP67 | Page 32

VENUS True Color family IP67 | Page 28

Variant	Power (W/m)	Luminous flux (lm/m)	CRI	CCT (Kelvin)	Length (mm)
3D OPTICS	6 - 15	435 - 1,520	95	2,200 - 5,000	354 - 3,924
3D OPAL	6 - 15	315 - 1,100	95	2,100 - 4,200	494 - 1,964
TV OPTICS	6 - 15	435 - 1,475	95	2,200 - 5,000	354 - 3,924
TV OPAL	6 - 15	325 - 1,105	95	2,100 - 4,200	494 - 1,964

VENUS True Color family specializes in celebrating organic, fluid, and unique architecture–effortlessly flowing with outdoor designs while highlighting their stylized shapes. Its stellar flexibility and overall versatility allow it to function as impressive facade lighting, orientation lighting, or accent lighting for a variety of structures.



VENUS family IP67 | Page 32

NEW

Variant	Power (W/m)	Luminous flux (lm/m)	CRI	CCT (Kelvin)	Length (mm)
TV	5 - 15	40 - 1,125	95	2,700 - 5,800	214 - 5,026
SV	5 - 15	30 - 705	95	2,500 - 4,900	228 - 5,040

Light lines bendable in one direction (top view or side view) with a perfectly homogeneous and dot-free light surface for outdoor architectural lighting.

VarioLED™ Flex AMOR IP67 | Page 36

Power (W/m)	Luminous flux (lm/m)	CRI	CCT (Kelvin)	Length (mm)
10	580 - 635	94	2,900 - 4,300	391 - 5,016

Slim, dot free and homogeneous light line for delicate contour lighting.

VarioLED™ Flex IP67 | Page 40

Power (W/m)	Luminous flux (lm/m)	CRI	CCT (Kelvin)	Length (mm)
3 - 15	250 - 2,025	up to 96	2,500 - 9,600	144 - 5,019

Pixelized light line produced to the desired length with IP67 connectors on both ends for fast indirect facade lighting installations.

HYDRALUX™ IP67 | Page 44

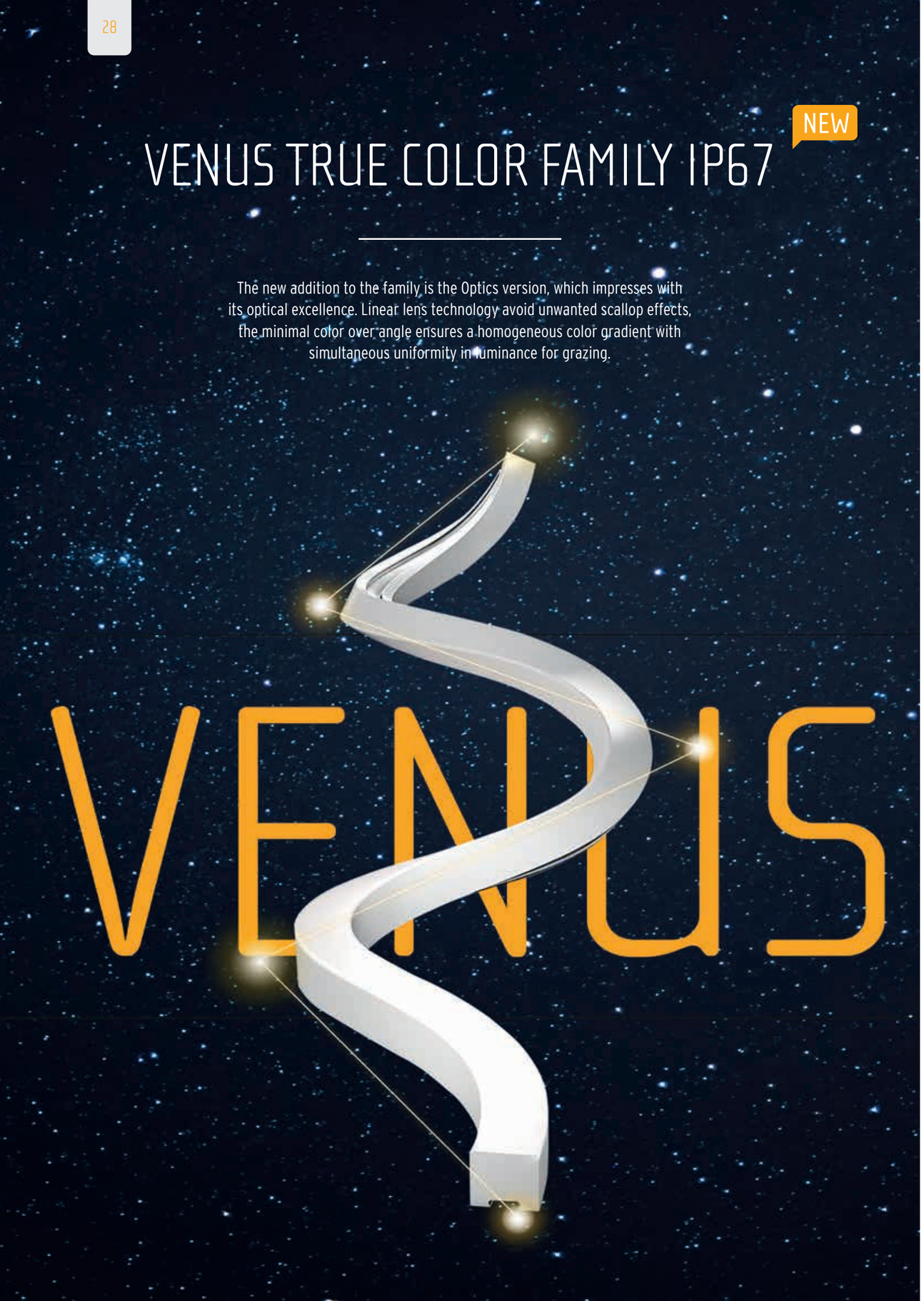
Power (W/m)	Luminous flux (lm/m)	CRI	CCT (Kelvin)	Length (mm)
3 - 15	80 - 2,025	up to 96	2,500 - 9,600	4,000 - 5,000

Field cuttable light line with visible pixels and high efficiency ideal for indirect lighting applications.

VENUS TRUE COLOR FAMILY IP67

NEW

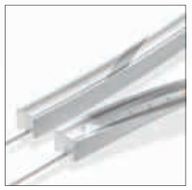
The new addition to the family is the Optics version, which impresses with its optical excellence. Linear lens technology avoid unwanted scallop effects, the minimal color over angle ensures a homogeneous color gradient with simultaneous uniformity in luminance for grazing.



VENUS True Color family IP67

NEW

Where impossible meets possible



Available in 2D (Top View) or 3D, VENUS True Color provides an absolute freedom of design even in complex organic and architectural concepts. Both versions are bendable with a minimal radius of 150 mm and the 3D version is also twistable by 180°/m. Its elaborate design enables sophisticated bent forms without compromising light quality and homogeneity.

There are 2 different light optics to choose from, covering elliptical light distribution with 20°, in addition to opal optics. With its unique linear lens technology, VENUS TC Optics offers homogeneous and precise light distribution without creating unwanted scallop effects (like with TIR lenses) and a minimal Color over Angle of < 65 K.

With its IP67 protection rating and high-grade polyurethane encapsulation, VENUS TC is UV, salt water, solvent and air-polluting substances resistant. This establishes VENUS TC as a reliable option for demanding external environments.

ICO2 NIC0 AWA1 RDS8 INNOVATIVE ARCHITECTURE best of best

GERMAN DESIGN AWARD SPECIAL 2019

LEDs Magazine SAPPHIRE AWARDS 2018 WINNER

DESIGN PLUS powered by: light+building

reddot design award winner 2018

VENUS True Color family IP67

NEW

Technical Specifications

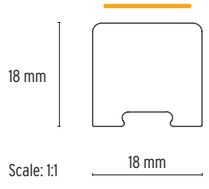
White

L80/B10
> 60,000 h

IP67

R_{max} = 15 cm

R_{max} = 15 cm



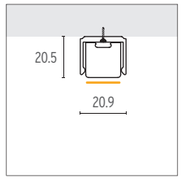
Polyurethane encapsulation

Optics 20°

Cross section	18 mm x 18 mm
Length	**3D:** 494 mm - 1,964 mm / **TV:** 354 mm - 3,924 mm
Power	6 W/m - 15 W/m
Luminous flux	**3D Optics:** up to 1,520 lm/m / **3D Opal:** up to 1,100 lm/m **TV Optics:** up to 1,475 lm/m / **TV Opal:** up to 1,105 lm/m
Efficacy	**3D Optics:** up to 101 lm/W / **3D Opal:** up to 73 lm/W **TV Optics:** up to 102 lm/W / **TV Opal:** up to 77 lm/W
Beam angle/optics	**Optics:** 20° / **Opal:** 120°
Color temperatures	**Opal:** 2,100 K, 2,500 K, 2,700 K, 3,000 K, 3,400 K and 4,200 K **Optics:** 2,200 K, 2,700 K, 3,000 K, 3,500 K, 4,000 K and 5,000 K
CRI	up to 95

Mounting All dimensions in mm.

1. Surface-mounted, Clips and profile without mounting channel



Mounting accessories

VTC Surface Mounting Clip Low (L x H x W) 30 mm x 17.5 mm x 20.9 mm
Digits in order code: CLL

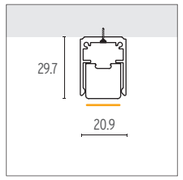
VTC Surface Mounting Profile Low (L x H x W) luminaire length x 17.5 mm x 20.9 mm
Digits in order code: MPL

Description

Robust aluminum extrusion powder-coated in white. Use according to the mounting instruction.

Example of application

2. Surface-mounted, Clips and profile with mounting channel



Mounting accessories

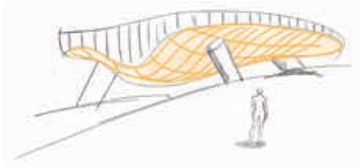
VTC Surface Mounting Clip High (L x H x W) 30 mm x 26.7 mm x 20.9 mm
Digits in order code: CLH

VTC Surface Mounting Profile High (L x H x W) 30 mm x 26.7 mm x 20.9 mm
Digits in order code: MPH

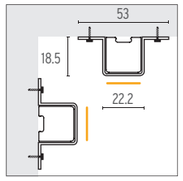
Description

Robust aluminum extrusion powder-coated in white. Use according to the mounting instruction.

Example of application



3. Surface-mounted, Holding clamp, clear



Mounting accessories

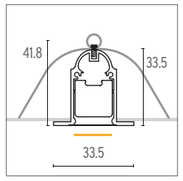
VTC Surface Holding Clamp Clear (L x H x W)
15 mm x 20.5 mm x 53 mm
Digits in order code: CLC

Description

PVC casting clamp for surface mount. Use according to the mounting instruction.

Example of application

4. Recessed



Mounting accessories

VTC Recessed Profile (2 m or 4 m Set)
(L x H x W) 2000 mm / 4000 mm x 46 mm x 36.3 mm
Art.-#: 10000559 (2 m)
10000559-4m (4 m)

VTC EndCap Recessed (Set of 2)
(L x H x W) 22 mm x 34.5 mm x 36.3 mm
Art.-#: 11000214

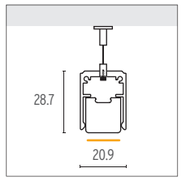
Description

Profile with mounting springs can be installed directly into false ceiling. Use according to the mounting instruction.

Set of two end caps for recessed VENUS TC light lines. Use according to the mounting instruction.

Example of application

5. Pendant



Mounting accessories

VTC Pendant Set - 2m for Flexible Pendant Profile (2 m Wire)
Art.-#: 13000273

VTC Flexible Pendant Channel (L x H x W) 2000 mm x 26.7 mm x 20.9 mm
Art.-#: 10000554

VTC Pendant Set - 5m for Flexible Pendant Profile (5 m Wire)
Art.-#: 13000274

VarioCANOPY Square Mounting set (optional) for pendant ceiling installations on concrete ceilings
Art.-#: 16000347

Description

2 m pendant set for VENUS TC. Required accessories VTC flexible pendant channel #10000554

Flexible pendant channel for decorative pendant light solutions. Required suspensions 13000273 (2m)/ 13000274 (5m)

5 m pendant set for VENUS TC. Required accessories VTC flexible pendant channel #10000554.

Pendant set with screws for installations directly on the ceiling. Recommended to use every 1 m.

Example of application

If the luminaire shall be installed without our mounting accessories, please get in touch with us to check the compatibility of the mounting.

VENUS IP67 FAMILY NEW

First linear flexible LED luminaire for outdoor architectural lighting with a perfectly homogeneous and dot-free light surface. The innovation brought by this 2 dimensions bendable light lines opened new doors in lighting design which were unreachable by any luminaires back then.

Photo: Reinhard Koslowski

VENUS IP67 family NEW

Flexible, dot-free design light line for appealing lighting accents

VENUS is a polyurethane encapsulated luminaire resistance and chemical stability against urban gases.

With an efficiency up to 76 lm/W, VENUS stands out as one of the most efficient light line available to date.

The various lumen output and a large panel of available CCTs turns VENUS into a modular lighting design tool-kit.

darc awards WINNER

German Design Award Nominee 2016

interior innovation award 2015 Winner

reddot design award winner 2012

Designpreis Deutschland 2011 SILVER

interior innovation award 2011 Winner

Industrie Preis 2011 Qualifiziert

M Silver Award Product

DESIGN PLUS

LED

LED Linear™ GmbH

VENUS IP67 family

NEW

Technical Specifications

Side View (SV) Top View (TV)

White

IQ White

L80/B10 > 60,000 h — White / IQ White

RGB

L80 > 30,000 h — RGB

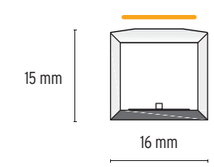
IP67

R_{max} = 15 cm

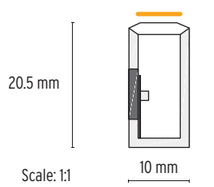
R_{max} = 15 cm

Polyurethane encapsulation

Top View (TV)



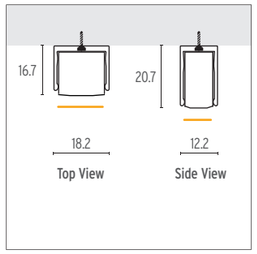
Side View (SV)



Cross section	**TV:** 15.0 mm x 16.0 mm / **SV:** 20.5 mm x 10.0 mm
Length	**TV:** 214 mm - 5,026 mm / **SV:** 228 mm - 5,040 mm
Power	5 W/m - 15 W/m
Luminous flux	**TV:** up to 1,125 lm/m / **SV:** up to 705 lm/m
Efficacy	**TV:** up to 77 lm/W / **SV:** up to 48 lm/W
Beam angle/optics	120°
Color temperatures	**TV:** 2,700 K, 3,000 K, 3,500 K, 3,900 K, 4,500 K and 5,800 K **SV:** 2,500 K, 2,900 K, 3,200 K, 3,600 K, 4,000 K and 4,900 K
Color	Tunable White (**TV** 2,500 K - 4,800 K / **SV** 2,400 K - 4,000 K), RGB
CRI	85 - 95

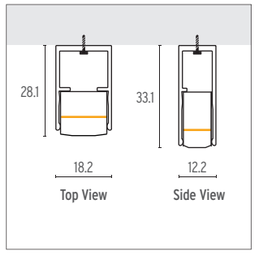
Mounting All dimensions in mm.

1. Surface-mounted, Clips and profile without cable channel



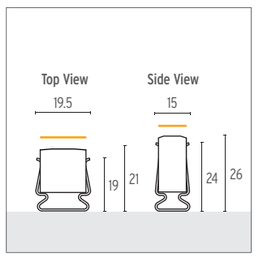
Mounting accessories	Description	Example of application
Top View Surface Mounting Clip TV w/o cable channel (L x H x W) 50 mm x 14.7 mm x 18.2 mm Digits in order code: CLL	**Top View** Robust aluminum extrusion for Top View, powder-coated in white. Use according to the mounting instruction.	
Surface Mounting Profile TV w/o cable channel (L x H x W) luminaire length x 14.7 mm x 18.2 mm Digits in order code: MPL	Robust aluminum extrusion for Top View, powder-coated in white. Use according to the mounting instruction.	
Side View Surface Mounting Clip SV w/o cable channel (L x H x W) 50 mm x 19.6 mm x 12.2 mm Digits in order code: CLL	**Side View** Robust aluminum extrusion for Side View, powder-coated in white. Use according to the mounting instruction.	
Surface Mounting Profile SV w/o cable channel (L x H x W) luminaire length x 19.6 mm x 12.2 mm Digits in order code: MPL	Robust aluminum extrusion for Side View, powder-coated in white. Use according to the mounting instruction.	

2. Surface-mounted, Clips and profile with cable channel

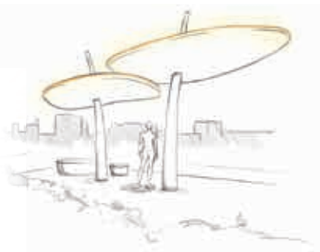


Mounting accessories	Description	Example of application
Top View Surface Mounting Clip TV with cable channel (L x H x W) 50 mm x 28.1 mm x 18.2 mm Digits in order code: CLH	**Top View** Robust aluminum extrusion for Top View, powder-coated in white. Use according to the mounting instruction.	
Surface Mounting Profile TV with cable channel (L x H x W) luminaire length x 28.1 mm x 18.2 mm Digits in order code: MPH	Robust aluminum extrusion for Top View, powder-coated in white. Use according to the mounting instruction.	
Side View Surface Mounting Clip SV with cable channel (L x H x W) 50 mm x 33.2 mm x 12.5 mm Digits in order code: CLH	**Side View** Robust aluminum extrusion for Side View, powder-coated in white. Use according to the mounting instruction.	
Surface Mounting Profile SV with cable channel (L x H x W) luminaire length x 33.2 mm x 12.5 mm Digits in order code: MPH	Robust aluminum extrusion for Side View, powder-coated in white. Use according to the mounting instruction.	

4. Surface-mounted, Clips



Mounting accessories	Description
Top View VarioClip TV 30 mm 301 (stainless steel - V2A) Art.-#: 13000033-01	**Top View** Stainless steel clips for surface mount application.
Side View VarioClip SV 30 mm 301 (stainless steel - V2A) Art.-#: 13000038	**Side View** Stainless steel clips for surface mount application.



If the luminaire shall be installed without our mounting accessories, please get in touch with us to check the compatibility of the mounting.

VARIOLED™ FLEX AMOR IP67

VarioLED™ Flex AMOR IP67

Narrowest, flexible LED light line
sets new standards in decorative lighting

Cross section of 5 mm x 13 mm, making it the most minimalistic product, which enables slim lines of light.

Unmatched flexibility with a minimum bending radius of 3 cm.

Dot free homogeneous light emission despite small footprints when recessed.

GERMAN DESIGN AWARD SPECIAL 2016

reddot award 2015
winner lighting design

LED

LED Linear™ GmbH

VarioLED™ Flex AMOR I P67

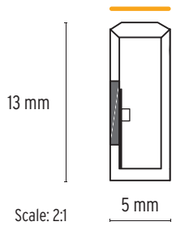
Technical Specifications

White

L80/B10
> 60,000 h

IP67

R_{max} = 15 cm

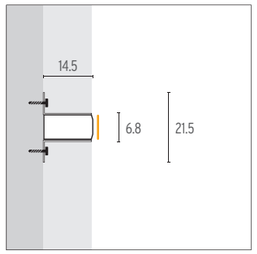


Polyurethane encapsulation

Cross section	5 mm x 13 mm
Length	391 mm - 5,016 mm
Power	10 W/m
Luminous flux	up to 635 lm/m
Efficacy	64 lm/W
Beam angle/optics	120°
Color temperatures	2,900 K, 3,200 K, 3,800 K and 4,300 K
CRI	up to 94

Mounting All dimensions in mm.

1. Recessed, Mounting channel



Mounting accessories

AMOR SV Flexible Mounting Profile, 980 mm
Art.-#: 10000527

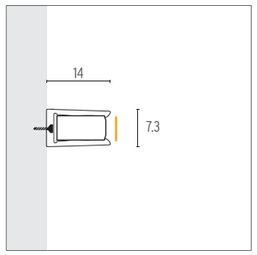
Dummy AMOR SV for Plastering, 5 m
Art.-#: 10000528-SCH-5m

Description

Flexible mounting profile for plaster in mounting.

Example of application

2. Surface-mounted, Clips



Mounting accessories

Description

Anodized aluminum clips for surface mount application.

Example of application

If the luminaire shall be installed without our mounting accessories, please get in touch with us to check the compatibility of the mounting.

VARIOLED™ FLEX IP67

VarioLED™ Flex IP67 are flexible, linear LED light lines produced in customer specified individual lengths. Depending on the step measurement they are freely scalable and available in lengths of up to 10 m (with large pitch). For applications such as coves, contours, furniture, counters, stairways, etc.

VarioLED™ Flex IP67

High protection and amazing flexibility

High efficiency with up to 135 Lumen/Watt.

IP67 protection against water, salt water and UV radiation through a clear polyurethane encapsulation.

The lamps are delivered ready to plug in with IP67 mini connectors at both ends and can be easily installed with adhesive tape or plastic clips.

www.led-linear.com/varioledflex

LED Linear™ GmbH

VarioLED™ Flex IP67

Technical Specifications

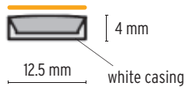
White

L80/B10
> 60,000 h

RGB

L80
> 30,000 h

IP67



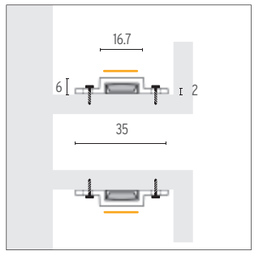
Scale: 1:1

Polyurethane encapsulation

Cross section	12 mm x 4 mm
Length	82 mm - 10,019 mm
Power	3 W/m - 15 W/m
Luminous flux	250 lm/m - 2,025 lm/m
Efficacy	up to 135 lm/W
Beam angle/optics	120°
Color temperatures	2,500 K, 2,800 K, 3,200 K, 3,700 K, 4,300 K, 5,100 K, 6,700 K and 9,600 K
Colors	RGB
CRI	86 - 96

Mounting All dimensions in mm.

1. Surface-mounted, Clips



Mounting accessories

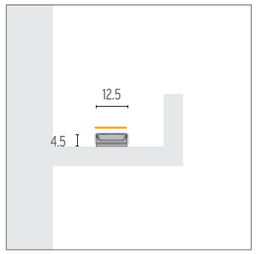
VarioClip Flex 12.7 mm
Clear (Set of 50)
Art.-#: 13000115

Description

Clear plastic mounting clips. Use to mount the product on hard surfaces. Sold as set of 50 pieces.

Example of application

2. Surface-mounted, Tape



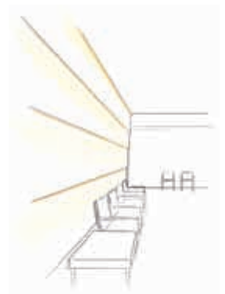
Mounting accessories

3M Adhesive tape
Art.-#: 18200035

Description

Double sided 3M adhesive tape roll. Use to mount products on surfaces.

Example of application



If the luminaire shall be installed without our mounting accessories, please get in touch with us to check the compatibility of the mounting.

HYDRALUX™ IP67

IP67 protected field cuttable luminaire with simple assembly
that can be easily and individually adapted to any application.

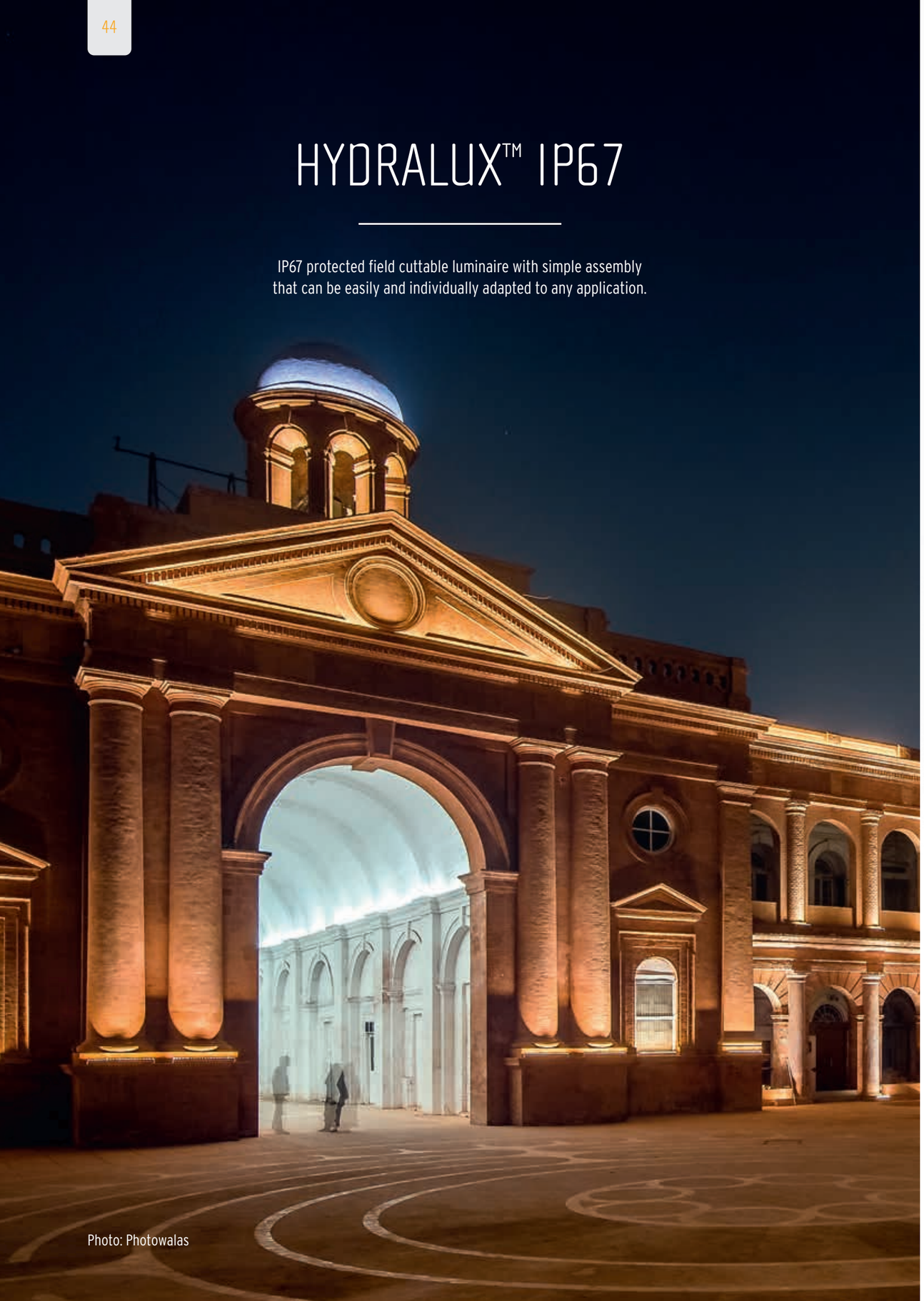


Photo: Photowalas

HYDRALUX™ IP67

The new standard of light

Cut on site to the desired length.

Quick installation using IP67 connector assembly assembled by adhesive bonding or with clips against external influences (IP67 protection).

A white base profile with lateral fins and reflective surface ensures high lumen currents of up to 2,025 lm/m.

GERMAN DESIGN AWARD SPECIAL 2017

reddot award 2015
winner lighting design

DESIGN AWARD 2015

German Design Award
SPECIAL MENTION 2015

www.led-linear.com/hydralux

LED Linear™ GmbH

HYDRALUX™ IP67

Technical Specifications

White

L80/B10
> 60,000 h

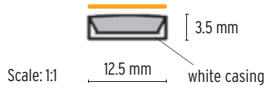
RGB

L80
> 30,000 h

IP67

Polyurethane encapsulation

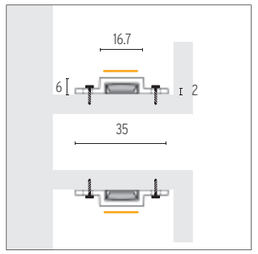
Cross section	12.5 mm x 3.5 mm
Length	4 m - 10 m
Power	3 W/m - 15 W/m
Luminous flux	80 lm/m - 2,025 lm/m
Efficacy	up to 142 lm/W
Beam angle/optics	120°
Color temperatures	2,500 K, 2,800 K, 3,200 K, 3,700 K, 4,300 K, 5,100 K, 6,700 K and 9,600 K
Colors	RGB
CRI	85 - 96



Scale: 1:1

Mounting All dimensions in mm.

1. Surface-mounted, Clips



Mounting accessories

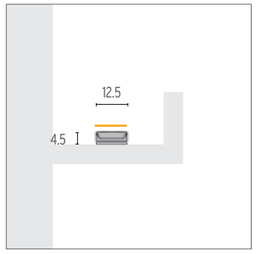
VarioClip Flex 12.7 mm
Clear (Set of 50)
Art.-#: 13000115

Description

Clear plastic mounting clips. Use to mount the product on hard surfaces. Sold as set of 50 pieces.

Example of application

2. Surface-mounted, Tape



Mounting accessories

3M Adhesive tape
Art.-#: 18200035

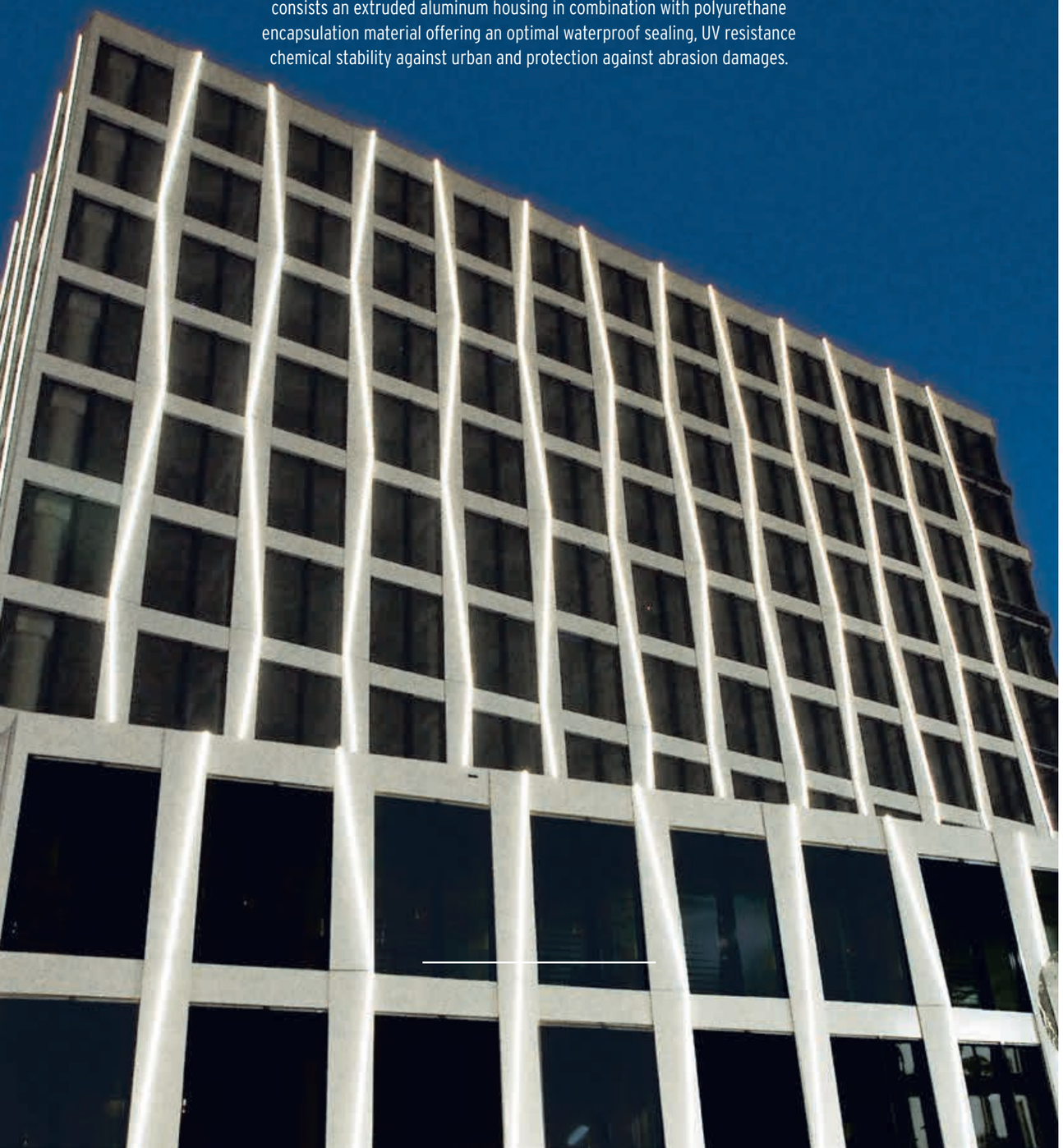
Description

Double sided 3M adhesive tape roll. Use to mount products on surfaces.

Example of application

RIGID LIGHT LINES

Assortment of rigid IP67 luminaires complementing the flexible line-up for straight lines application on facade, landscapes as well as ambient lighting. Each luminaire consists an extruded aluminum housing in combination with polyurethane encapsulation material offering an optimal waterproof sealing, UV resistance chemical stability against urban and protection against abrasion damages.



ADONIS ARCHITECTURAL IP67 | Page 50

NEW

Variant	Power (W/m)	Luminous flux (lm/m)	CRI	CCT (Kelvin)	Length (mm)
OPAL	4 - 40	50 - 1,320	97	2,500 - 3,600	514 - 4,014
OPTICS	4 - 40	120 - 3,520	97	2,700 - 4,000	514 - 4,014

Miniaturized design meets architectural scales: Its exceptional integration makes ADONIS ARCHITECTURAL an excellent choice for grazing applications and direct illumination on façades and ceilings.

XOOLINE™ IP67 | Page 54

NEW

Power (W/m)	Luminous flux (lm/m)	CRI	CCT (Kelvin)	Length (mm)
5 - 25	50 - 1,930	85 - 96	2,500 - 9,600	380 - 5,014

Modular luminaire with 9 different optics available and side cabling and a large panel of mounting options.

XOOLUM™ IP67 | Page 58

Power (W/m)	Luminous flux (lm/m)	CRI	CCT (Kelvin)	Length (mm)
6 - 25	145 - 1,000	85 - 96	2,300 - 9,600	198 - 3,010

Luminaire with 45° adjustable head with an opal encapsulation for decent accent lighting.

XOOLUM™ Reflector IP67 | Page 62

Power (W/m)	Luminous flux (lm/m)	CRI	CCT (Kelvin)	Length (mm)
5 - 25	400 - 3,060	85 - 96	2,600 - 9,600	198 - 3,010

Luminaire with 45° adjustable head with a clear encapsulation and reflectors for general lighting applications.

XOOLUM™ Reflector Wall Wash IP67 | Page 66

Power (W/m)	Luminous flux (lm/m)	CRI	CCT (Kelvin)	Length (mm)
5 - 25	80 - 2,930	85 - 96	2,500 - 9,600	198 - 4,010

Compact luminaire with a clear encapsulation and reflectors for wall washing in outdoor areas.

XOOLIGHT™ IP67 | Page 70

Power (W/m)	Luminous flux (lm/m)	CRI	CCT (Kelvin)	Length (mm)
6 - 25	60 - 1,170	85 - 95	2.400 - 7,200	84 - 4,021

Sleek design luminaire for general lighting manufactured to length. Available as pendant, surface and recessed.

VarioLED™ IP67 | Page 74

Power (W/m)	Luminous flux (lm/m)	CRI	CCT (Kelvin)	Length (mm)
3 - 25	70 - 2,500	85 - 96	2,500 - 9,600	82 - 5,019

Pixelized light line produced to the desired length with IP67 connectors on both ends for fast indirect facade lighting installations. Suitable with 10 different optics.

LED Linear™ GmbH

ADONIS ARCHITECTURAL IP67

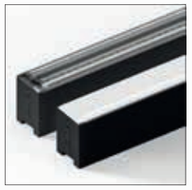
NEW

With its powerful light engine within a miniaturized design, the ADONIS ARCHITECTURAl emphasizes the architectural features of building structures. Thanks to its perfect integration, this luminaire is ideal for grazing applications as well as for direct lighting on facades and ceilings.

ADONIS ARCHITECTURAL IP67

NEW

Convinces with light intensity and precise light control



A multitude of options include several power levels and color temperatures plus options in tunable white, RGB/W as well as 10°, 30° or 60° and opal optics to choose from.

Polyurethane is utilized in ADONIS Architectural to make it more resistant to impact from salt water UV-light and solvents. High protection against vandalism thanks to a robust, powder-coated aluminum profile with an IK10 rating.

The choice between non-transparent and translucent end caps combined with smart cabling and mounting options enables infinite light lines without dark or hot spots.

www.led-linear.com/adonis-arc

LED Linear™ GmbH

ADONIS ARCHITECTURAL IP67 NEW

Technical Specifications

White

IQ White

RGB

RGBW

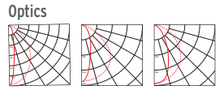
L80/B10
> 60,000 h

IP67

IK10

Opal

Optics

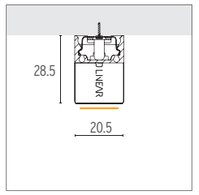


Opal | Lens 10° | Lens 30° | Lens 60°

Cross section	20.5 mm x 28.5 mm
Length	up to 4,014 mm
Power	4 W/m - 40 W/m
Luminous flux	up to 3,520 lm/m
Efficacy	up to 112 lm/W
Beam angle/optics	Opal; Lens 10°, 30° or 60° (clear encapsulation)
Color temperatures	**Opal:** 2,500 K, 2,800 K, 3,200 K and 3,600 K **Optics:** 2,700 K, 3,000 K, 3,500 K and 4,000 K
Colors	Tunable White (**Opal:** 2,000 K - 3,600 K / **Optics:** 2,200 K - 4,000 K), RGB and RGBW
Profile colors	Black, White and Gray
CRI	up to 97

Mounting All dimensions in mm.

1. Surface Mounting fixed horizontal



Mounting accessories

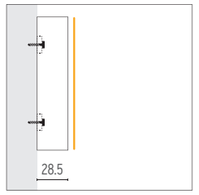
VarioClip 010
Digits in order code: SH

Description

Aluminum mounting clip with washer. Clips inside the fixture profile for invisible mounting. Use according to the mounting instruction.

Example of application

2. Surface Mounting fixed vertical



Mounting accessories

VarioClip 010
Digits in order code: SH

Sliding block C010 Set, incl. Screw
Digits in order code: SV

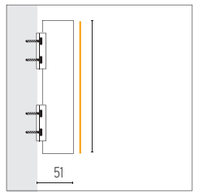
Description

Aluminum mounting clip with washer. Clips inside the fixture profile for invisible mounting.

Metal mounting block with set screw for vertical applications. Install inside the fixture profile to stop the fixture from sliding. Use according to the mounting instruction.

Example of application

3. Surface Mounting adjustable



Mounting accessories

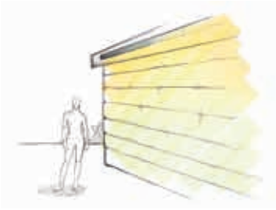
Adjustable Mounting Clip C007/C010 L140 (silver anodized)
Digits in order code: SV

Adjustable Mounting Clip C007/C010 L140 (black anodized)
Digits in order code: SA

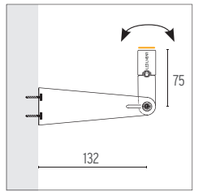
Description

140 mm adjustable mounting clip with a tilt of 60° to each side, comes together with profile.

140 mm adjustable mounting clip with a tilt of 60° to each side, comes together with profile color black. Use according to the mounting instruction.



4. Wall Mounted adjustable



Mounting accessories

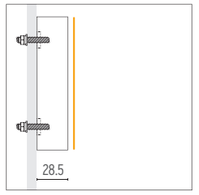
Contour 010 Adjustable Wall Mount
Digits in order code: WA

Description

Metal surface mounting adjustable wall arm. The set includes mounting block, mounting clip and adjusting screws. Tilts 140° in each direction and screw locks in position. Use according to the mounting instruction.

Example of application

5. Mounting Lock



Mounting accessories

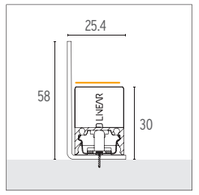
Screw Kit M5 for Mounting Lock
Digits in order code: ML

Description

25 mm threaded pin with washer and nut. For a vandal resistant installation. Use according to the mounting instruction.

Example of application

6. Glare Protection



Mounting accessories

Glare Shield white
Art.-#:
10000622-RAL9003-1m
10000622-RAL9003-2m

Glare Shield black
Art.-#:
10000622-RAL9005-1m
10000622-RAL9005-2m

Glare Shield gray
Art.-#:
10000622-RAL9022-1m
10000622-RAL9022-2m

Description

Aluminium glare shield in 1 m and 2 m length. For a better glare control for people passing by. Use according to the mounting instruction.

XOOLINE™ IP67

NEW

XOOLINE™ is a minimalistic modular luminaire suitable for a multitude of other applications. A variety of light engines ranging from static white to RGB, with color temperatures from 2,500 K to 9,600 K, 8 optics to choose from, 8 different mounting accessories plus further options make XOOLINE™ an extremely versatile lighting tool.

XOOLINE™ IP67 NEW

Minimal luminaire with maximum versatility

Translucent end caps and special cable exit solutions make it easy to create infinite lines of light.

Housing and mounting profile are also available in black for directly visible applications.

Minimalistic form factor and several cable exit and connector options enable seamless integration.

Next Generation LUMINAIRES INDOOR 2014

www.led-linear.com/xooline

LED Linear™ GmbH

XOOLINE™ IP67 NEW

Technical Specifications

White

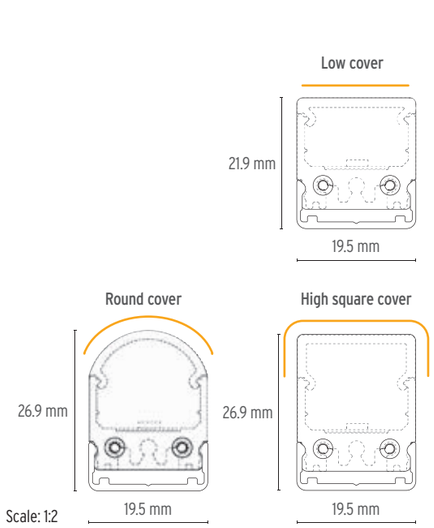
IQ White

RGB

L80/B10 > 60,000 h — White / IQ White

L80 > 30,000 h — RGB

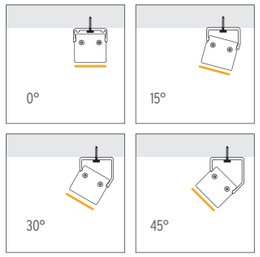
IP67



	Low cover			Round cover			High square cover	
	opal	diffuse	clear	opal	diffuse	clear	opal	diffuse
Length	up to 3,014 mm							
Power	5 W/m – 25 W/m							
Luminous flux	50 lm/m – 1,930 lm/m							
Efficacy	up to 87 lm/W							
Beam angle/optics	Opal, Diffuse, Clear							
Color temperatures	2,500 K, 2,900 K, 3,300 K, 3,800 K, 4,400 K, 5,400 K, 6,800 K and 9,600							
Colors	Tunable White (2,600 K – 6,200 K), RGB							
CRI	up to 96							

Mounting All dimensions in mm.

1. Surface-mounted*, horizontal



* Low cover

Mounting accessories

Full length mounting channel
Digits in order code: MP

0° aluminum mounting clip in 90 mm length
Digits in order code: CL0

15° aluminum mounting clip in 90 mm length
Digits in order code: CL15

30° aluminum mounting clip in 90 mm length
Digits in order code: CL30

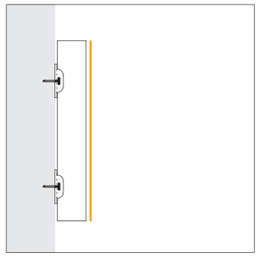
45° aluminum mounting clip in 90 mm length
Digits in order code: CL45

Description

Aluminum surface mounting bracket, recommended to use every 50 cm. Available in four different angles.

Example of application

2. Surface-mounted, vertical



Mounting accessories

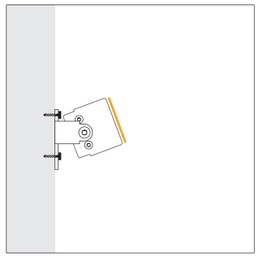
Plastic Mounting Bracket
Digits in order code: PCL

Description

White plastic surface mounting clip. Recommended to use every 50 cm. Cannot be used together with the aluminum mounting profile.

Example of application

3. Adjustable, vertical*



Mounting accessories

Adjustable Bracket
Digits in order code: AMC

Description

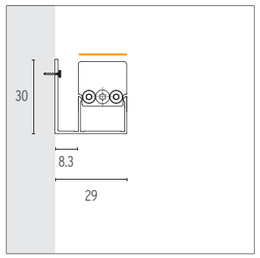
Use to adjust and fix the angle of fixture. 180 degrees adjusting range. Delivered with axis screw.

Example of application

* Mounting option AMC is not available for Tunable White Luminaires in combination with an 'LD' light engine.

Cable feed options BS and FS can't be combined with mounting option AMC.

4. Wall-mounted



Mounting accessories

No additional accessories are required for this mounting option.
Digits in order code: WMP

Description

Full length mounting channel, sets light axis parallel to wall. Connectors fit into gap between luminaire and wall.

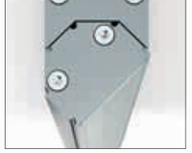
XOOLUM™ IP67

XOOLUM™ is an exceptionally efficient design lamp, which offers enormous modularity and user-friendliness. Through the external converter, the light line retains its sleek shape.

Photo: Stadtwerke Schwerin / Maxpress

XOOLUM™ IP67

The smallest and brightest lighting solutions for general illumination



High Lumen output up to 1,870 lm/m and efficiency of 77 lm/W in combination with minimalistic design (25.4 mm x 31 mm) makes XOOLUM™ an efficient product.

Polyurethane is utilized in XOOLUM™ to make it more resistant to impact from salt water UV-light and solvents.

XOOLUM™ is a two in one fixture thanks to the possibility to mount it with an 45° angle. It can be surface mounted or as pendant fixture.

German Design Award NOMINEE 2013

reddot design award best of the best 2012

www.led-linear.com/xoolum

LED Linear™ GmbH

XOOLUM™ IP67

Technical Specifications

White

IQ White

RGB

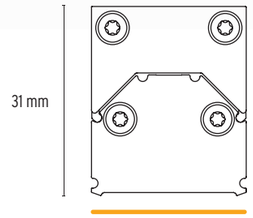
L80/B10 > 60,000 h — White / IQ White

L80 > 30,000 h — RGB

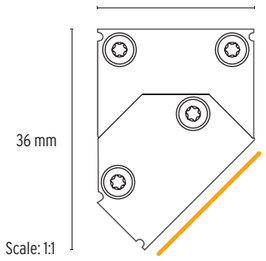
IP67

IK10

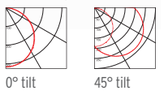
0° tilt



45° tilt



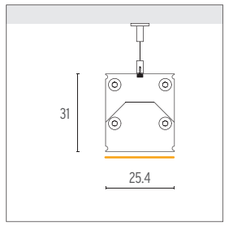
opal encapsulation

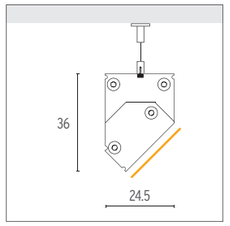


Cross section	25.4 mm x 31 mm / 25.4 mm x 36 mm
Length	198 mm - 3,010 mm
Power	6 W/m - 25 W/m
Luminous flux	145 lm/m - 1,000 lm/m
Efficacy	up to 45 lm/W
Beam angle/optics	Opal encapsulation
Color temperatures	2,300 K, 2,700 K, 3,100 K, 3,500 K, 4,100 K, 5,000 K, 6,100 K and 9,600 K
Colors	Tunable White (2,500 K - 5,300 K), RGB
CRI	86 - 96

Mounting All dimensions in mm.

1. Pendant





Mounting accessories

VarioPendant 007
Slide Silver
Art.-#: 13000157

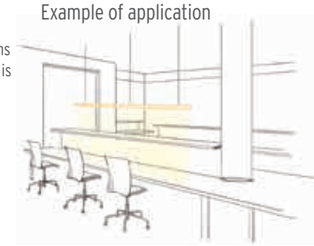
VarioPendant 007
Slide Black
Art.-#: 13000158

VarioCANOPY Square
Mounting set (optional)
for pendant ceiling
installations on concrete
ceilings
Art.-#: 16000347

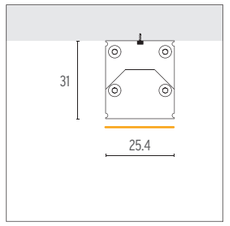
Description

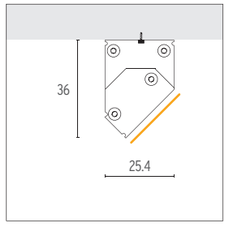
Pendant set with screws for installations directly on the ceiling. 2 m Suspension is cuttable on site. Recommended to use two suspensions per meter.

Example of application



2. Surface-mounted, fixed





Mounting accessories

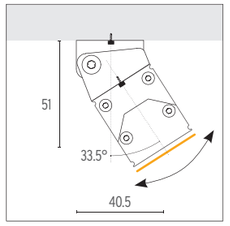
No additional accessories are required for this mounting option.

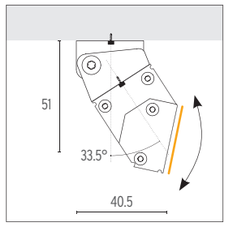
Description

Special designed mounting profile for surface-mounting options. Holes have to be drilled at site.

Example of application

3. Surface-mounted, adjustable





Mounting accessories

XOOLUM™ 007 Swivel-
Angle Set +/- 45°
Art.-#: 13000081

Description

Adjustable clip for extra 45° tilt.

XOOLUM™ Reflector IP67

XOOLUM™ R convinces by its high efficiency and low glare optics which keeping a compact design.

XOOLUM™ R Reflector IP67

Impresses with high versatility and aluminum reflectors

Polyurethane is utilized in XOOLUM™ R to make it more resistant to impact from salt water UV-light and solvents.

Modular mounting and lighting scenery thanks to its LEDs-Click™ technology enabling a 45° tilt of the luminaire head.

Appealing form factor of 25.4 mm by 31 mm which blends easily in any architectural concepts.

German Design Award NOMINEE 2013

reddot design award best of the best 2012

www.led-linear.com/xoolum

LED Linear™ GmbH

XOOLUM™ Reflector IP67

Technical Specifications

White

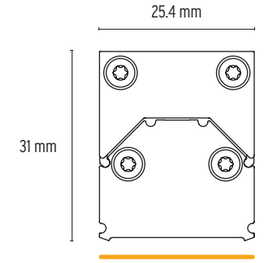
IQ White

L80/B10
> 60,000 h

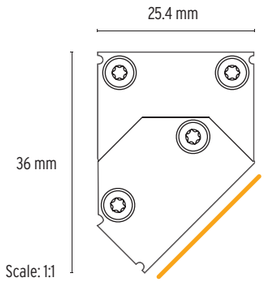
IP67

IK10

0° tilt



45° tilt



0° tilt

Deep wide 65°

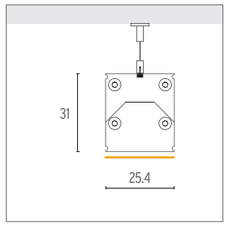
45° tilt

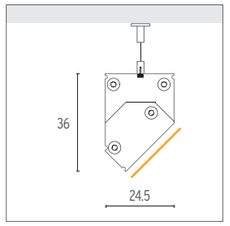
Deep wide 65°

Cross section	25.4 mm x 31 mm / 25.4 mm x 36 mm
Length	198 mm - 4,010 mm
Power	5 W/m - 25 W/m
Luminous flux	400 lm/m - 3,060 lm/m
Efficacy	up to 136 lm/W
Beam angle/optics	65° Reflector
Color temperatures	2,600 K, 3,000 K, 3,500 K, 3,800 K, 4,400 K, 5,200 K, 6,800 K and 9,600 K
Colors	Tunable White (3,500 K - 6,800 K)
CRI	85 - 96

Mounting All dimensions in mm.

1. Pendant





Mounting accessories

VarioPendant 007
Slide Silver
Art.-#: 13000157

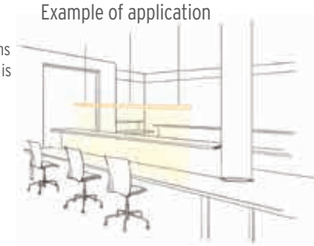
VarioPendant 007
Slide Black
Art.-#: 13000158

VarioCANOPY Square
Mounting set (optional)
for pendant ceiling
installations on concrete
ceilings
Art.-#: 16000347

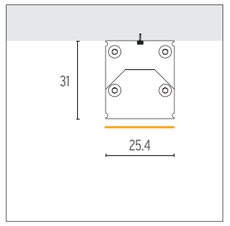
Description

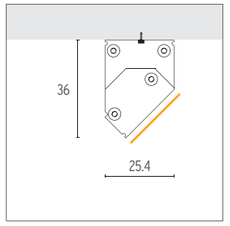
Pendant set with screws for installations directly on the ceiling. 2 m Suspension is cuttable on site. Recommended to use two suspensions per meter.

Example of application



2. Surface-mounted, fixed





Mounting accessories

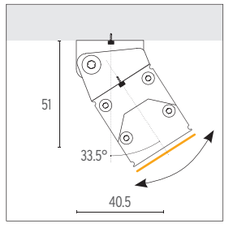
No additional accessories are required for this mounting option.

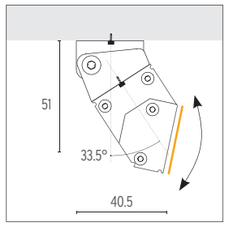
Description

Special designed mounting profile for surface-mounting options. Holes have to be drilled at site.

Example of application

3. Surface-mounted, adjustable





Mounting accessories

XOOLUM™ 007 Swivel-
Angle Set +/- 45°
Art.-#: 13000081

Description

Adjustable clip for extra 45° tilt.

XOOLUM™ Reflector Wall Wash IP67

Slim and discrete surface mount wall washer using a specular aluminum reflector tilted by 45° making the light source disappearing.

XOOLUM™ Reflector Wall Wash IP67

Smart solution for invisible wall washing

Alanod reflector technology for an excellent color mixing and homogeneous wall wash effect.

Polyurethane is utilized in XOOLUM™ R Wall Wash to make it more resistant to impact from salt water UV-light and solvents.

Compact design and simple surface mounting enabling a discrete installation in the ceiling.

German Design Award NOMINEE 2013

reddot design award best of the best 2012

www.led-linear.com/xoolum

LED Linear™ GmbH

XOOLUM™ Reflector Wall Wash IP67

Technical Specifications

White

IQ White

L80/B10 > 60,000 h — White / IQ White

RGB

L80 > 30,000 h — RGB

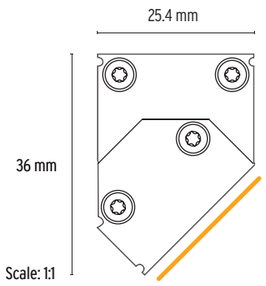
IP67

IK10

Wall wash

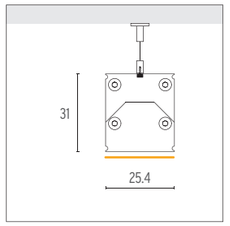
Cross section	25.4 mm x 31 mm / 25.4 mm x 36 mm
Length	198 mm - 4,010 mm
Power	5 W/m - 25 W/m
Luminous flux	80 lm/m - 2,930 lm/m
Efficacy	up to 130 lm/W
Beam angle/optics	Wall Wash
Color temperatures	2,600 K, 3,000 K, 3,500 K, 3,800 K, 4,400 K, 5,200 K, 6,800 K and 9,600 K
Colors	Tunable White (3,500 K - 6,800 K), RGB
CRI	85 - 96

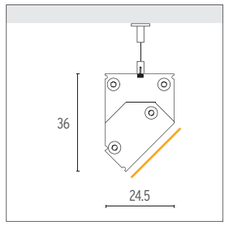
45° tilt



Mounting All dimensions in mm.

1. Pendant





Mounting accessories

VarioPendant 007
Slide Silver
Art.-#: 13000157

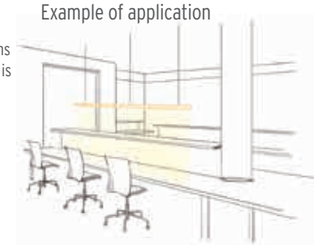
VarioPendant 007
Slide Black
Art.-#: 13000158

VarioCANOPY Square
Mounting set (optional)
for pendant ceiling
installations on concrete
ceilings
Art.-#: 16000347

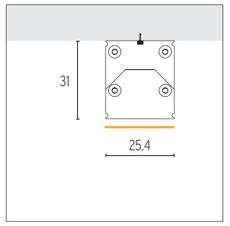
Description

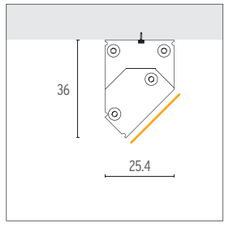
Pendant set with screws for installations directly on the ceiling. 2 m Suspension is cuttable on site. Recommended to use two suspensions per meter.

Example of application



2. Surface-mounted, fixed





Mounting accessories

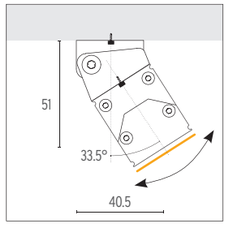
No additional accessories are required for this mounting option.

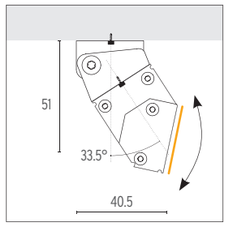
Description

Special designed mounting profile for surface-mounting options. Holes have to be drilled at site.

Example of application

3. Surface-mounted, adjustable





Mounting accessories

XOOLUM™ 007 Swivel-
Angle Set +/- 45°
Art.-#: 13000081

Description

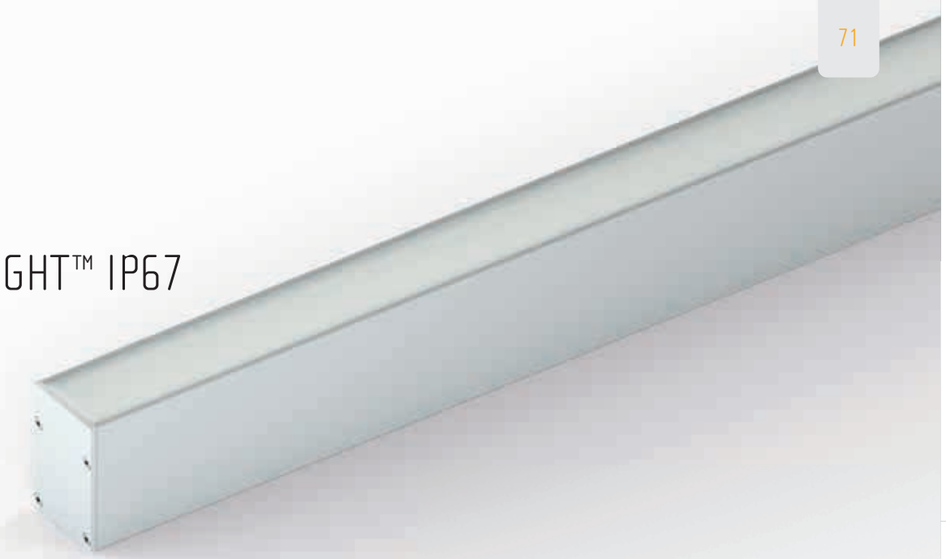
Adjustable clip for extra 45° tilt.

XOOLIGHT™ IP67

XOOLIGHT™ with its classic and elegant design form is a luminaire for general illumination. The wide range of light sources enable a variety of lumen output and make it possible to use the fixture in public areas for ambient lighting.

Photo: BMLD, Barcelona

XOOLIGHT™ IP67



Excellent balance between design and functional lighting

Pleasing form factor of 42 mm x 62 mm.

3 different mounting possibilities for homogeneity throughout a building. It is therefore possible to utilize the same product at different locations using different construction types.

Freely scalable up to 4 m.

www.led-linear.com/xoolight

LED Linear™ GmbH

XOOLIGHT™ IP67

Technical Specifications

White

IQ White

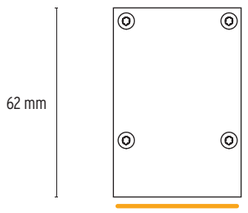
L80/B10 > 50,000 h — White / IQ White

RGB

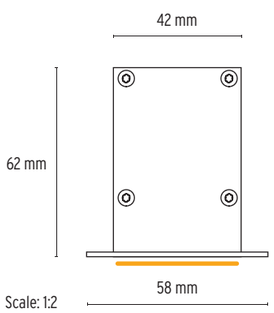
L80 > 30,000 h — RGB

IP67

Without trim



With trim



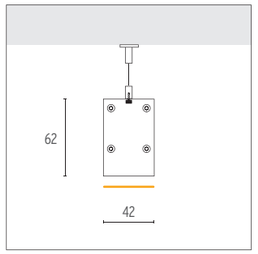
Scale: 1:2

IP67 without lenses only and with opal encapsulation on top

Cross section	42 mm x 62 mm / 58 mm x 62 mm (recessed)
Length	84 mm - 4,021 mm
Power	6 W/m - 25 W/m
Luminous flux	170 lm/m - 1,170 lm/m
Efficacy	53 lm/W
Beam angle/optics	Opal
Color temperatures	2,400 K, 2,700 K, 3,000 K, 3,500 K, 3,900 K, 4,600 K, 5,500 K and 7,200 K
Colors	Tunable White (2,500 K - 5,500 K), RGB
CRI	85 - 96

Mounting All dimensions in mm.

1. Pendant



Mounting accessories

VarioPendant 4262
Art.-#: 13000106

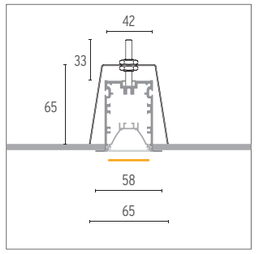
VarioCANOPY Square Mounting set (optional) for pendant ceiling installations on concrete ceilings
Art.-#: 16000347

Description

Pendant set with screws for installations directly on the ceiling. 2 m Suspension is cuttable on site. Recommended to use two suspensions per meter.

Example of application

2. Recessed



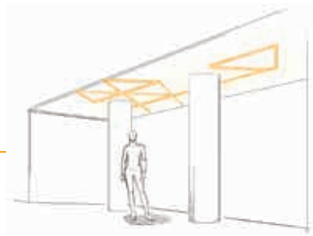
Mounting accessories

VarioClamp Contour 4262R
Art.-#: 13000080

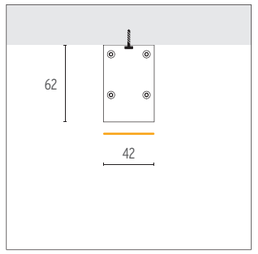
Description

The clamps can be adjusted in height to properly fit the thickness of the ceiling by tightening up the screw/bolt before clicking the light insert in.

Example of application



3. Surface-mounted, horizontal



Mounting accessories

No additional accessories are required for this mounting option.

Description

Special designed mounting profile for surface-mounting options. Holes have to be drilled at site.

VARIOLED™ IP67

VarioLED™ IP67 fixtures are fully encapsulated linear LED light lines in aluminum profiles with excellent heat dissipation and very high lumen packages of up to 2,500 lm/m suitable for surface mounting and recessed installation and optimal for the indirect illumination of facades, baths and shower rooms, workshops, back lighting and other dusty or humid areas etc.

Photo: Jannes Linders

VarioLED™ IP67

High protection and optimum heat dissipation

Delivered ready to use with an IP67 connector on both ends and can be easily installed via clips or mounting profiles.

The aluminum profile is used for thermal management, so that even powerful LED strips with up to 25 W/m can be used.

The polyurethane encapsulation ensures an IP67 rating and high resistance against salt water and UV radiation by a clear polyurethane encapsulation.

www.led-linear.com/varioledip67

VarioLED™ IP67

Technical Specifications

White

IQ White

L80/B10 > 60,000 h — White / IQ White

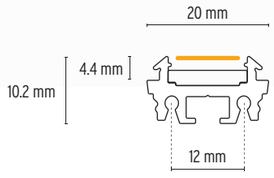
RGB

L80 > 30,000 h — RGB

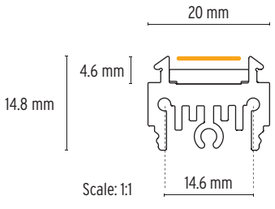
IP67

Polyurethane encapsulation

Contour C013



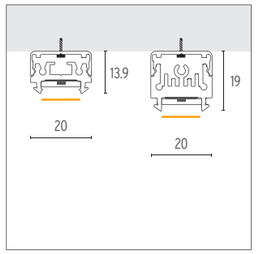
Contour C016

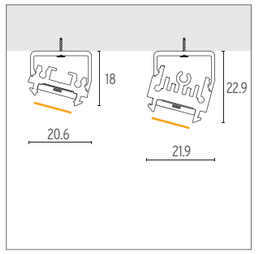


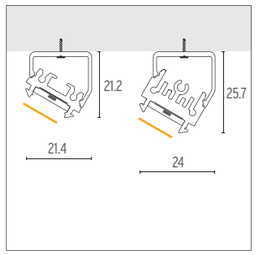
Cross section	20 mm x 10.2 mm / 20 mm x 14.8 mm
Length	up to 4 m
Power	3 W/m - 25 W/m
Luminous flux	up to 2,500 lm/m
Efficacy	up to 113 lm/W
Beam angle/optics	120°
Color temperatures	2,500 K, 2,800 K, 3,200 K, 3,700 K, 4,300 K, 5,100 K, 6,700 K and 9,600 K
Colors	Tunable White (**LD:** 3,200 K - 6,800 K / **HD:** 2,700 K - 6,000 K), RGB
CRI	85 - 96

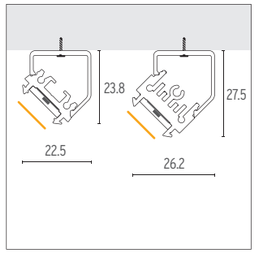
Mounting All dimensions in mm.

1. Surface-mounted, Clips









Mounting accessories

VarioClip Plastic
Art.-#: 13000032

VarioClip 19 0°
Art.-#: 10000040-01

VarioClip 19 15°
Art.-#: 10000040-01-15D

VarioClip 19 30°
Art.-#: 10000040-01-30D

VarioClip 19 45°
Art.-#: 10000040-01-45D

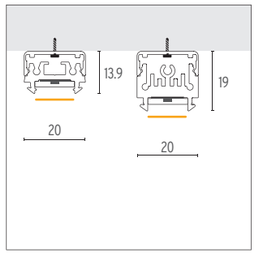
Description

Plastic surface mounting bracket, recommended to use every 50 cm.

Aluminum surface mounting bracket, recommended to use every 50 cm.

Example of application

2. Surface-mounted, Profile



Mounting accessories

VarioClip 19 Mounting Profile 0° - 2m
Art.-#: 10000039-2m

Description

Aluminum surface mounting profile in 2 m length.

Example of application

If the luminaire shall be installed without our mounting accessories, please get in touch with us to check the compatibility of the mounting.

IN-GROUND

Robust IP67 walk-over and roll-over (air filed tires) luminaire for in-ground installation with drainage management ideal for parking lots, roads or pedestrian areas. Luminaire using hard polyurethane encapsulation offering an optimal waterproof sealing, UV resistance, chemical stability against urban pollution and protection against abrasion damages.

Photo: Omri Amsalem

VarioLED™ OCEANOS IP67 | Page 80

Variant	Power (W/m)	Luminous flux (lm/m)	CRI	CCT (Kelvin)	Length (mm)
OPAL	6 - 24	30 - 450	97	1.900 - 4.500	520 oder 1.020
OPTICS	6 - 24	115 - 1.690	97	2.000 - 5.000	520 oder 1.020

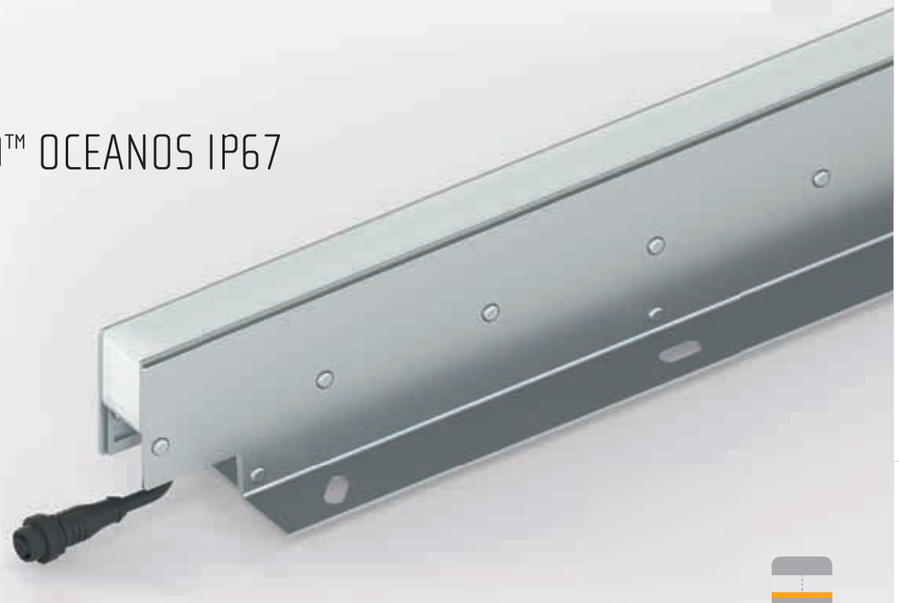
Robust, roll-over, dot free and homogeneous light line with 10° and 30° made of V4A stainless steel available in two standard lengths.

VARIOLED™ OCEANOS IP67

Precise engineered linear fixtures with IP67 and IK10 classifications suitable for challenging application environments. Installation system designed specifically for linear outdoor in-ground applications with continuous, homogeneous or directional lighting effects.

Photo: Suldal Foto

VarioLED™ OCEANOS IP67



Soft and endless in-ground light lines to lead the way

The V4A stainless steel housing makes the fixture extremely resistant to impact and helps to increase the resistance against vehicles driving over it.

The many different optics enable adaptability to different projects. The 10° optic suit well for wall grazing, as the 30° and opal are suitable for accent lighting.

IK10 classification and suitable for walk and drive over according to DIN EN 60598-2-13.

German Design Award NOMINEE 2014

reddot design award winner 2012

www.led-linear.com/oceanos

LED Linear™ GmbH

VarioLED™ OCEANOS IP67

Technical Specifications

White

IQ White

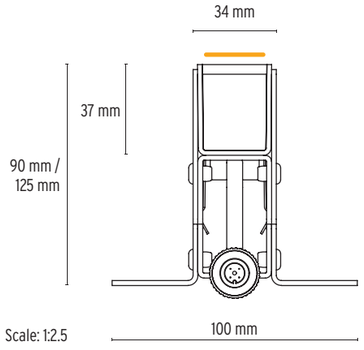
L80/B10 > 60,000 h — White / IQ White

RGB

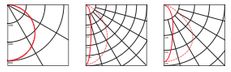
L80 > 30,000 h — RGB

IP67

IK10



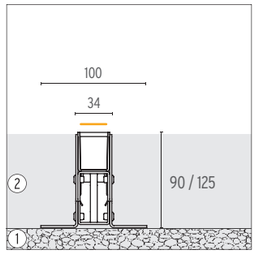
Opal | Lens 10° | Lens 30°



Cross section	30 mm x 37 mm (fixture only)
Length	520 mm or 1,020 mm
Power	6 W/m - 24 W/m
Luminous flux	**Opal encapsulation:** 30 lm/m - 450 lm/m **/ Linear lens:** 115 lm/m - 1.690 lm/m
Efficacy	up to 118 lm/W
Beam angle/optics	Opal, 10° or 30° (clear encapsulation)
Color temperatures	**Opal encapsulation:** 1,900 K, 2,100 K, 2,300 K, 2,500 K, 2,800 K, 3,200 K, 3,700 K and 4,500 K **Linear lens:** 2,000 K, 2,200 K, 2,500 K, 2,700 K, 3,000 K, 3,500 K, 4,000 K and 5,000 K
Colors	Tunable White (**Opal encapsulation:** 2,100 K - 4,500 K / **Linear lens:** 2,200 K - 4,000 K), RGB
CRI	85 - 96

Mounting All dimensions in mm.

1. In-ground



1. solid base with drainage possibility
2. materials like stone, concrete, cement, rock, paving

Mounting accessories

OCEANOS End Cap Mounting Kit
Art.-#: 11000226

OCEANOS Dismounting tool
Art.-#: 13100031

OCEANOS IP67 Cable Protection Cap
Art.-#: 15000133

OCEANOS Mounting frame - Short (90 mm) MF316L 520 mm
Art.-#: 10000541-L520

OCEANOS Mounting frame - Short (90 mm) MF316L 1020 mm
Art.-#: 10000541-L1020

OCEANOS Mounting frame - Tall (125 mm) MF316L 520 mm
Art.-#: 10000578-L520

OCEANOS Mounting frame - Tall (125 mm) MF316L 1020 mm
Art.-#: 10000578-L1020

Description

Recommended at the end of each light lines to prevent vandalism.

Use to take the fixture out of the in-ground mounting frame.

Use to cap and seal the unused end of the cable before starting the inground installation. Required to maintain IP67 grade.

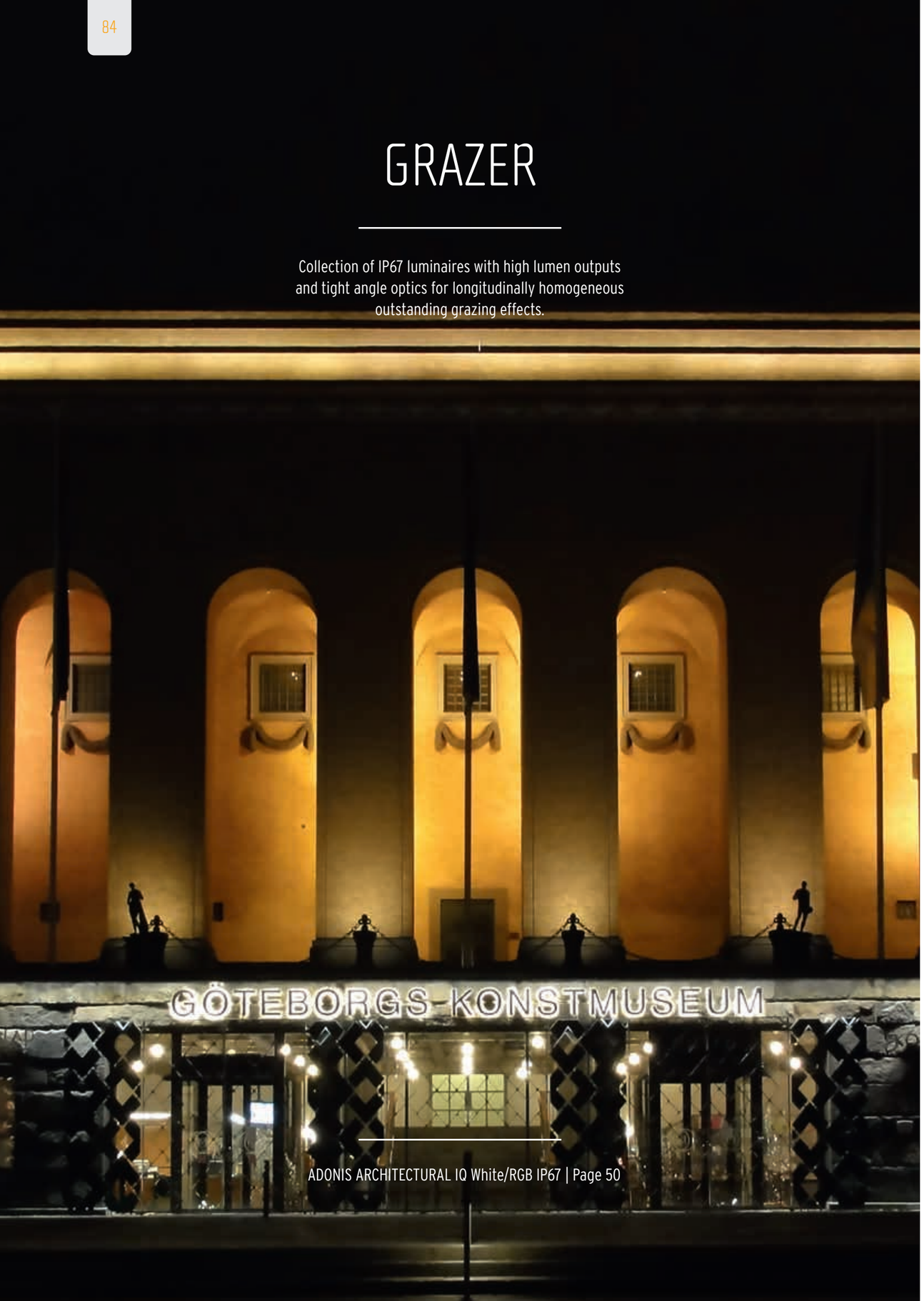
Stainless steel mounting frame with dedicated chamber for cable management and drainage.

Tall, Stainless steel mounting frame with dedicated chamber for cable management and drainage.

Example of application

GRAZER

Collection of IP67 luminaires with high lumen outputs and tight angle optics for longitudinally homogeneous outstanding grazing effects.



ADONIS ARCHITECTURAL IQ White/RGB IP67 | Page 50

XOOLUX™ NANO IP65 | Page 86

Power (W/m)	Luminous flux (lm/m)	CRI	CCT (Kelvin)	Length (mm)
5 - 40	320 - 2,745	95	2,200 - 5,000	271 - 521

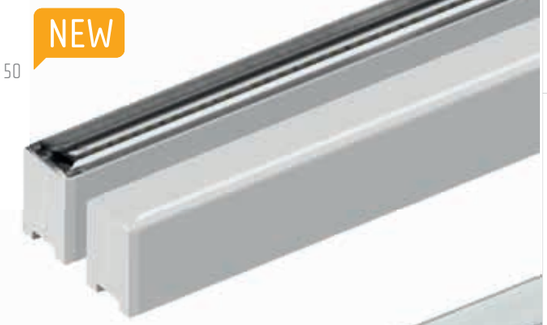
XOOLUX™ NANO is a minimalistic and flat luminaire designed primarily for grazing applications. The updated IP classification now stretch to IP65, meaning water resistance and suitable for canopied outdoor use.

ADONIS ARCHITECTURAL IP67 | Page 50

NEW

Variant	Power (W/m)	Luminous flux (lm/m)	CRI	CCT (Kelvin)	Length (mm)
OPAL	4 - 32	120 - 1,320	97	2,500 - 3,600	514 - 4,014
OPTICS	4 - 32	330 - 3,520	97	2,700 - 4,000	514 - 4,014

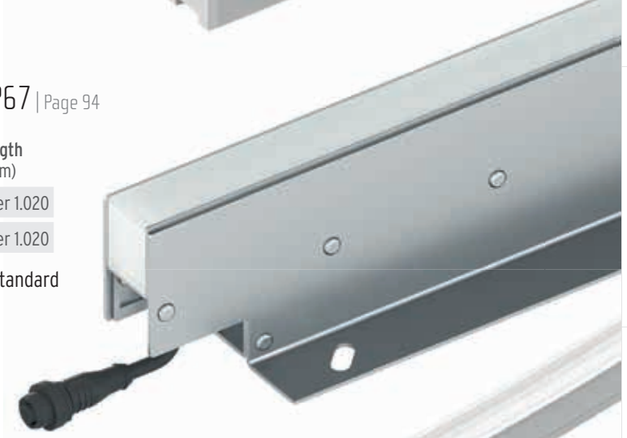
Miniaturized design meets architectural scales: Its exceptional integration makes ADONIS ARCHITECTURAL an excellent choice for grazing applications and direct illumination on façades and ceilings.



VarioLED™ OCEANOS IP67 | Page 94

Variant	Power (W/m)	Luminous flux (lm/m)	CRI	CCT (Kelvin)	Length (mm)
OPAL	6 - 24	30 - 450	97	1.900 - 4.500	520 oder 1.020
OPTICS	6 - 24	115 - 1.690	97	2.000 - 5.000	520 oder 1.020

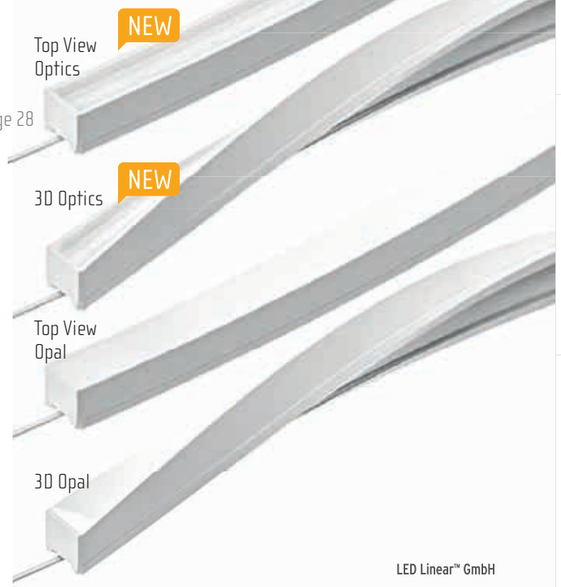
Robust in ground grazer made of V4A stainless steel available in standard lengths and 10° and 30° beam optic.



VENUS True Color family IP67 | Page 28

Variant	Power (W/m)	Luminous flux (lm/m)	CRI	CCT (Kelvin)	Length (mm)
3D OPTICS	6 - 15	435 - 1,520	95	2,200 - 5,000	354 - 3,924
3D OPAL	6 - 15	315 - 1,100	95	2,100 - 4,200	494 - 1,964
TV OPTICS	6 - 15	435 - 1,475	95	2,200 - 5,000	354 - 3,924
TV OPAL	6 - 15	325 - 1,105	95	2,100 - 4,200	494 - 1,964

VENUS True Color family specializes in celebrating organic, fluid, and unique architecture–effortlessly flowing with outdoor designs while highlighting their stylized shapes. Its stellar flexibility and overall versatility allow it to function as impressive facade lighting, orientation lighting, or accent lighting for a variety of structures.



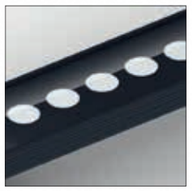
XOOLUX™ NANO IP65

A sleek and functional design enables mountings close to the illuminated surface while keeping the luminaire as discrete as possible in the architecture for optimal grazing effects and minimally invasive installation.

XOOLUX™ NANO IP65

The age of nano optics has been

Nano lens optics allow precise control of the light distribution while maximizing lumen output and minimalizing color over angle for crisp and homogeneous grazing.



Different light distributions makes XOOLUX™ NANO the go-to product for grazing- as well as delicate flooding applications.

Further improving flexibility is achieved through the use of mounting clips, enabling tilt angles every 5° increments from 0° to 45°.

NANO RAY

www.led-linear.com/xoolux

XOOLUX™ NANO IP65

Technical Specifications

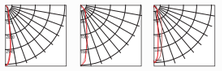
White

IQ White

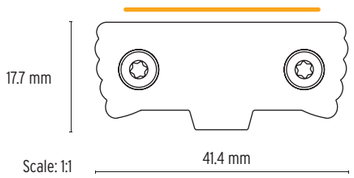
L80/B10
> 60,000 h

IP67

Optic 15° Optic 25° Optic 15° x 40° (oval)

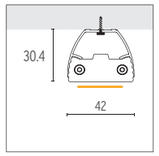


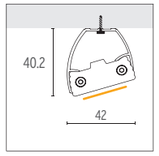
Cross section	41.4 mm x 17.7 mm
Length	up to 521 mm
Power	5 W/m - 40 W/m
Luminous flux	up to 2,745 lm/m
Efficacy	up to 82 lm/W
Beam angle/optics	Oval (15° x 40°), 15°or 25°
Color temperatures	2,200 K, 2,700 K, 3,000 K, 3,500 K, 4,000 K and 5,000 K
Colors	Tunable White (2,200 K - 5,000 K)
CRI	up to 95

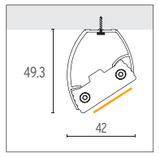


Mounting All dimensions in mm.

1. Ceiling







Mounting accessories

XOOLUX™ NANO
Mounting Bracket,
0° - 15° Black Aluminum
Art.-#: 13000292-SCH

XOOLUX™ NANO
Mounting Bracket,
15° - 30° Black Aluminum
Art.-#: 13000293-SCH

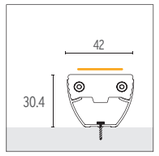
XOOLUX™ NANO
Mounting Bracket,
30° - 45° Black Aluminum
Art.-#: 13000294-SCH

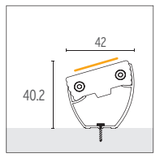
Description

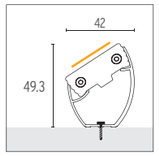
5 cm long, surface mounting brackets. Installs with screws to surface. The product can be tilted every 5 degrees inside the bracket.

Example of application

2. Surface-mounted







Mounting accessories

Please ensure that the luminaire is in an appropriate canopied area.

XOOLUX™ NANO
Mounting Bracket,
0° - 15° Black Aluminum
Art.-#: 13000292-SCH

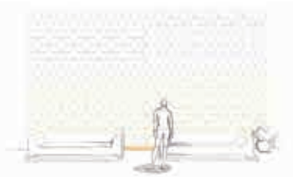
XOOLUX™ NANO
Mounting Bracket,
15° - 30° Black Aluminum
Art.-#: 13000293-SCH

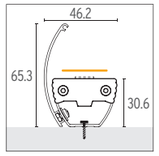
XOOLUX™ NANO
Mounting Bracket,
30° - 45° Black Aluminum
Art.-#: 13000294-SCH

Description

5 cm long, surface mounting brackets. Installs with screws to surface. The product can be tilted every 5 degrees inside the bracket.

Example of application





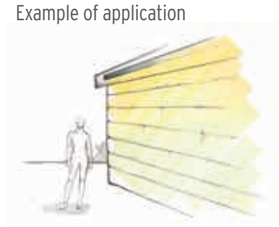
Mounting accessories

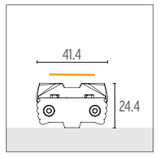
XOOLUX™ NANO
Shield 300 - 2042 mm
Art.-#: 13000377-0300-SCH
13000377-0550-SCH
13000377-0800-SCH
13000377-1050-SCH
13000377-2042-SCH

Description

Glare shield with surface mounting brackets. Installed with screws to surface. The product can be tilted every 5 degrees inside the bracket. For a better glare control for people passing by.

Example of application





XOOLUX™ NANO IP67
Anti-Glare Black 250 mm
Art.-#: 10000608-0250-SCH

Anti-glare cover with easy mounting by clicking on the luminaire. Delivered in 250 mm pieces. Geometry feature ensures correct lateral positioning against optics.

VARIOLED™ OCEANOS IP67

Complete system solution designed and engineered to offer a robust housing (IK10) with continuous, homogeneous and directional lighting effects with 10° optics for wall grazing and 30° optics for accent lighting.

Photo: Shutterstock.com / Dr Ajay Kumar Singh

VarioLED™ OCEANOS IP67

In-ground drive over linear LED luminaire

Stainless steel housing

OCEANOS has an environmental resistance of IP67. This is made possible thanks to the unique polyurethane encapsulation.

The many different optics enable adaptability to different projects. The 10° optic suit well for wall grazing, as the 30° and opal are suitable for accent lighting.

OCEANOS has an IK10 classification hence is very robust. The ability to withstand a pressure of 30 kN is equivalent to being traversed by a vehicle according to DIN-EN-60598-2-13.

German Design Award NOMINEE 2014

reddot design award winner 2012

www.led-linear.com/oceanos

LED Linear™ GmbH

VarioLED™ OCEANOS IP67

Technical Specifications

White

IQ White

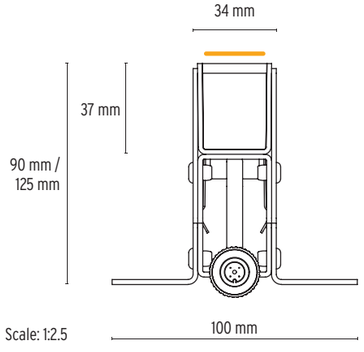
L80/B10 > 60,000 h — White / IQ White

RGB

L80 > 30,000 h — RGB

IP67

IK10

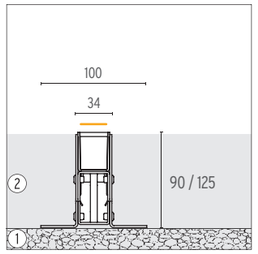


	Opal	Lens 10°	Lens 30°
			

Cross section	30 mm x 37 mm (fixture only)
Length	520 mm or 1,020 mm
Power	6 W/m - 24 W/m
Luminous flux	**Opal encapsulation:** 30 lm/m - 450 lm/m **/ Linear lens:** 115 lm/m - 1.690 lm/m
Efficacy	up to 118 lm/W
Beam angle/optics	Opal, 10° or 30° (clear encapsulation)
Color temperatures	**Opal encapsulation:** 1,900 K, 2,100 K, 2,300 K, 2,500 K, 2,800 K, 3,200 K, 3,700 K and 4,500 K **Linear lens:** 2,000 K, 2,200 K, 2,500 K, 2,700 K, 3,000 K, 3,500 K, 4,000 K and 5,000 K
Colors	Tunable White (**Opal encapsulation:** 2,100 K - 4,500 K / **Linear lens:** 2,200 K - 4,000 K), RGB
CRI	85 - 97

Mounting All dimensions in mm.

1. In-ground



1. solid base with drainage possibility
2. materials like stone, concrete, cement, rock, paving

Mounting accessories

OCEANOS End Cap Mounting Kit
Art.-#: 11000226

OCEANOS Dismounting tool
Art.-#: 13100031

OCEANOS IP67 Cable Protection Cap
Art.-#: 15000133

OCEANOS Mounting frame - Short (90 mm) MF316L 520 mm
Art.-#: 10000541-L520

OCEANOS Mounting frame - Short (90 mm) MF316L 1020 mm
Art.-#: 10000541-L1020

OCEANOS Mounting frame - Tall (125 mm) MF316L 520 mm
Art.-#: 10000578-L520

OCEANOS Mounting frame - Tall (125 mm) MF316L 1020 mm
Art.-#: 10000578-L1020

Description

Recommended at the end of each light lines to prevent vandalism.

Use to take the fixture out of the in-ground mounting frame.

Use to cap and seal the unused end of the cable before starting the inground installation. Required to maintain IP67 grade.

Stainless steel mounting frame with dedicated chamber for cable management and drainage.

Tall, Stainless steel mounting frame with dedicated chamber for cable management and drainage.

Example of application

UNDER WATER

Lighting elements create beautiful and pleasant environments when luminaires are placed inside water entities like pools, fountains, ponds and even tubs. Surface-mounted or recessed linear fixtures form homogeneous lines and increase the aesthetic appeal of the pool structure.

NEPTUNE IP68 | Page 96

NEW

Power (W/m)	**Luminous flux** (lm/m)	**CRI**	**CCT** (Kelvin)	**Length** (mm)
6 - 15	30 - 750	86 - 96	2,500 - 4,000	544 - 5,055

Rigid linear IP68 rated fixture with opal PVC extruded body and 220° beam angle in custom lengths up to 5 m.

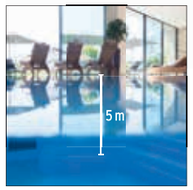
NEPTUNE IP68

Precise engineered rigid linear fixture with IP68 for pool lighting and water features with challenging requirements. Especially designed for long homogeneous linear light lines to create a pleasant atmosphere within and around the pool area and accentuate the elements of design.

Photo: 45g Photography

NEPTUNE IP68 NEW

Setting standards in underwater lighting



Submersible up to 1 m (depths down to 5 m are also possible after consultation your LED Linear™ partner).

Chlorine resistant up to 5 ppm and even higher resistance during shock treatment.

Homogeneous lines of light up to 5 m in single piece.

www.led-linear.com/neptune

NEPTUNE IP68

NEW

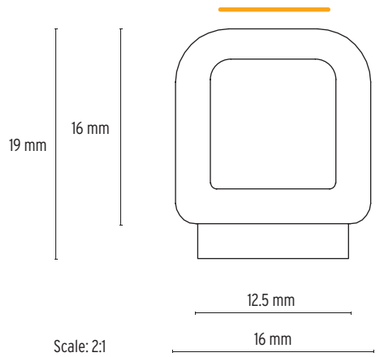
Technical Specifications

White

RGB

>50,000 h

IP68

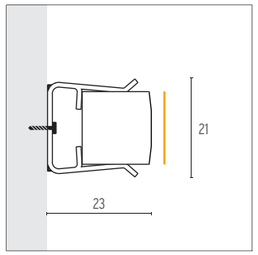


Opal PVC

Cross section	16 mm x 16 mm
Power	6 W/m, 10 W/m and 15 W/m
Luminous flux	up to 750 lm/m
Efficacy	up to 50 lm/W
Beam angle/optics	220°
Color temperatures	CRI 80: 2,700 K, 3,000 K, 3,500 K and 4,000 K CRI 90: 2,500 K, 2,800 K, 3,300 K and 3,900 K
Colors	RGB
CRI	up to 96

Mounting All dimensions in mm.

1. Surface-mounted



Mounting accessories

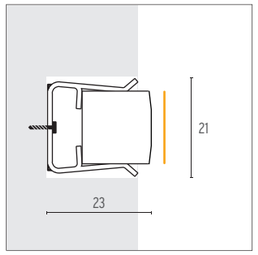
VarioClip TV 30 mm 316L
Art.-#: 13000050-01

Description

Special grade stainless steel surface mounting clip for harsh environments. Use according to the mounting instruction.

Example of application

2. Recessed-mounted



Mounting accessories

VarioClip TV 30 mm 316L
Art.-#: 13000050-01

Description

Special grade stainless steel surface mounting clip for harsh environments. Use according to the mounting instruction.

INDOOR

Modular set of decorative to functional lighting solutions for indoor applications.

VENUS family White Top View IP67 | Page 32
VarioLED™ Flex HYDRA LD White | Page 180

Photo: David Wakely Photography

ALLROUNDER

Family of highly modular luminaires with slim extruded aluminum housings which can implement various optics. These luminaires can be used for grazing, ambient, decorative or indirect lighting as well as in coves.

VarioLED™ Flex HYDRA HD White | Page 180

Lighting design: Licht Kunst Licht
Photo: Sichau & Walter Architekten

ULTIMA IP40 Family | Page 104

Power (W/m)	Luminous flux (lm/m)	CRI	CCT (Kelvin)	Length (mm)
5 - 25	390 - 2,330	95	2,200 - 5,000	262 - 2,012

Highly modular miniature luminaire that can be flexibly integrated into any architecture. Available as a single luminaire or as a track system to allow any creative freedom in planning.

XOOLINE™ IP40 | Page 114

Power (W/m)	Luminous flux (lm/m)	CRI	CCT (Kelvin)	Length (mm)
4 - 42	90 - 3,820	85 - 98	2,200 - 5,000	380 - 3,014

Minimalistic modular surface mount luminaire with up to 10 different optics available for any application, cabling solutions for continuous runs and a large choice of mounting accessories.

LYRA IP40 | Page 118

Power (W/m)	Luminous flux (lm/m)	CRI	CCT (Kelvin)	Length (mm)
5 - 25	80 - 2,800	85 - 96	2,000 - 6,500	73 - 4,010

Elegant and chic round luminaire with the choice of LD and HD tapes further increasing the possibility of creating unique solutions.

XOOLUM™ IP40 | Page 122

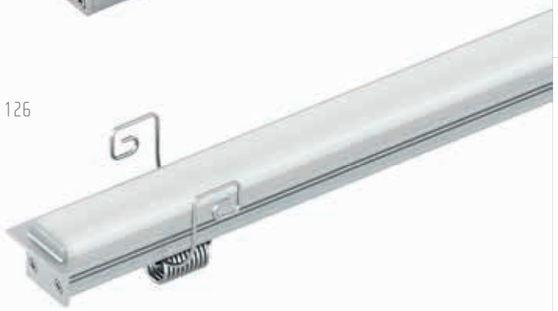
Power (W/m)	Luminous flux (lm/m)	CRI	CCT (Kelvin)	Length (mm)
6 - 42	110 - 3,730	85 - 97	2,000 - 5,000	135 - 4,010

Compact luminaire with adjustable luminaire head (45°) which offers enormous modularity lighting effect and mounting wise.

LUNA IP40 | Page 126

Power (W/m)	Luminous flux (lm/m)	CRI	CCT (Kelvin)	Length (mm)
5 - 42	90 - 5,100	85 - 97	2,000 - 6,500	135 - 4,010

Sister of XOOLINE™ as a recessed version offering 3 more optics.



ULTIMA FAMILY

ULTIMA represents a ground breaking step for lighting integration in the architecture. Its minimal design makes it blend in any building structure and disappear from sight. The ULTIMA family is divided into ULTIMA-S (Stand-alone) and ULTIMA-T (Track).

ULTIMA-S (Stand alone) | Page 106

NEW

The stand-alone version presents ULTIMA in its most compact form as a system. Its cross section of 10 mm x 13 mm (H x W) makes it an ideal candidate for finesse integrations or confined spaces.

NANO symmetrical

Power (W/m)	**Luminous flux** (lm/m)	**CRI**	**CCT** (Kelvin)	**Length** (mm)
6 - 25	500 - 2,330	85 - 95	2,200 - 5,500	262 - 2,012

NANO asymmetrical

Power (W/m)	**Luminous flux** (lm/m)	**CRI**	**CCT** (Kelvin)	**Length** (mm)
5 - 25	390 - 1,750	95	2,200 - 4,000	262 - 2,012

Opal

Power (W/m)	**Luminous flux** (lm/m)	**CRI**	**CCT** (Kelvin)	**Length** (mm)
6 - 25	490 - 2,060	95	2,200 - 4,000	262 - 2,012

ULTIMA-T (Track) IP40 | Page 110

ULTIMA-T is a set of track modules which can be placed at will in an extended 24 V track system. Each modules offers the exact same features as ULTIMA-S aside of its power feeding.

NANO

Power (W/m)	**Luminous flux** (lm/m)	**CRI**	**CCT** (Kelvin)	**Length** (mm)
6 - 20	550 - 2,160	95	2,200 - 5,000	290 - 1,540

Opal

Power (W/m)	**Luminous flux** (lm/m)	**CRI**	**CCT** (Kelvin)	**Length** (mm)
6 - 15	490 - 1,120	95	2,200 - 5,000	290 - 1,540

ULTIMA-S

NEW

ULTIMA represents a ground breaking step for lighting integration into architecture or furniture. Its miniaturised design and low glare makes it blend into any building structure and nearly disappear from sight. Thanks to numerous options it can be used in many different lighting applications and is even powerful enough to handle general lighting.

ULTIMA-S NEW

NANO RAY

UGR <13

The perfect blend of miniaturisation and functionality

A cross section of only 10 mm x 13 mm (H x W) combined with optics and lumen packages sufficient even for general lighting make ULTIMA-S suitable for many different applications, especially where integration into architecture or furniture is required.

Six different optics based on nanotechnology, ranging from spot to asymmetric plus an opal diffusor, outstanding control of glare (UGR < 13) and color consistency as well as various lumen packages and CCTs offer outstanding lighting quality and options.

ULTIMA has been designed with sustainability in mind. Thanks to miniaturisation it only uses a minimum of materials - a 1 meter long luminaire with Nano optics weighs just 133 g. It outputs up to more than 20 Lumen per gram of luminaire weight (without PSU). All of the nonelectrical components can be recycled, 87% of which are highly purified mono materials. The electrical components make up only 13 g per fixture meter.

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reddot winner 2020 lighting design

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GERMAN DESIGN AWARD SPECIAL 2021

www.led-linear.com/ultima

LED

ULTIMA-S NEW

Technical Specifications

White

IQ White

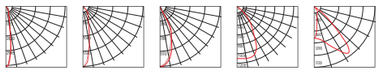
only NANO symmetrical

L80/B10 > 60,000 h

IP40

NANO asymmetrical | NANO symmetrical | Opal

NANO optics symmetrical



15° 25° 40° 60° Batwing

NANO optic asymmetrical

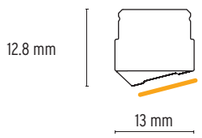
Asymmetrical

Opal cover

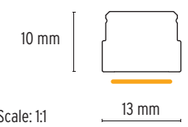
Opal

Cross section (W x H)	Symmetrical 13 mm x 10 mm // Asymmetrical 13 mm x 12.8 mm
Length	262 mm bis 2,012 mm
Power	**NANO symmetrical:** 6 W/m, 10 W/m, 15 W/m, 20 W/m, 25 W/m **NANO asymmetrical:** 5 W/m, 10 W/m, 15 W/m, 25 W/m **Opal:** 6 W/m, 10 W/m, 15 W/m, 25 W/m
Luminous flux	**NANO:** 500 lm/m - 2,330 lm/m // **NANO AS:** 390 lm/m - 1,750 lm/m // **Opal:** 490 lm/m - 2,060 lm/m
Efficacy	**NANO** up to 106 lm/W // **NANO AS** up to 116 lm/W // **Opal** up to 94 lm/W
Beam angle/optics	15°, 25°, 40°, 60°, Batwing, Asymmetric or Opal
Color temperatures	2,200 K, 2,700 K, 3,000 K, 3,500 K and 4,000 K
Colors	Tunable White (only NANO symmetrical) (2,200 K - 5,000 K)
CRI	up to 95

Asymmetrical optic



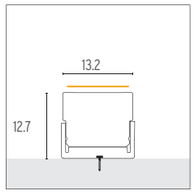
Other optics



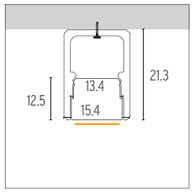
Scale: 1:1

Mounting All dimensions in mm.

1. Plastic clip, surface-mounted

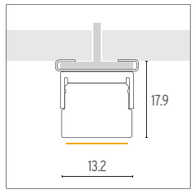


2. High mounting profile



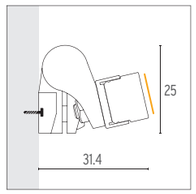
Mounting profile with sufficient space behind luminaire to place connectors. Profile is powder-coated white or black (RAL 9003 and 9004) and covers entire flank of luminaire.

3. Grid ceiling clip



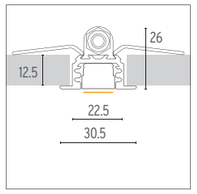
Grid clips are twisted onto T-bars of suspended ceiling. Very practical for retrofits.

4. Adjustable mounting clip



Adjustable clips can be used to freely aim the luminaire from 0° to approx. 125°.

5. Recessed with trim

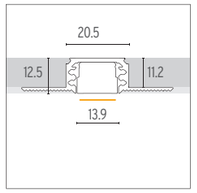


Recessed installation with trim of individual luminaires in plasterboard ceiling or other boards.

Please note: Maximum allowed wattage per meter for recessed installations is 20 W/m.

If you want to dim an ULTIMA-S with magnets that is mounted in low ambience noise surroundings, we recommend using a controller from the IN.finite™ range optimised for ULTIMA (article codes ending on -ULT).

6. Recessed trimless

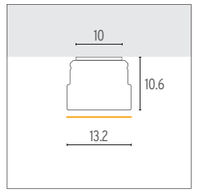


Recessed installation of individual luminaires in plasterboard ceiling, subsequently plastered in.

Please note: Maximum allowed wattage per meter for recessed installations is 20 W/m.

If you want to dim an ULTIMA-S with magnets that is mounted in low ambience noise surroundings, we recommend using a controller from the IN.finite™ range optimised for ULTIMA (article codes ending on -ULT).

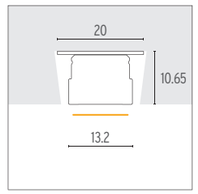
7. Magnetic, surface-mounted



E. g. surface mounted on suitable steel structure or with the help of an attached separate steel strip.

Please note: If you want to dim an ULTIMA-S with magnets that is mounted in low ambience noise surroundings, we recommend using a controller from the IN.finite™ range optimised for ULTIMA (article codes ending on -ULT).

8. Magnetic, recessed



E. g. recessed into swallow-tail groove cut into wooden board for furniture integration.

Please note: Maximum allowed wattage per meter for recessed installations is 20 W/m.

If you want to dim an ULTIMA-S with magnets that is mounted in low ambience noise surroundings, we recommend using a controller from the IN.finite™ range optimised for ULTIMA (article codes ending on -ULT).

9. No mounting accessories

No mounting accessories are delivered with the luminaire. Intended for cases where longer lengths of high mounting profiles with several luminaires are to be used for continuous lines. These can be ordered separately and cut to the required length.

ULTIMA-T IP40

Ideal for gallery & museum lighting or spaces requiring multiple lighting effects with strong structural restrictions. ULTIMA-T can be placed anywhere in the recessed trimless, recessed with trim or surface / pendant track systems.

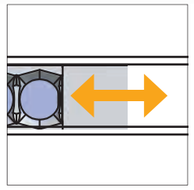
ULTIMA-T IP40

NANO RAY 2.0

UGR <13

Tailored for millwork integration

ULTIMA-T embeds electrical contact at its ends for a simple contacting in the track (patent pending). Just click the ULTIMA-T module in the pre-installed track system without having to worry about complex cabling.



Each light module can be freely moved within its track by simply sliding it which provides a full flexibility necessary in dynamic places such as galleries or showrooms.

Thanks to the 4 x 2.4 mm² copper lines in each track, runs up to 10 m are possible. They also enable the control of two different lighting scenes by connecting ULTIMA-T modules to two independent channels.

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www.led-linear.com/ultima

LED Linear™ GmbH

ULTIMA Track IP40

Technical Specifications

Pendant (2 flames) | Surface-mounted | Recessed with trim | Recessed trimless

White

IQ White

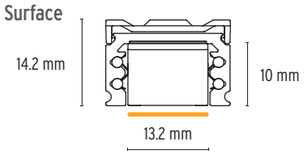
only NANO

L80/B10
> 60,000 h

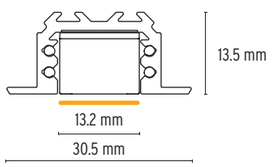
IP20/
IP40

Pendant

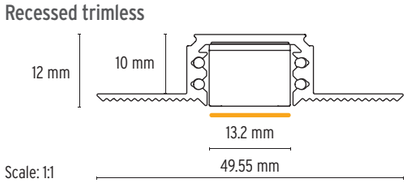
Surface



Recessed with trim



Recessed trimless



Scale: 1:1

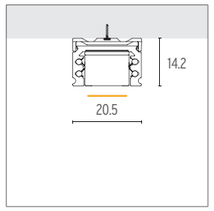
NANO optics

Cover

Cross section	14.2 mm x 20.5 mm (H x W)
Length	290 mm / 540 mm / 790 mm / 1,040 mm / 1,290 mm / 1,540 mm
Power	**NANO:** 6 W/m, 10 W/m, 15 W/m, 20 W/m **Opal:** 6 W/m, 10 W/m, 15 W/m
Luminous flux	**NANO:** 550 lm/m - 2,160 lm/m // **Opal:** 490 lm/m - 1,120 lm/m
Efficacy	up to 117 lm/W
Beam angle/optics	15°, 25°, 40°, 60°, Batwing, Asymmetric or Opal
Color temperatures	2,200 K, 2,700 K, 3,000 K, 3,500 K, 4,000 K and 5,000 K
Colors	Tunable White (only NANO) (2,200 K - 5,000 K)
CRI	up to 95

Mounting All dimensions in mm.

1. Surface-mounted



Mounting accessories

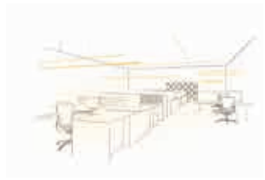
VarioTrack Clip 061
Art.-#: 13000349-W
13000349-SCH

VarioTrack 001
Art.-#: 16000342-W
16000342-SCH

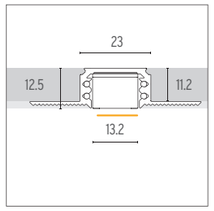
Description

Track and Clip for surface mounting.

Example of application



2. Recessed trimless



Mounting accessories

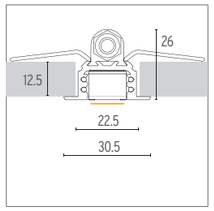
VarioTrack 001 Trimless
Art.-#: 13000344-W

Description

Trimless track for plastering

Example of application

3. Recessed with trim



Mounting accessories

Mounting spring
VarioTrack 01 for
recessed mounting
Art.-#: 13000443

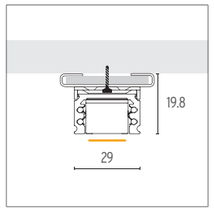
VarioTrack 001 Trim
Art.-#: 16000343-W
16000343-SCH

Description

Mounting spring for recessed mounting.

Example of application

4. Grid ceiling T-bar



Mounting accessories

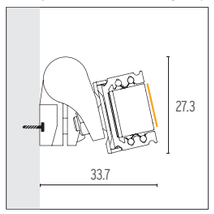
VarioTrack Clips 061
Grid Ceiling
Art.-#: 13000391-W
13000391-SCH

VarioTrack 001
Art.-#: 16000342-W
16000342-SCH

Description

Surface-mounted track and grid ceiling cllip for easy mounting on the t-bars of the ceiling.

5. Adjustable mounting clip



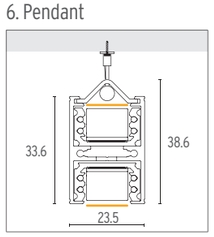
Mounting accessories

Adjustable mounting clip
Art.-#: 13000372-SCH

Description

Adjustable mounting clip for easy adjustment of the luminaire.

6. Pendant



Mounting accessories

VarioTrack 001
Art.-#: 16000342-W
16000342-SCH

Description

Pendant kit for pendant solution.

XOOLINE™ IP40 NEW

XOOLINE™ is a minimalistic modular luminaire suitable for wall grazing, general lighting and a multitude of other applications. A variety of light engines ranging from static white to RGBW, with color temperatures from 2,200 K to 5,000 K, 10 optics to choose from, 8 different mounting accessories plus further options make XOOLINE™ an extremely versatile lighting tool.

Photo: Whitelight Studio Berlin, Jens Bösenberg

XOOLINE™ IP40 NEW

Minimal luminaire with maximum versatility

Translucent end caps and special cable exit solutions make it easy to create infinite lines of light.

Housing and mounting profile are also available in black for directly visible applications.

Minimalistic form factor and several cable exit and connector options enable seamless integration.

Next Generation LUMINAIRES INDOOR 2014

www.led-linear.com/xooline

LED Linear™ GmbH

XOOLINE™ IP40

NEW

Technical Specifications

White

IQ White

RGB

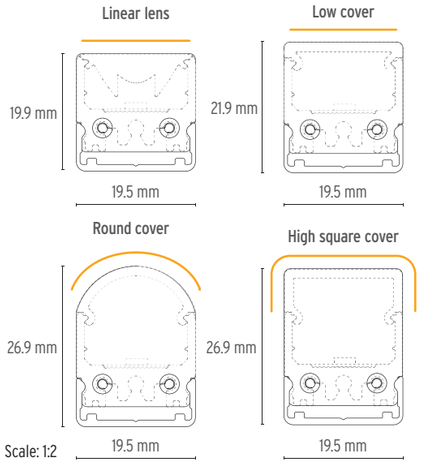
RGBW

L80/B10 › 60,000 h — White / IQ White

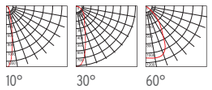
L90/B10 › 60,000 h — White for RGBW

L80 › 30,000 h — RGB

IP40



Linear lens



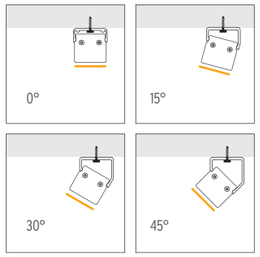
Low cover			Round cover		High square cover		
opal*	diffuse	clear	opal	diffuse	opal	diffuse	* not for RGBW

Length	up to 3,014 mm
Power	4 W/m - 42 W/m
Luminous flux	90 lm/m - 3,820 lm/m
Efficacy	up to 148 lm/W
Beam angle/optics	opal, diffuse, clear, 10°, 30°, 60°
Color temperatures	2,200 K, 2,500 K, 2,700 K, 3,000 K, 3,500 K, 4,000 K and 5,000 K
Colors	Tunable White (**HE** 2,500 K - 4,000 K / **HC** 2,200 K - 5,000 K / **UHC** 2,700 K - 6,500 K), RGB, RGBW
CRI	up to 98

Mounting

All dimensions in mm.

1. Surface-mounted*, horizontal



* Low cover

Mounting accessories

Full length mounting channel
Digits in order code: MP

0° aluminum mounting clip in 90 mm length
Digits in order code: CL0

15° aluminum mounting clip in 90 mm length
Digits in order code: CL15

30° aluminum mounting clip in 90 mm length
Digits in order code: CL30

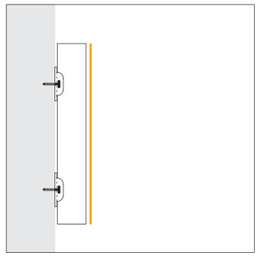
45° aluminum mounting clip in 90 mm length
Digits in order code: CL45

Description

Aluminum surface mounting bracket, recommended to use every 50 cm. Available in four different angles.

Example of application

2. Surface-mounted, vertical



Mounting accessories

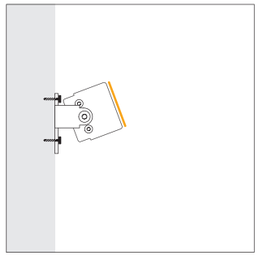
Plastic Mounting Bracket
Digits in order code: PCL

Description

White plastic surface mounting clip. Recommended to use every 50 cm. Cannot be used together with the aluminum mounting profile.

Example of application

3. Adjustable, vertical*



Mounting accessories

Adjustable Bracket
Digits in order code: AMC

Description

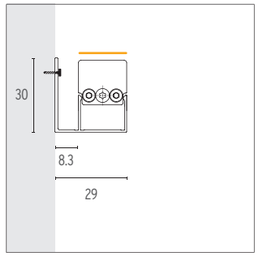
Use to adjust and fix the angle of fixture. 180 degrees adjusting range. Delivered with axis screw.

Example of application

* Mounting option AMC is not available for Tunable White Luminaires in combination with an 'LD' light engine.

Cable feed options BS and FS can't be combined with mounting option AMC.

4. Wall-mounted



Mounting accessories

No additional accessories are required for this mounting option.
Digits in order code: WMP

Description

Full length mounting channel, sets light axis parallel to wall. Connectors fit into gap between luminaire and wall.

LYRA IP40

LYRA is a slim luminaire, applicable as pendant or surface mount. The possibility to rotate the fixture makes it possible to illuminate targets in any direction.

LYRA IP40

Perfectly shaped and stylish lighting solution

The lumen output up to 2,800 lm/m is high for such a minimalistic fixture.

The elegant spirit of LYRA is also shown in the mounting clips, which enable both pendant and surface mount.

The possibility to choose between a linear lens or a clear cover provides flexibility and makes it possible to create multiple light distributions.

GERMAN DESIGN AWARD WINNER 2018

reddot award 2017 winner

www.led-linear.com/lyra

LED Linear™ GmbH

LYRA IP40

Technical Specifications

White

IQ White

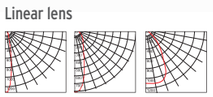
RGB

L80/B10 > 60,000 h — White / IQ White

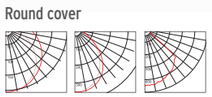
L80 > 30,000 h — RGB

IP40

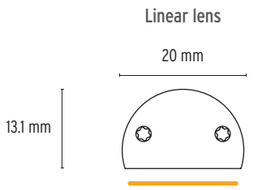
Linear lens



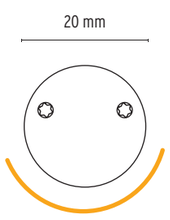
Round cover



Linear lens



Round cover

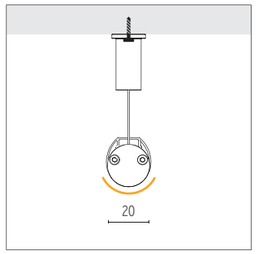


Scale: 1:1

Cross section	ø 20 mm
Length	up to 4,010 mm
Power	5 W/m - 42 W/m
Luminous flux	up to 5,100 lm/m
Efficacy	up to 121 lm/W
Beam angle/optics	10°, 30°, 60°, opal, diffuse, clear
Color temperatures	2,000 K, 2,200 K, 2,500 K, 2,700 K, 3,000 K, 3,500 K, 4,000 K and 5,000 K
Colors	Tunable White (HE LD: 2,500 K - 4,000 K / HE HD: 2,200 K - 4,000 K / HC: 2,500 - 5,000 K / UHD: 2,700 K - 6,500 K), RGB
CRI	85 - 97
Profile colors	Black, Silver

Mounting All dimensions in mm.

1. Pendant



Mounting accessories

VarioPendant 024 Set Silver
Art.-#: 13000161

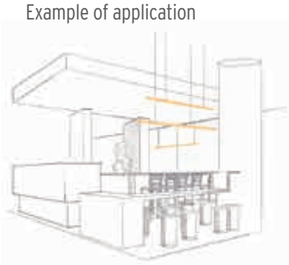
VarioPendant 024 Set Black
Art.-#: 13000161-SCH

VarioCANOPY Square Mounting set (optional) for pendant ceiling installations on concrete ceilings
Art.-#: 16000347

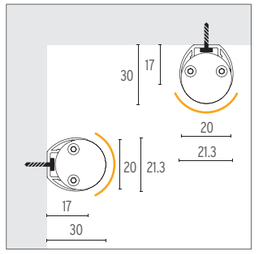
Description

Pendant set with screws for installations directly on the ceiling. 2 m Suspension is cuttable on site. Recommended to use two suspensions per meter.

Example of application



2. Surface-mounted



Mounting accessories

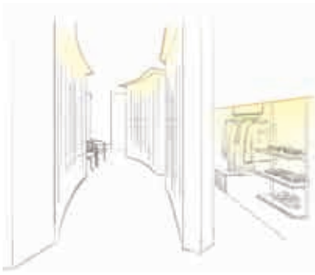
VarioClip 024 Silver
Art.-#: 13000160

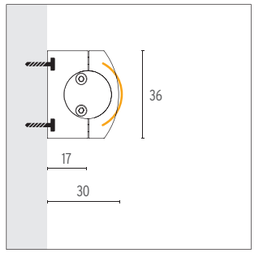
VarioClip 024 Black
Art.-#: 13000160-SCH

Description

Surface mount clips with screws for installation directly on the wall or ceiling. Recommended to use 2 clips per meter.

Example of application





VarioContour 024 Surface Mounting Set
Art.-#: 13000162

XOOLUM™ IP40

XOOLUM™ is applicable in almost any area and project thanks to the many covers and reflectors. The mounting possibilities are surface, pendant and cove and it is possible to tilt the fixture in an 45° angle. XOOLUM™ is suitable as the general or functional light source in offices, production areas, schools and museums.

XOOLUM™ IP40

The smallest and brightest lighting solutions for general illumination

High lumen output up to 3,730 lm/m and efficiency of 105 lm/W in combination with a minimalistic design makes XOOLUM™ an efficient product.

The range of covers and reflectors (25°, 65° and Wall Washer) increase the flexibility of XOOLUM™.

XOOLUM™ is a two in one fixture thanks to the possibility to mount it with an 45° angle. The mounting possibilities are surface, pendant and cove.

German Design Award NOMINEE 2013

reddot design award best of the best 2012

www.led-linear.com/xoolum

LED Linear™ GmbH

XOOLUM™ IP40

Technical Specifications

White

IQ White

RGB

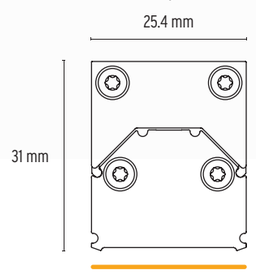
RGBW

L80/B10 › 60,000 h — White / IQ White

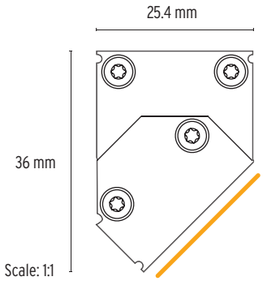
L80 › 30,000 h — RGB

IP40

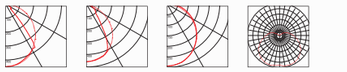
Not adjusted



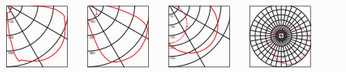
45° adjusted



not adjusted



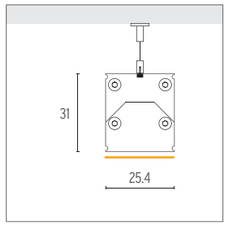
45° adjusted

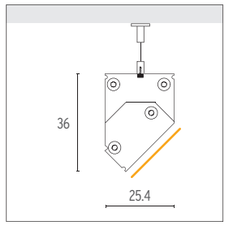


Cross section	25.4 mm x 31 mm / 25.4 mm x 36 mm
Length	135 mm - 4,010 mm
Power	6 W/m - 42 W/m
Luminous flux	110 lm/m - 3,730 lm/m
Efficacy	up to 104 lm/W
Beam angle/optics	Opal, Clear, without cover (Reflector optics please see page 164)
Color temperatures	2,000 K, 2,200 K, 2,500 K, 2,700 K, 3,000 K, 3,500 K, 4,000 K and 5,000 K
Colors	Tunable White (2,200 K - 5,000 K), RGBW, RGB
CRI	85 - 96

Mounting All dimensions in mm.

1. Pendant





Mounting accessories

VarioPendant 007
Slide Silver
Art.-#: 13000157

VarioPendant 007
Slide Black
Art.-#: 13000158

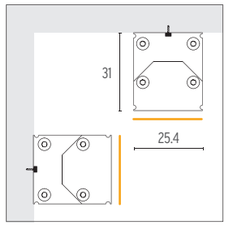
VarioCANOPY Square
Mounting set (optional)
for pendant ceiling
installations on concrete
ceilings
Art.-#: 16000347

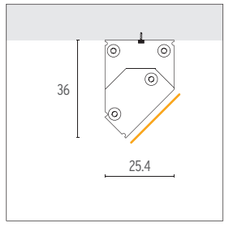
Description

Pendant set with screws for installations directly on the ceiling. 2 m Suspension is cuttable on site. Recommended to use every 1 m.

Example of application

2. Surface-mounted, fixed





Mounting accessories

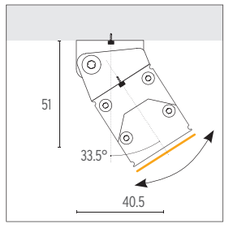
No additional accessories are required for this mounting option.

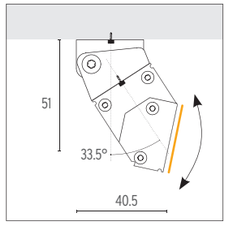
Description

Special designed mounting profile for surface-mounting options. Holes have to be drilled at site.

Example of application

3. Surface-mounted, adjustable





Mounting accessories

XOOLUM™ 007 Swivel-
Angle Set +/- 45°
Art.-#: 13000081

Description

Adjustable clip for extra 45° tilt.

LUNA IP40

LUNA is a recessed luminaire with IP40 classification. It is possible to choose between 12 different optics. The smooth lines of LUNA with a flat cover is perfectly integrated into ceiling creating long light lines. This makes it possible to meet the demands of most projects.

Photo: KKS Stragety LLP / Timothy Soar

LUNA IP40

Discreet and elegant – the lighting solution for recessed applications

9 different covers for flexibility in applications and 3 different lenses increases possible solutions.

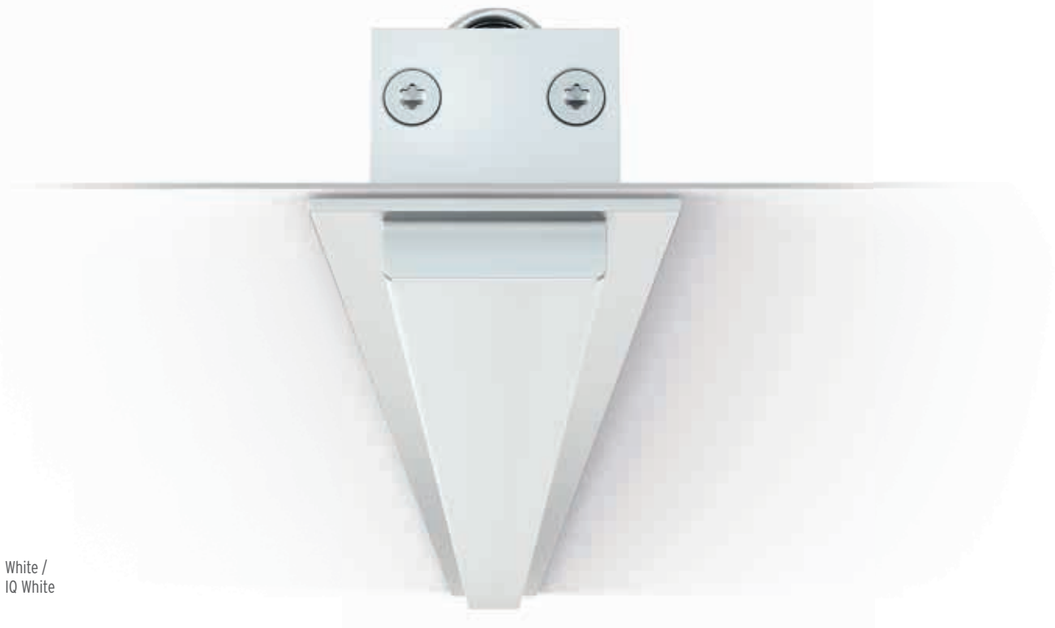
High lumen output in minimalistic design up to 5,100 lm/m.

LUNA is minimally invasive and designed in a way that enables easy installation thanks to premounted springs and low installation depth.

www.led-linear.com/luna

LUNA IP40

Technical Specifications



White

IQ White

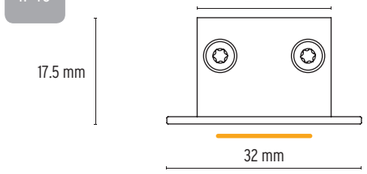
RGB

L80/B10
> 60,000 h
White /
IQ White

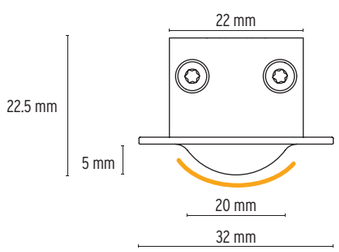
L80
> 30,000 h
RGB

IP40

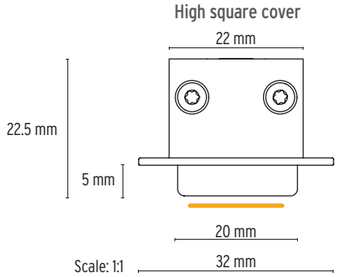
Flat cover



Round cover

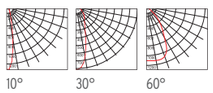


High square cover

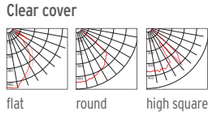


Scale: 1:1

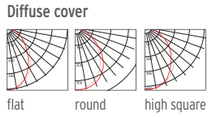
Linear lens



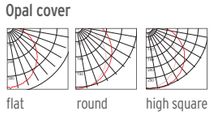
Clear cover



Diffuse cover



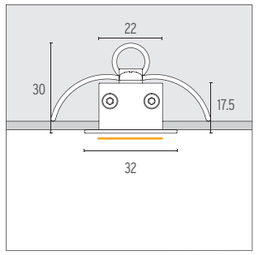
Opal cover



Cross section	32 mm x 17.5 mm / 32 mm x 22.5 mm
Length	up to 4,010 mm
Power	5 W/m - 42 W/m
Luminous flux	up to 5,100 lm/m
Efficacy	up to 145 lm/W
Beam angle/optics	10°, 30°, 60°, clear, diffuse, opal
Color temperatures	2,000 K, 2,200 K, 2,500 K, 2,700 K, 3,000 K, 3,500 K, 4,000 K and 5,000 K
Colors	Tunable White (HYDRA: 2,500 K - 4,000 K / ATON: 2,200 K - 4,000 K), RGB
CRI	85 - 96

Mounting All dimensions in mm.

1. Recessed



Mounting accessories

No additional accessories are required for this mounting option.

Description

Mounting springs are pre mounted. Luminaire can be installed directly into false ceiling.

Example of application

GENERAL LIGHTING & TASK LIGHTING

Assortment of functional luminaires offering homogeneous illumination with wide or narrow distributions for ambient lighting as well as excellent glare control for task lighting.

VarioLED™ Flex HYDRA LD/HD White | Page 178

Photo: KKS Strategy LLP/Timothy Soar

ULTIMA-P (PENDANT) IP40 | Page 132

Power (W/m)	Luminous flux (lm/m)	CRI	CCT (Kelvin)	Length (mm)
15 / 20	1,140 - 1,950	95	2,700 - 4,000	1,092 - 1,592

Unobtrusive and minimal pendant luminaire, yet packing a powerful punch and suitable for any task lighting. Intended primarily as a stand-alone luminaire, with multiple options.

NEW

MARS ARCHITECTURAL family | Page 136

Power (W/m)	Luminous flux (lm/m)	CRI	CCT (Kelvin)	Length (mm)
15 - 42	1,200 - 3,460	95	2,700 - 4,000	345 - 3,020

A system of stylish linear solutions offering minimalist design language with maximum lighting as well as a multitude of options.

XOOMINAIRE™ 4292 IP40 | Page 148

Power (W/m)	Luminous flux (lm/m)	CRI	CCT (Kelvin)	Length (mm)
15 - 40	1,690 - 4,120	up to 86	2,700 - 4,000	887 - 1.512

Direct and indirect luminaire available as pendant or wall-mounted with the same width and optics as 4262 which enables a consistent visual in large project implementing both luminaires. Ideal for open space offices or corridor wall-mounted lighting in hospitals for example.

XOOLUM™ Opal Continuous IP20 | Page 152

Power (W/m)	Luminous flux (lm/m)	CRI	CCT (Kelvin)	Length (mm)
10 - 42	470 - 2,410	85 - 97	2,200 - 5,000	135 - 4,010

Compact opal dot free luminaire with continuous cover which offers uninterrupted light lines up to 15 m long.

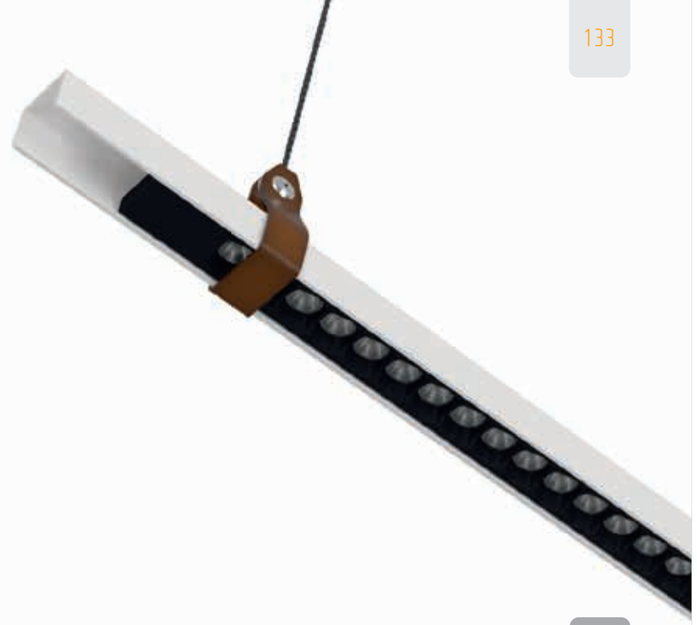
XOOLUM™ Reflector IP20 | Page 156

Power (W/m)	Luminous flux (lm/m)	CRI	CCT (Kelvin)	Length (mm)
5 - 40	360 - 3,710	85 - 98	2,000 - 6,500	135 - 4,010

Small form factor and yet modular luminaire with adjustable light head embedding specular reflectors with excellent glare control.

ULTIMA-P

Ideal for pendant task lighting over workdesks, counters and smaller meeting room tables.



ULTIMA-P IP40

NANO RAY 2.0

UGR <14

Minimal pendant luminaire

Extremely small for a pendant luminaire, especially when considering the built-in optical technology and an output of up to 1,840 lm/m.

NanoRay 2.0 optics offer precise beam and glare control with minimal color over angle.

Standard includes multiple variations like 40° or 60°, Batwing and opal optics; 4 different color temperatures as well as 6 different housing/antiglare color combinations.

For ULTIMA family

SAPPHIRE AWARDS 2021 Winner

BUILD BACK BETTER GOLD

GERMAN INNOVATION AWARD '21 WINNER

reddot winner 2020 lighting design

GERMAN DESIGN AWARD WINNER 2021

GERMAN DESIGN AWARD SPECIAL 2021

www.led-linear.com/ultima

ULTIMA-P IP40

Technical Specifications

White

IQ White

only NANO

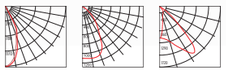
L80/B10
> 60,000 h

IP40

NANO

Opal

NANO optics

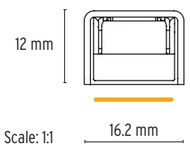


40° 60° Batwing

Opal

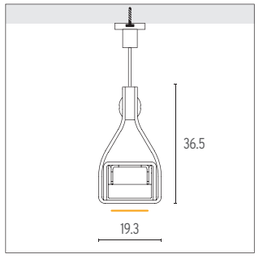
Opal

Cross section	12 mm x 16.2 mm (H x W)
Length	1,092 mm / 1,592 mm
Power	**NANO:** 15 W/m and 20 W/m // **Opal:** 15 W/m
Luminous flux	**NANO:** 1,400 lm/m - 1,950 lm/m // **Opal:** 1,140 lm/m - 1,210 lm/m
Efficacy	up to 115 lm/W
Beam angle/optics	40°, 60°, Batwing or Opal
Color temperatures	2,700 K, 3,000 K, 3,500 K and 4,000 K
Colors	Tunable White (only NANO) 2,200 K - 5,000 K
CRI	up to 95



Mounting All dimensions in mm.

1. Pendant, false/concrete ceiling



Mounting accessories

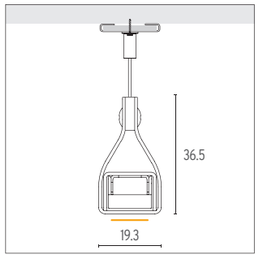
Mounting option "C" in order code

Description

Ceiling fasteners for false ceiling or concrete ceilings.

Example of application

2. Pendant, Grid ceiling



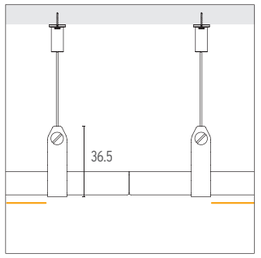
Mounting accessories

Mounting option "G" in order code

Description

Grid ceiling clip for easy mounting on the cross struts of the ceiling.

3. Pendant, Connector



Mounting accessories

Luminaire connector
ULTIMA-P (Set)
Art.-#: 13000408-SCH

Description

Mechanically connect two adjacent luminaires.

Power & Controls

The following accessories are included with the luminaire if chosen as part of the order code.

1a. Surface mounted canopy with driver*

PSU option "C" in order code
VarioCANOPY Square Mounting set (optional)
for pendant ceiling installations on concrete ceilings.
(suitable for all countries except North America)

1b. External driver*

PSU option "E" in order code
VarioPSU 24V/35W IP20, 100-277 V
(suitable for all countries except North America)

2a. CASAMBI

Control option "C" in order code
IN.finite™ CASAMBI 2CH CV

2b. DALI® DT-6

Control option "D" in order code
IN.finite™ DALI® DT6 2CH CV

* If PSU option "C" or "E" was chosen as part of order code, no further accessories are required to install and operate the luminaire.

MARS ARCHITECTURAL – PENDANT

NEW

The timeless design of MARS ARCHITECTURAL blends in perfectly in offices but is also a valuable solution for education facilities, retail environments, public buildings and warehouses. The very wide range of options enables almost any general lighting application.

MARS ARCHITECTURAL – PENDANT

NEW

NANO RAY

UGR <13

Excellent balance between design and functional lighting

True nano optics in four precise beam angles combined with an antiglare provide near invisible light and an UGR as low as < 13. An additional variant with an opal diffusor rounds off the options.

A multitude of options include several power levels and color temperatures plus options in tunable white and RGBW, as well as two form factors to choose from.

The pendant luminaires are available in three housing and antiglare colors that can be freely combined. All luminaires with external drivers are powered with a transparent cable. The type 62 also features magnetically fastened end caps to provide a clean finish.

reddot award 2017 winner

INNOVATIVE INTERIOR winner

LEDs MAGAZINE SAPPHIRE AWARDS 2019 FINALIST

GERMAN DESIGN AWARD 2020

www.led-linear.com/mars-arc-p

MARS ARCHITECTURAL – PENDANT

NEW

Technical Specifications

White

IQ White

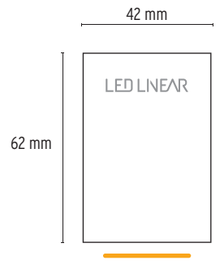
RGBW

Only MARS ARCHITECTURAL OPAL

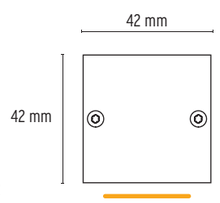
L80/B10 > 60,000 h

IP40

Type 62

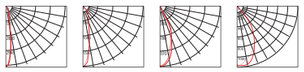


Type 42



Scale: 1:2

Nano optics

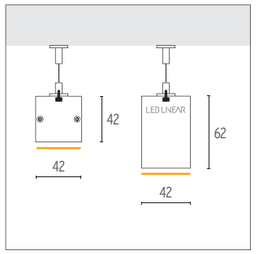


Diffusor

Cross section	42 mm x 62 mm (Type 62) / 42 mm x 42 mm (Type 42)
Length	345 mm - 3,020 mm
Power	15 W/m - 42 W/m
Luminous flux	**NANO:** up to 3.460 lm/m / **Opal:** up to 2.970 lm/m
Efficacy	**NANO:** up to 119 lm/W / **Opal:** up to 102 lm/W
Beam angle/optics	Nano optics: 15°, 25°, 40° or 65°/ Diffusor: Opal
Color temperatures	2,700 K, 3,000 K, 3,500 K and 4,000 K
Colors	Tunable White (2,200 K - 5,000 K), RGBW (only opal optics)
CRI	up to 95

Mounting All dimensions in mm.

1. Pendant



Mounting accessories

The required accessories for pendant mounting are included with the luminaire.

VarioPendant 4242/4262 C
Art.-#: 13000106

Description

Pendant set with screws for installations directly on the ceiling. Recommended to use every 1 m.

Example of application

MARS ARCHITECTURAL – RECESSED NEW

The timeless design of MARS ARCHITECTURAL blends in perfectly in offices but is also a valuable solution for education facilities, retail environments, public buildings and warehouses. The very wide range of options enables almost any general lighting application.

Photo: toneteam

MARS ARCHITECTURAL – RECESSED NEW

NANO RAY

UGR <13

The nearly invisible linear downlight

True nano optics in four precise beam angles combined with an antiglare provide near invisible light and an UGR as low as < 13. An additional variant with an opal diffusor rounds off the options.

Driver and controls can be integrated or external - installations that suit external drivers benefit from the small luminaire height of 31mm including mounting springs, allowing installation in shallow spaces.

Smaller luminaires are more sustainable as less raw materials are used in production and less energy consumed during transport to site.

reddot award 2017 winner

INNOVATIVE INTERIOR winner

LEDs MAGAZINE SAPPHIRE AWARDS 2019 FINALIST

GERMAN DESIGN AWARD 2020

www.led-linear.com/mars-arc-r

LED Linear™ GmbH

MARS ARCHITECTURAL – RECESSED

NEW

Technical Specifications

White

IQ White

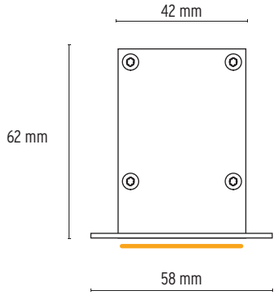
RGBW

Only MARS
ARCHITECTURAL OPAL

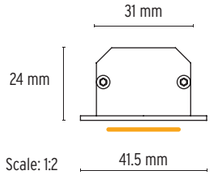
L80/B10
> 60,000 h

IP40

Type 62

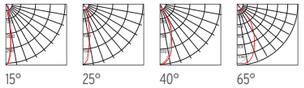


Type 24



Scale: 1:2

Nano optics

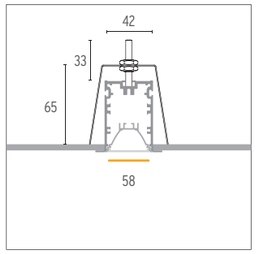


Diffusor

Cross section	42 mm x 62 mm (Type 62) / 41.5 mm x 24 mm (Type 24)
Length	345 mm - 3,020 mm
Power	15 W/m - 42 W/m
Luminous flux	**NANO:** up to 3.460 lm/m / **Opal:** up to 2.970 lm/m
Efficacy	**NANO:** up to 119 lm/W / **Opal:** up to 102 lm/W
Beam angle/optics	Nano optics: 15°, 25°, 40° or 65°/ Diffusor: Opal
Color temperatures	2,700 K, 3,000 K, 3,500 K and 4,000 K
Colors	Tunable White (2,200 K - 5,000 K), RGBW (only opal optics)
CRI	95 (except at 2,200 K and 5,000 K)

Mounting All dimensions in mm.

1. Recessed with trim (driver internal)



Mounting accessories

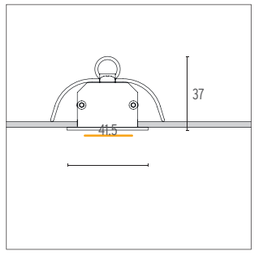
VarioClamp Contour 4262R
Art.-#: 13000080

Description

The required brackets for recessed mounting are included with the luminaire.

Example of application

2. Recessed with trim (driver external)



Mounting accessories

No additional accessories are required for this mounting option.

Description

The mounting springs are already fitted to the luminaire.

MARS ARCHITECTURAL – SURFACE NEW

The timeless design of MARS ARCHITECTURAL blends in perfectly in offices but is also a valuable solution for education facilities, retail environments, public buildings and warehouses. The very wide range of options enables almost any general lighting application.

Photo: BMLD, Barcelona

MARS ARCHITECTURAL – Surface NEW

NANO RAY

UGR <13

The versatile architectural lighting tool

True nano optics in four precise beam angles combined with an antiglare provide near invisible light and an UGR as low as < 13. An additional variant with an opal diffusor rounds off the options.

A multitude of options include several power levels and color temperatures plus options in tunable white and RGBW, as well as two form factors to choose from.

The surface-mounted luminaires are available in three housing and antiglare colors that can be freely combined. The type 62 also features magnetically fastened end caps to provide a clean finish.

reddot award 2017 winner

INNOVATIVE INTERIOR winner

LEDs MAGAZINE SAPPHIRE AWARDS 2019 FINALIST

GERMAN DESIGN AWARD 2020

www.led-linear.com/mars-arc-s

LED Linear™ GmbH

MARS ARCHITECTURAL – Surface

NEW

Technical Specifications

White

IQ White

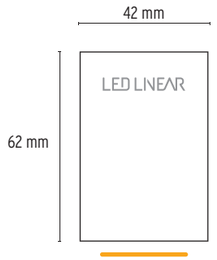
RGBW

Only MARS ARCHITECTURAL OPAL

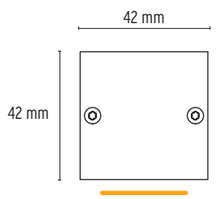
L80/B10 > 60,000 h

IP40

Type 62

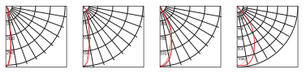


Type 42



Scale: 1:2

Nano optics

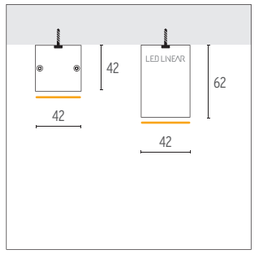


Diffusor

Cross section	42 mm x 62 mm (Type 62) / 42 mm x 42 mm (Type 42)
Length	345 mm – 3,020 mm
Power	15 W/m – 42 W/m
Luminous flux	**NANO:** up to 3.460 lm/m / **Opal:** up to 2.970 lm/m
Efficacy	**NANO:** up to 119 lm/W / **Opal:** up to 102 lm/W
Beam angle/optics	Nano optics: 15°, 25°, 40° or 65°/ Diffusor: Opal
Color temperatures	2,700 K, 3,000 K, 3,500 K and 4,000 K
Colors	Tunable White (2,200 K – 5,000 K), RGBW (only opal optics)
CRI	95 (except at 2,200 K and 5,000 K)

Mounting All dimensions in mm.

1 Surface-mounted, horizontal



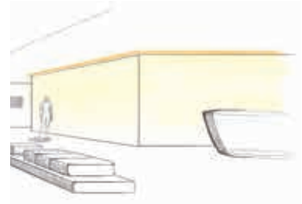
Mounting accessories

No additional accessories are required for this mounting option.

Description

Simple installation by just screw the profile onto the ceiling thanks to pre-drilled holes.

Example of application



XOOMINAIRE™ 4292 IP20 / IP40

The XOOMINAIRE™ family stands at crossroad of modularity and functionality embedded in aesthetic design. Each luminaire has its own driver on board (on/off or DALI®) and can be easily mounted in continuous line as recessed, surface, pendant or wall luminaires.

XOOMINAIRE™ 4292 IP20 / IP40

Continuous light line system

Easy fixture to fixture mounting thanks to robust mechanical connectors and through wiring system.

Magnetic end caps and tight mechanical tolerances offering a screw-free for a clean finish while avoiding any light leaks.

High efficiency reflectors with excellent glare control (UGR < 16) for task lighting and wide beam opal cover for ambient lighting applications.

XOOMINAIRE™ 4292

GERMAN DESIGN AWARD SPECIAL 2017

XOOMINAIRE™ 4262

GOOD DESIGN

German Design Award NOMINEE 2015

product design award 2014

interior innovation award 2015 Selection

www.led-linear.com/xoominaire-4292

LED Linear™ GmbH

XOOMINAIRE™ 4292 IP20 / IP40

Technical Specifications

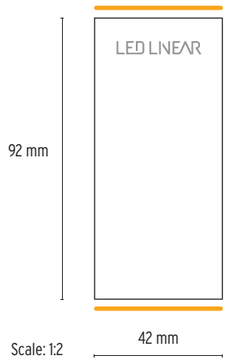
White

IQ White

on request

L80/B10
> 60,000 h

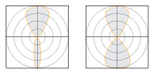
IP20/
IP40



Cover

opal

Reflector



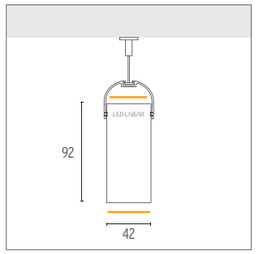
25°

65°

Cross section	42 mm x 92 mm
Length	887 mm, 1,262 mm, 1,512 mm
Power	15 – 40 W/m
Luminous flux	**Direct:** HE 1,950 lm/m, HO 2,990 lm/m, SO 4,120 lm/m (65° optics) **Indirect:** 1,400 lm/m, 2,400 lm/m (diffuse cover)
Efficacy	up to 136 lm/W @ 65° optics
Beam angle/optics	opal, 25°, 65°
Color temperatures	2,700 K, 3,000 K, 3,500 K and 4,000 K
CRI	up to 86
Control	on/off, DALI®

Mounting All dimensions in mm.

1. Pendant



Mounting accessories

VarioPendant 4292
Art.-#: 13000107

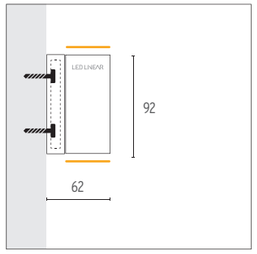
VarioCANOPY Square
Mounting set (optional)
for pendant ceiling
installations on concrete
ceilings
Art.-#: 16000347

Description

Automatically delivered with luminaires.

Example of application

2. Wall-mounted, horizontal



Mounting accessories

Wall-mounting Set 4292
Art.-#: 13000333

Description

Automatically delivered with luminaires.

Example of application

XOOLUM™ Opal Continuous IP40

XOOLUM™ Opal Continuous can be used in any general lighting application that calls for an uninterrupted dotfree lightline. Thanks to many standard variants in static white (with a CRI of up to 98), as well as tunable white and RGBW it can fulfill any requirement for a continuous light line, be it surface or pendant mounted.

XOOLUM™ Opal Continuous IP40

XOOLUM™ Opal Continuous allows uninterrupted dot free lightlines up to 15 m length.

High lumen output up to 2,560 lm/m in a minimalistic design make this luminaire a very good choice for general lighting.

XOOLUM™ Opal Continuous is available in three different variants of static white (with a CRI of up to 98), as well as color-tunable white and RGBW. It can be mounted on surfaces and as a pendant luminaire.

German Design Award NOMINEE 2013

reddot design award best of the best 2012

www.led-linear.com/xoolum

LED Linear™ GmbH

XOOLUM™ Opal Continuous IP40

Technical Specifications

White

IQ White

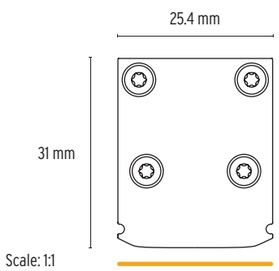
RGBW

L80/B10
> 60,000 h

IP40

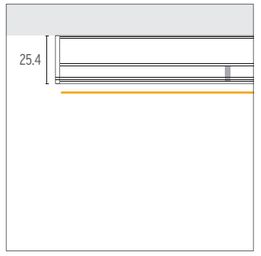
opal

Cross section	25.4 mm x 31 mm
Length	4,018 mm - 14,985 mm
Power	10 W/m - 42 W/m
Luminous flux	up to 2,410 lm/m
Efficacy	up to 66 lm/W
Beam angle/optics	Opal
Color temperatures	2,700 K, 3,000 K, 3,500 K and 4,000 K
Colors	Tunable White (HE 2,200 K - 4,000 K / HC 2,200 K - 5,000 K) and RGBW
CRI	85 - 97



Mounting All dimensions in mm.

1. Surface-mounted, Opal continuous



Mounting accessories

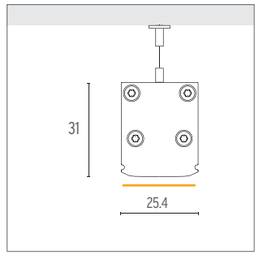
No additional accessories are required for this mounting option.

Description

Special designed mounting profile for surface-mounting options. Holes have to be drilled at site.

Example of application

2. Pendant



Mounting accessories

VarioPendant 007
Slide Silver
Art.-#: 13000157

VarioPendant 007
Slide Black
Art.-#: 13000158

VarioCANOPY Square
Mounting set (optional)
for pendant ceiling
installations on concrete
ceilings
Art.-#: 16000347

Description

Pendant set with screws for installations directly on the ceiling. 2 m Suspension is cuttable on site. Recommended to use every 1 m.

Example of application

XOOLUM™ Reflector IP20

XOOLUM™ R convinces by its high efficiency and low glare optics which keeping a compact design.

Photo: Michael Conroy

XOOLUM™ Reflector IP20

Impresses with high versatility and aluminum reflectors

High optical efficiency with a UGR < 16.

Modular mounting and lighting scenery thanks to its LEDs-Click™ technology enabling a 45° tilt of the luminaire head.

Appealing form factor of 25.4 mm by 31 mm which blends easily in any architectural concepts.

www.led-linear.com/xoolumr

LED Linear™ GmbH

XOOLUM™ Reflector IP20

Technical Specifications

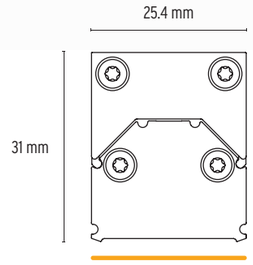
White

IQ White

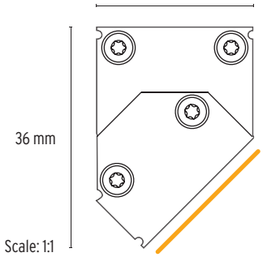
L80/B10
> 60,000 h

IP20

0° tilt



45° tilt



0° tilt

Deep wide 65°

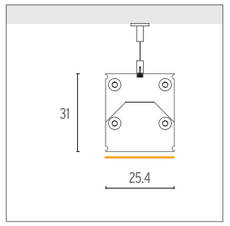
45° tilt

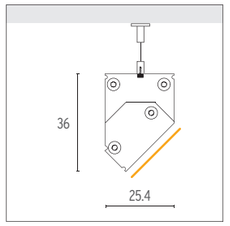
Deep wide 65°

Cross section	25.4 mm x 31 mm / 25.4 mm x 36 mm
Length	135 mm - 4,010 mm
Power	5 W/m - 40 W/m
Luminous flux	360 lm/m - 3,710 lm/m
Efficacy	up to 122 lm/W
Beam angle/optics	65° Reflector
Color temperatures	2,000 K, 2,200 K, 2,500 K, 2,700 K, 3,000 K, 3,500 K, 4,000 K and 5,000 K
Colors	Tunable White (HE: 2,500 K - 4,000 K / HC: 2,200 K - 5,000 K / UHC: 2,700 K - 6,500 K)
CRI	85 - 98

Mounting All dimensions in mm.

1. Pendant





Mounting accessories

VarioPendant 007 Slide Silver
Art.-#: 13000157

VarioPendant 007 Slide Black
Art.-#: 13000158

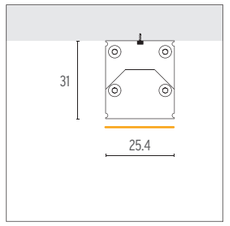
VarioCANOPY Square Mounting set (optional) for pendant ceiling installations on concrete ceilings
Art.-#: 16000347

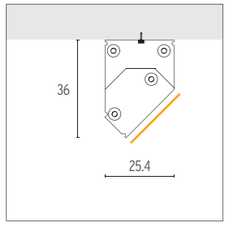
Description

Pendant set with screws for installations directly on the ceiling. 2 m Suspension is cuttable on site. Recommended to use two suspensions per meter..

Example of application

2. Surface-mounted, fixed





Mounting accessories

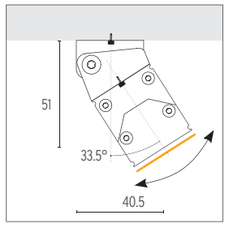
No additional accessories are required for this mounting option.

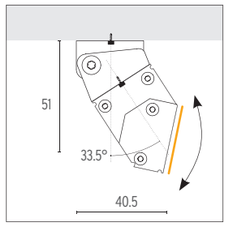
Description

Special designed mounting profile for surface-mounting options. Holes have to be drilled at site.

Example of application

3. Surface-mounted, adjustable





Mounting accessories

XOOLUM™ 007 Swivel-Angle Set +/- 45°
Art.-#: 13000081

Description

Adjustable clip for extra 45° tilt.

COVE

Lighting system optimized for soft cove lighting effect and tool-free installation.
Further lighting solutions for cove can be configured in the allrounder section or flexible light engine (Tape) and Profol and Cover System (Mix & Match).

XOOLINE™ HYDRA White IP40 | Seite 122

XOOCOVE | Page 170

NEW

Power (W/m)	Luminous flux (lm/m)	CRI	CCT (Kelvin)	Length (mm)
5 - 24	440 - 2,580	85 - 92	2,700 - 4,000	260 - 2,510

XOOCOVE is a smart solution developed specifically for cove applications. It is quick and easy to install without the need for tools.

XOOLINE™ IP40 | Page 114

NEW

Power (W/m)	Luminous flux (lm/m)	CRI	CCT (Kelvin)	Length (mm)
4 - 42	90 - 3,820	85 - 98	2,200 - 5,000	380 - 3,014

Minimalistic modular surface mount luminaire with up to 10 different optics available for any application, cabling solutions for continuous runs and a large choice of mounting accessories.

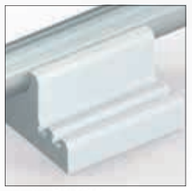
XOOCOVE NEW

The luminaire is specifically designed for cove applications and toolless installation. XOOCOVE is available with two different light engines, with a focus either on high efficiency or high CRI. The fixture can be freely rotated to any orientation, making it easy to adapt to the dimensions of the cove and the desired effect.

Photo: Andy Stagg

XOOCOVE NEW

The easy system to master cove applications



The silicone pads allow toolless installation and angle adjustability of the luminaires. The cables are tidied away in the silicone pad's holding grooves for clean cable management. There are also clips available for vertical surfaces.

A bus cable is placed in the cove that allows up to 11 m of fixtures to be powered by a single feed. Piercing connectors are set wherever required to supply individual luminaires.

Available with diffuse cover or 60° linear lens. Translucent end caps ensure cove homogeneity by prohibiting light gaps and dark spots.

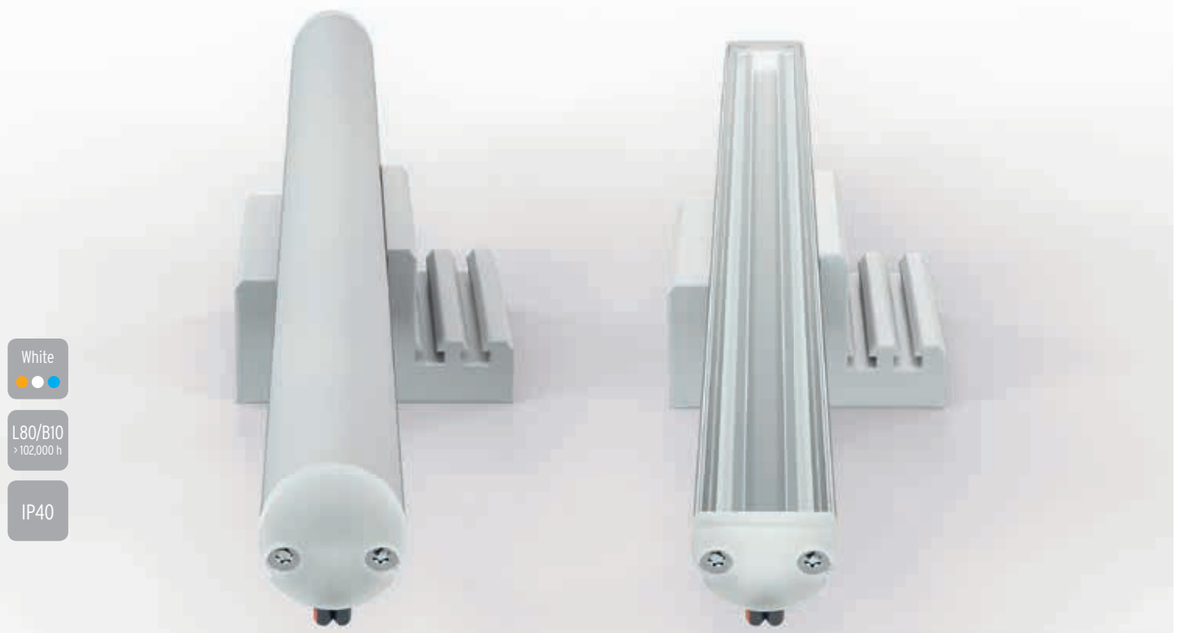
GERMAN DESIGN AWARD 2020

www.led-linear.com/xoocove

LED Linear™ GmbH

XOOCOVE NEW

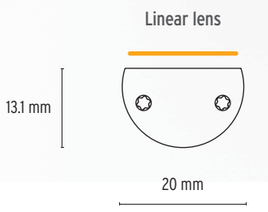
Technical Specifications

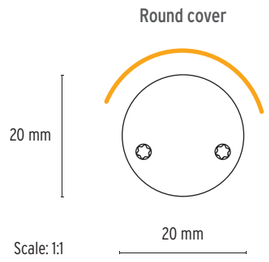


White

L80/B10
> 102,000 h

IP40





Linear lens

60°

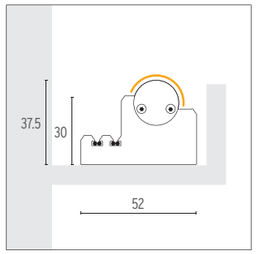
Round cover

diffuse

Cross section	20 mm diameter
Length	up to 2,510 mm
Power	5 W/m - 24 W/m
Luminous flux	up to 2,580 lm/m
Efficacy	up to 129 lm/W
Beam angle/optics	60° oder Round diffuse
Color temperatures	2,700 K, 3,000 K and 4,000 K
CRI	85 - 92

Mounting All dimensions in mm.

1. Tool-free mounting with pads



Mounting accessories

XOOCOVE Silicon mounting pad, white
Silicon, 40 +5° Shore A, L = 50 mm
Digits in order code: SPA

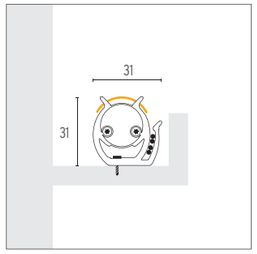
Description

On flat surfaces the silicone pads allow toolless installation and angle adjustability of the luminaires. The cables are tidied away in the silicone pad's holding grooves for clean cable management. The pads require an internal cove width of at least 55 mm.

A sufficient number of pads are delivered together with the fixture when chosen as part of the order code.

Example of application

2. Mounting with clips (any surface)



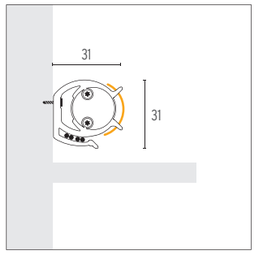
Mounting accessories

VarioClip XOOCOVE, black
Digits in order code: PCL

Description

The clip can be screwed to any surface and allows installations where the silicone pads can't be used. It likewise allows the angle of the luminaires to be adjusted. Little side clips can take the cables for clean cable management. The clips require an internal cove width of at least 35 mm.

A sufficient number of clips are delivered together with the fixture when chosen as part of the order code.



WALL WASH

Slim and discrete surface mount wall-washer using a specular aluminum reflector tilted by 45° making the light source disappearing.

XOOLUM™ R WW IP20 | Page 160

MARS Wall Wash IP20 | Page 170

Power (W)	**Luminous flux** (lm/m)	**CRI**	**CCT** (Kelvin)	**Length** (mm)
8 - 46	350 - 3,490	90	2,200 - 5,000	180 - 980

MARS Wall Wash is a high end wall washer with a possible lumen output of 3,490 lm/m combined with a color temperature ranging between 2,200 K to 5,000 K.

XOOLUM™ Reflector Wall Wash IP20 | Page 174

Power (W/m)	**Luminous flux** (lm/m)	**CRI**	**CCT** (Kelvin)	**Length** (mm)
5 - 40	350 - 3,770	85 - 98	2,000 - 5,000	135 - 4,010

Surface mount wall washer with small form factor using specular reflector offering a variety of lumen outputs from 350 lm/m up to 3,770 lm/m and CCTs.

MARS Wall Wash IP20

MARS Wall Wash IP20 is a luminaire designed at its core for wall washing applications. A minimalistic and tight design adds aesthetical dimensions to any project and enables installations close to the illuminated target.

MARS Wall Wash IP20

Light where it is meant to be

MARS Wall Wash is equipped with Bartenbach reflectors which enable a precise cut off and perfect homogeneity.

Outstanding CRI up to 90 and low glare.

Minimally invasive (only 10 mm) and possibility to install close to the target.

www.led-linear.com/marsww

LED Linear™ GmbH

MARS Wall Wash IP20

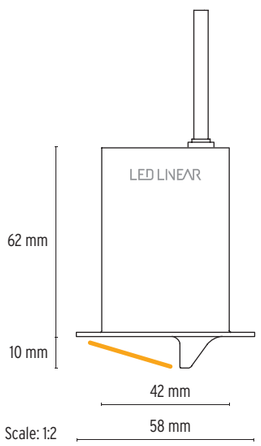
Technical Specifications

White

IQ White

L80/B10
> 60,000 h

IP20

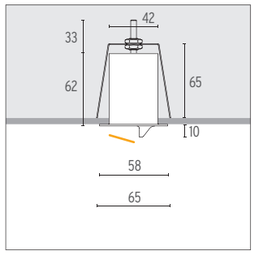


Wall wash reflector (Bartenbach®)

Cross section	42 mm x 72 mm
Length	180 mm - 980 mm
Power	8 W - 46 W
Luminous flux	up to 3,490 lm/m (Tunable White: up to 3,970 lm/m)
Efficacy	90 lm/W
Beam angle/optics	Wall wash
Color temperatures	2,200 K, 2,700 K, 3,000 K, 3,500 K, 4,000 K and 5,000 K
Colors	Tunable White (2,200 K - 4,000 K)
CRI	up to 90

Mounting All dimensions in mm.

1. Recessed



Mounting accessories

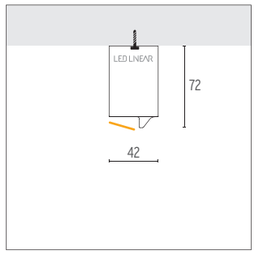
VarioClamp
Art.-#: 13000080

Description

Pre-drilled holes on the backside of the profile for a simple screw connection between clamp and profile.

Example of application

2. Surface-mounted, horizontal



Mounting accessories

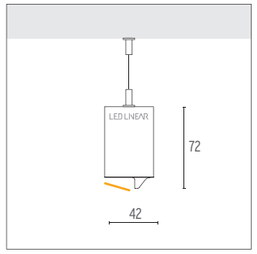
No additional accessories are required for this mounting option.

Description

Simple installation by just screw the profile onto the ceiling thanks to pre-drilled holes.

Example of application

3. Pendant



Mounting accessories

VarioPendant 4262
Art.-#: 13000106

VarioCANOPY Square
Mounting set (optional) for pendant ceiling installations on concrete ceilings
Art.-#: 16000347

Description

Pendant set with 2 m wire.
Recommended to use two times a meter.

Example of application

XOOLUM™ Reflector Wall Wash IP20

Slim and discrete surface mount wall-washer using a specular aluminum reflector tilted by 45° making the light source disappearing.

XOOLUM™ Reflector Wall Wash IP20

Smart solution for invisible wall washing

Alanod reflector technology for an excellent color mixing and homogeneous wall wash effect.

Large offer of lumen outputs and CCTs with an outstanding efficiency of 94%.

Compact design and simple surface mounting enabling a discrete installation in the ceiling.

German Design Award NOMINEE 2013

reddot design award best of the best 2012

www.led-linear.com/xoolumr

LED Linear™ GmbH

XOOLUM™ Reflector Wall Wash IP20

Technical Specifications

White

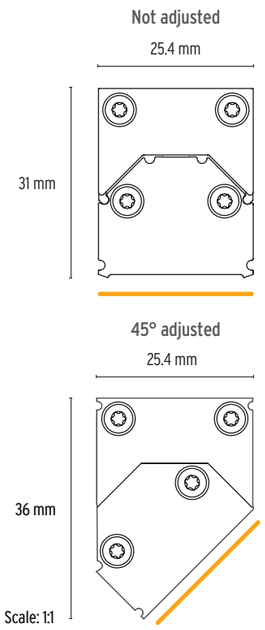
IQ White

RGB

L80/B10 > 60,000 h — White / IQ White

L80 > 30,000 h — RGB

IP20



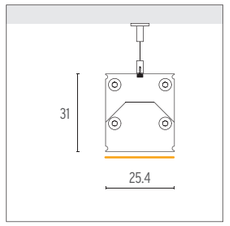
Wall wash

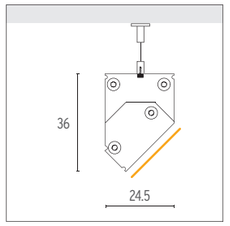
Cross section	25.4 mm x 36 mm
Length	135 mm - 4, 010 mm
Power	5 W/m - 40 W/m
Luminous flux	350 lm/m - 3,770 lm/m
Efficacy	up to 128 lm/W
Beam angle/optics	Wall Wash
Color temperatures	2,000 K, 2,200 K, 2,500 K, 2,700 K, 3,000 K, 3,500 K, 4,000 K and 5,000 K
Colors	Tunable White (HE: 2.500 K - 4.000 K, HC: 2.200 K - 5.000 K, UHC: 2.700 K - 6.500 K), RGB
CRI	up to 96

Mounting

All dimensions in mm.

1. Pendant





Mounting accessories

VarioPendant 007
Slide Silver
Art.-#: 13000157

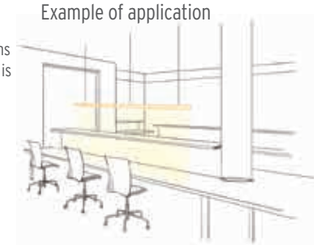
VarioPendant 007
Slide Black
Art.-#: 13000158

VarioCANOPY Square
Mounting set (optional)
for pendant ceiling
installations on concrete
ceilings
Art.-#: 16000347

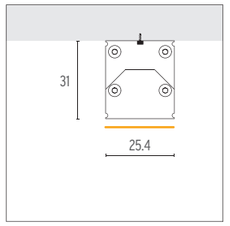
Description

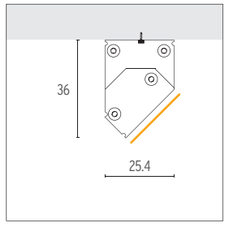
Pendant set with screws for installations directly on the ceiling. 2 m Suspension is cuttable on site. Recommended to use two suspensions per meter.

Example of application



2. Surface-mounted, fixed





Mounting accessories

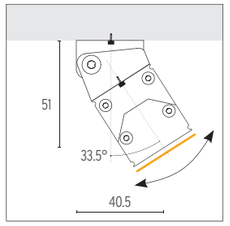
No additional accessories are required for this mounting option.

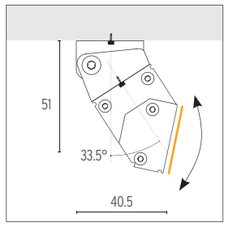
Description

Special designed mounting profile for surface-mounting options. Holes have to be drilled at site.

Example of application

3. Surface-mounted, adjustable





Mounting accessories

XOOLUM™ 007 Swivel-
Angle Set +/- 45°
Art.-#: 13000081

Description

Adjustable clip for extra 45° tilt.

FLEXIBLE LIGHT ENGINE

The core of LED Linear™ technology.
A collection of static white, tunable white and color dynamic solutions produced in Germany with cutting edge components and production line technologies.
The tape can be found in our luminaires or can be easily combined with LED Linear™ profile and cover system, Mix & Match, to address any linear lighting application.

Photo: Daniel Kessler, Zurich

LED LINEAR™ TECHNOLOGY

High quality components & smart design

LED

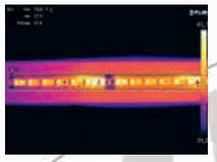
Each LED series implemented is carefully selected based on it's performance, the tolerances of the 3 Step MacAdams binning as well as the lumen maintenance and color consistency stability.

ELECTRONIC DESIGN

Each step embeds an active current regulation operated by a dedicated integrated circuit (ICs) which ensures homogeneous light intensity all along the tape length. The positioning of each component is optimized to have all LEDs at the same temperature level. Finally, the components are specified to support PWM dimming at frequencies above the flicker threshold defined by IEEE P1789 standard.

THERMAL MANAGEMENT

LED Linear™ Tj Away® thin flexible circuit board technology offers an optimal heat dissipation (junction to heat sink) which guarantees an optimal cooling of the LEDs to enable outstanding lifetime and color consistency ratings.



ADHESIVE TAPE

Adhesive tapes from 3M or Nitto featuring high thermal conductivity and resistance to harsh environments for an easy and robust mounting.

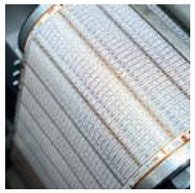
PHOTON+ TECHNOLOGY

The Photon+ technology enables the combination of very high color rendering values (CRI > 95, R9 up to 90) with very high efficiency values up to 145 lm/W on LED strips equipped with Photon+.

Automated production and quality control

REEL TO REEL (R2R) PRODUCTION

All the components are assembled using state of the art Reel to Reel (R2R) automated production lines installed at LED Linear's production site in Germany.



AUTOMATED IN-LINE TEST

Several electrical and visual automated tests are performed in order to ensure the quality of each solder points and the accuracy of the components position.

TRACEABILITY

Each production lot receives a unique QR-code linked to a database enabling full transparency on the production date and time and components batch.

FLEX LED TAPE – STATIC WHITE

HYDRA ECO SW NEW

The new HYDRA ECO series is our new basis level light engine which includes single-channel, dimmable strips for 24 V constant voltage, based on the improved successful technologies of the previous models (OneBinOnly, Tj Away®, Reel-2-Reel technology).

All HYDRA ECO series tapes are equipped with a high quality double sided adhesive tape on the back.

L80/B10 > 60,000 h | Wxxx/ 339 | White

Color vector graphic

Reference illuminant — Test source

Color distorsion graphic

R_f 87
R_g 97
92
R9 60

2200 | 2500 | 2700 | 3000 | 3500 | 4000 | 5000 Kelvin

ECO - Economical / 8.33 mm LED pitch

50 mm

Watts per meter (W/m)

4 W/m — 42 W/m

7 W/m 24

Lumens per meter (lm/m)

200 lm/m — 5.000 lm/m

680 lm/m 2,620

HYDRA PRO SW NEW

Our new HYDRA PRO series includes single-channel, dimmable strips for constant voltage, based on the improved successful technologies of the previous model (OneBinOnly, Tj Away®, Reel-2-Reel technology).

All HYDRA PRO series tapes are equipped with a high quality double sided adhesive tape on the back.

L80/B10 > 60,000 h | Wxxx/ 339 | White

R_f 91
R_g 101
94
R9 74

2700 | 3000 | 3500 | 4000 | 5000 Kelvin

PRO - Professional / 8.93 mm LED pitch

62.5 mm

4 W/m — 42 W/m

4 W/m 35

200 lm/m — 5.000 lm/m

380 lm/m 4,170

HYDRA EXL SW NEW

As the latest generation of our single-channel and dimmable 24 V constant voltage LED strips, the HYDRA EXL series sets new standards in efficiency for indoor LED tapes. Equipped with the latest generation of high-quality Japanese 3030 LEDs, which in combination with our new "Photon+ tbd" technology, offer very high efficiency combined with very high color rendering.

Consistent with the previous HYDRA generation, our top features such as OneBinOnly, Tj Away® and the production in the most modern Reel-to-Reel (R2R) technology remain in an improved form in the HYDRA EXL series, which leads to an improved lifetime of the HYDRA EXL series from L90/B10 > 60,000 hrs.

L90/B10 > 60,000 h | Wxxx/ 339 | White | photon +

R_f 91
R_g 101
97
R9 90

2700 | 3000 | 3500 | 4000 | 5000 Kelvin

EXL - Excellence / 8.93 mm LED pitch

62.5 mm

4 W/m — 42 W/m

4 W/m 32

200 lm/m — 5.000 lm/m

470 lm/m 4.200

FLEX LED TAPE – STATIC WHITE

VarioLED™ Flex SOL

Award winning full spectrum LEDs providing the industry's closest match to both the sun and incandescent spectrums - Ideal for applications requiring outstanding color rendition or Human Centric Lighting (HCL).

L80/B10 › 60,000 h | Wxxx/339 | White

Farbwiedergabegrafik
Referenzlichtquelle — Testlichtquelle

Farbverfälschungsgrafik

R_f	96
R_g	101
	98
R9	90

2700 | 3000 | 3500 | 4000 | 5000 Kelvin

LD - Low density / 17.86 mm LED pitch

125 mm

HD - High density / 8.93 mm LED pitch

62.5 mm

Watts per meter (W/m)

5 W/m — 42 W/m
15 W/m 25

5 W/m — 42 W/m
15 W/m 36

Lumens per meter (lm/m)

530 lm/m
1,640 lm/m 2,670

530 lm/m
1,640 lm/m 3,900

VarioLED™ Flex LINUS+

High color rendition 3030 LEDs with tight pitch and short cut length. Perfect for applications where lighting quality is of great importance, good price/performance ratio.

L80/B10 › 60,000 h | Wxxx/339 | White

R_f	89
R_g	103
	93
R9	66

2700 | 3000 | 3500 | 4000 Kelvin

HD - High density / 8.3 mm LED pitch

25 mm

5 W/m — 42 W/m
10 W/m 42

530 lm/m
1,080 lm/m 4,110

FLEX LED TAPE – TUNABLE WHITE

VarioLED™ Flex IQ White SOL

Award winning full spectrum LEDs providing the industry's closest match to both the sun and incandescent spectrums - Ideal for applications requiring outstanding color rendition and large CCT tuning range.

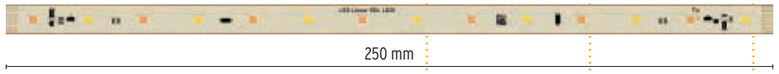
98
R9 95

L80/B10 > 60,000 h | Wxxx/ 339 | IQ White

2700 – 6500 Kelvin

Watts per meter (W/m) | **Lumens per meter** (lm/m)

LD - Low density / 17.86 mm LED pitch



250 mm

5 W/m – **42** W/m | 530 lm/m

20 W/m | 2,120 lm/m

VarioLED™ Flex IQ White NEXUS

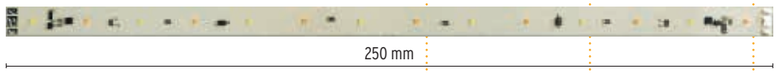
Chip Scale Package (CSP) LEDs with outstanding thermal and color over angle performances - Ideal for applications requiring excellent color rendition and large tuning range.

85
R9 71

L80/B10 > 60,000 h | Wxxx/ 339 | IQ White

2200 – 5000 Kelvin

LD - Low density / 17.86 mm LED pitch



250 mm

HD - High density / 8.93 mm LED pitch

62.5 mm

5 W/m – **42** W/m | 530 lm/m

LD 40 W/m | 3,940 lm/m

HD 12 W/m 42 | 1,310 lm/m 4,880

VarioLED™ Flex IQ White HYDRA

High quality 3030 package LEDs for the LD version and 2016 package for the HD version. Versatile light source offering high efficiency and reliability. Ideal for applications requiring a tuning span close to the Planckian locus.

95
R9 76

L80/B10 > 60,000 h | Wxxx/ 339 | IQ White

2500 – 4000 Kelvin

2200 – 4000 Kelvin

LD - Low density / 17.86 mm LED pitch

250 mm

HD - High density / 8.93 mm LED pitch

62.5 mm

5 W/m – 42 W/m | 530 lm/m

LD 25 W/m | 3,010 lm/m

HD 12 W/m 24 | 1,290 lm/m 2,760 lm/m

FLEX LED TAPE – RGBW, RGB & STATIC COLOR

VarioLED™ Flex RGBW

High-end Japanese RGB LEDs combined with white CSP LEDs - Ideal for color dynamic application (Dim to Warm, pastel tones, etc.) with excellent color rendition and high power levels.

L80/B10 > 60,000 h | L80 > 30,000 h | RGBW

95 | R9 85

3000 | 4000 Kelvin

13.88 mm LED pitch

83.33 mm

Watts per meter (W/m) | **Lumens per meter** (lm/m)

5 W/m – 42 W/m | 20 W/m 40 | 530 lm/m | 1,430 | 2,220

VarioLED™ Flex RGB

High-end Japanese RGB LEDs - Ideal for decorative color dynamic applications.

L80/B10 > 60,000 h | RGB

LD - Low density / 20.83 mm LED pitch

125 mm

HD - High density / 10.4 mm LED pitch

62.5 mm

5 W/m – 42 W/m | 15 W/m | 530 lm/m | 672

10 W/m 20 | 544 | 1,016

VarioLED™ Flex ECO Color P12

Quality 2835 LED package for static color provides atmospheric light and color accents for every application. Three color options red, green and blue high quality mono tapes.

L80/B10 > 50,000 h | Wxxx/339 | Color

Red (R) | Green (G) | Blue (B)

HD - High density / 11,66 mm LED pitch

70 mm

5 W/m – 42 W/m | 10 W/m | 530 lm/m | 980

APPLICATIONS – OVERVIEW

		General Lighting (direct) Functional and homogeneous lighting fixture	Cove Lighting (indirect) Low density pitch homogeneous light output	Decorative Lighting Option to adjust the color temperature to different scenarios	Task Lighting Higher color rendering and homogeneous light output	Retail Good color rendering with option to adjust the color temperature to different scenarios	Furniture Lighting High color rendering and high density pitch to adjust the length to the furniture	Museum Excellent color rendering for the artwork and option the create different moods	Food Great color rendering to stage the food	Outdoor (IP67) Option to have the tape encapsulated
STATIC WHITE	HYDRA ECO SW NEW	✓			✓	✓	✓	✓	✓	✓
	HYDRA EXL SW NEW	✓			✓	✓	✓		✓	✓
	HYDRA PRO SW NEW	✓			✓	✓	✓			
	VarioLED™ Flex SOL LD		✓					✓	✓	
	VarioLED™ Flex SOL HD	✓			✓		✓	✓		
	VarioLED™ Flex LINUS+ HD	✓			✓	✓	✓		✓	✓
TUNABLE WHITE	VarioLED™ Flex IQ White SOL LD		✓	✓				✓	✓	
	VarioLED™ Flex IQ White NEXUS LD		✓	✓		✓		✓	✓	
	VarioLED™ Flex IQ White NEXUS HD	✓		✓	✓	✓	✓	✓		
	VarioLED™ Flex IQ White HYDRA LD		✓	✓						✓
	VarioLED™ Flex IQ White HYDRA HD		✓	✓						✓
RGBW	VarioLED™ Flex RGBW HD	✓	✓	✓			✓			
RGB	VarioLED™ Flex RGB LD		✓	✓						✓
	VarioLED™ Flex RGB HD	✓		✓			✓			✓
STATIC COLOR	VarioLED™ Flex ECO Color P12		✓	✓						✓

MIX & MATCH

TAPE – PROFILE – COVER – MOUNTING – ACCESSORIES

Mix & Match complement LED Linears premium lighting solution by offering a DIY toll box which enables the integration of LED tapes in user defined luminaires. A large range of small and yet functional profile, covers and mounting options allows the configuration of individual luminaires to suit perfectly the desired application.

Photo: Steinitz Lirad

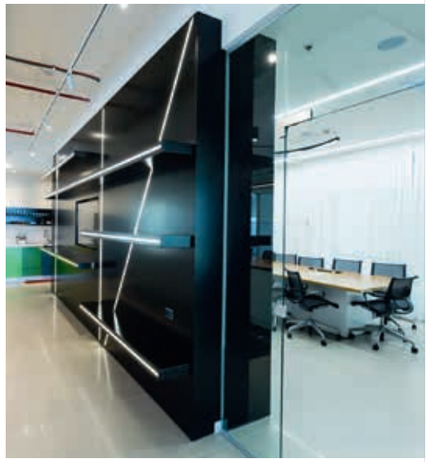
To specify out of the Mix & Match portfolio
please try out our online configurator
www.led-linear.com/mix&match/

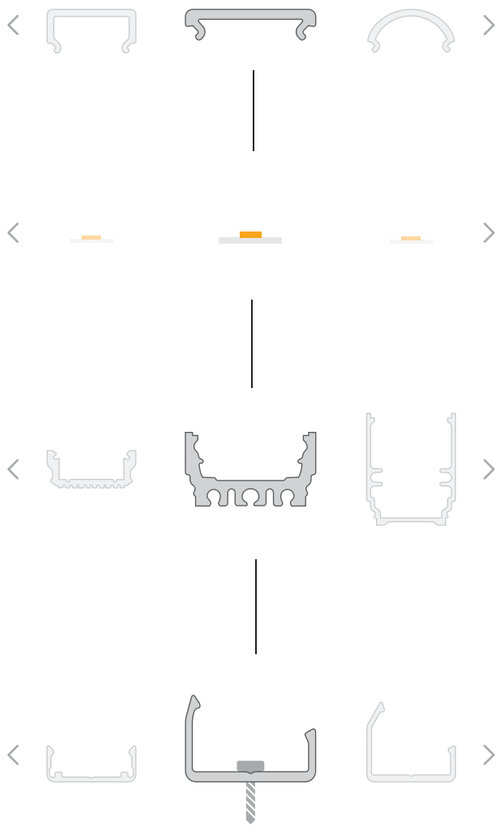
MIX & MATCH

Tape - Profile - Cover - Mounting - Accessories

This portfolio offers over 600,000 possible combinations. For example indirect and direct lighting, corner and shlef lighting, or recessed lighting. The delivery as Do It Yourself Kit in standard lengths to be cut on site makes this portfolio even more flexible and individual. With our new configurator you can start where you want to configure you own lighting fixture.

The light is with you!





COVER

You can choose between different cover forms - Round, High², Low² in opal for wide beam spread and homogenous ligh lines or diffuse for indirect lighting or higher efficiency.

LED TAPE

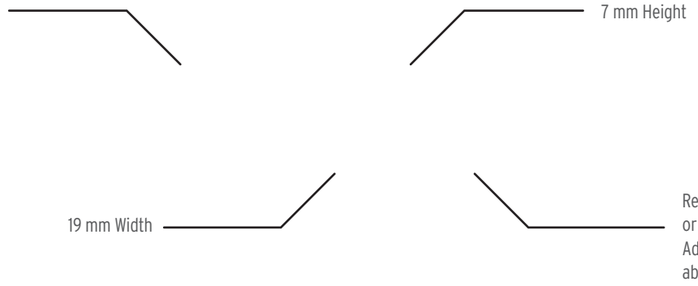
Choose among the large range of LED Linear's state oft he art LED tape portfolio: VarioLED™ Flex or LUMINARIS ECO.

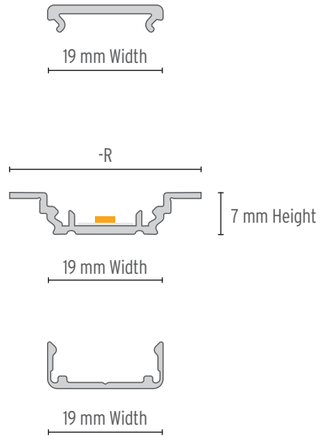
PROFILE

A new range of highly functional aluminum profiles with hight tolerances for a clean design and a nice finish, in combination with LED Linears Tj Away®, an optimal hear management to achieve durable luminaires.

MOUNTING

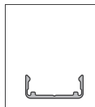
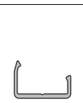
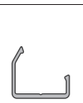
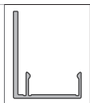
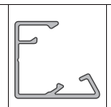
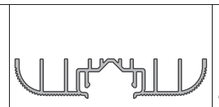
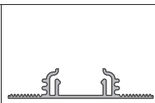
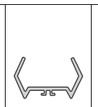
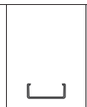
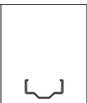
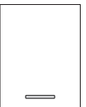
To enable flexibility and individuality in the combinations multiple mounting options are available for each profile to address multiple types of mounting and applications.





To provide easy access and understanding of the possible combinations of different parts, the term contains a lot of information. The first numbers provide information about the width of the cover, the profile or mounting accessories and indicate whether the parts fit together.
This system gives us different product lines that can be freely combined with their covers and clips. An overview can be found on the following page.

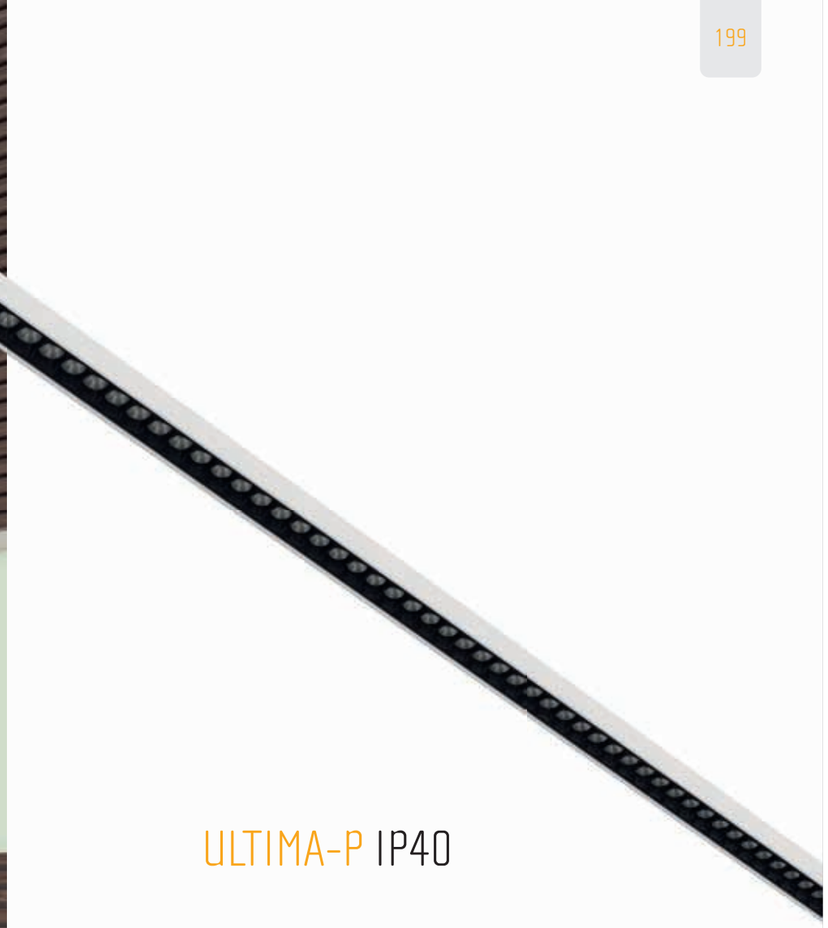
PORTFOLIO OVERVIEW

				MOUNTING																
				VarioClip	19 0°	19 15°	19 30°	19 45°	19 Plastic		19 Wall-Mount	19 60°	1907-R Corner	1508 Trimless DRY	1508 PVC	1512-R Mounting Spring	1508 0°	12 0°	12 0° Cone	Adhesive Tape
					Clip / Profile	Clip	Clip	Clip	Clip		Profile	Profile	Profile	Profile	Profile	Clip	Clip	Clip	Clip	
					Recessed	Recessed	Recessed	Recessed						Recessed	Recessed	Recessed	Recessed	Recessed	Recessed	Recessed
COVER		**PROFILE**			Surface	Surface	Surface	Surface	Surface		Surface	Surface	Surface				Surface	Surface	Surface	Surface
Artikelnummer					10000039-2m (Profile) 10000040 (Clip)	10000040-15D	10000040-30D	10000040-45D	13000032		13000319	10000500	13000320	10000580-W	10000534	10000597-SCH	13000318	13000316	13000315	18200128
Opal	Diffuse	VarioContour	Article number	Max. Wattage W/m																
12000011	12000014	 1907-R	10000506 10000506-RAL9003 10000506-SCH	25	✓	✓	✓	✓	✓				✓							✓
		 1908	10000038	25	✓	✓	✓	✓	✓											✓
12000012	12000015	 1911	10000300	30	✓	✓	✓	✓	✓			✓								✓
12000013	12000016	 1924	10000533	25	✓	✓	✓	✓	✓		✓									✓
12000055	-	 1508	10000537	20										✓	✓		✓			✓
		 1512-R	10000535-RAL9003 10000535-SCH-FS	25												✓				✓
12000057	-	 1207	10000583	20														✓	✓	✓
		 1212	10000585	20														✓	✓	✓
		 1212-R	10000587-W	20														✓	✓	✓

DESIGN LUMINAIRES

Photo: Pirjo Lindfors

LED Linear™ GmbH



ULTIMA-P IP40

- Extremely small for a pendant luminaire, especially when considering the built-in optical technology and an output of up to 1,710 lm/m.
- The elegant brown leather loops with a rivet fit perfectly into the material mix of the luminaire.
- Standard includes multiple variations like 40° or 60°, Batwing and opal optics; 4 different color temperatures as well as 6 different housing/anti-glare color combinations.

For ULTIMA family

SAPPHIRE AWARDS 2021 Winner

BUILD BACK BETTER GOLD

GERMAN INNOVATION AWARD '21 WINNER

reddot winner 2020 lighting design

GERMAN DESIGN AWARD WINNER 2021

GERMAN DESIGN AWARD SPECIAL 2021

LED Linear™ GmbH

LYRA ECLIPSE

Poetic dance of light and darkness.
An elegant circular pendant luminaire with inner lighting.
An eye-catcher in every lounge, mall or lobby.

- Small cross section with minimal pendant and supply cable for a refined design with clean finish.
- Available in 806 mm or 1,164 mm diameter.
- Various lumen outputs up to 4,950 lm.

XOOTUBE™

XOOTUBE™ - the round pendant luminaire for decorative or general lighting applications, also available as wall/surface variant.
Light engines include static white, tunable white and RGB.

- XOOTUBE™ outputs absolutely homogeneous light in all directions. Different lumen packages allow both decorative as well as general lighting.
- The round design reminiscing of fluorescent tubes offers a tool for decorative installations seemingly floating in the air.
- The surface mounted version can be installed on ceilings and walls in any orientation. Thanks to its shape it also casts light on the surface it is installed on.

LED Linear™ GmbH

TECHNICAL APPENDIX
202 – 231

GENERAL REFERENCES AND PRODUCT SPECIFIC INFORMATION

Trademarks and copyrights

LED Linear™ owns a broad portfolio of patents and trademarks for products manufactured by LED Linear™:
10 2008 016 697.9, PCT/EP 2009/002337, 10 709957.4-2307, PCT/EP 2010/000873, 10 709957.4, 10 2009 008 947.0, 10 2013 0052 30.0, 14001131.3, 50 2014 000 472.7, 2784373, 14/226877, 10 2012 013 332.4, 13 002 863.2, 13/932125, 10 201 301 7229.2, 102015001552.4, 20 2009 002 127.0, 20 2016 001 608.4, 20 2014 010 697.5, 2784373, 14/226877, 9,638,380, 13/307174, 20 2011 104 303, 20 2012 006 443.6, 202014002719.6, 002 069 351-01 bis -06, 402016000344.2, 29/469740, 402015000225.7-0001, 402015000225.7-0002, 402015000225.7-0003, 402015000225.7-0004, 402015000163-0001-0037, 402015000163-0002, 402015000163-0003, 402015000163-0004, 402015000163-0005, 402015000163-0006, 402015000163-0007, 402015000163-0008, 402015000163-0009, 402015000163-0010, 402015000163-0011, 402015000163-0012, 402015000163-0013, 402015000163-0014, 402015000163-0015, 402015000163-0016, 402015000163-0017, 402015000163-0018, 402015000163-0019, 402015000163-0020, 402015000163-0021, 402015000163-0022, 402015000163-0023, 402015000163-0024, 402015000163-0025, 402015000163-0026, 402015000163-0027, 402015000163-0028, 402015000163-0029, 402015000163-0030, 402015000163-0031, 402015000163-0032, 402015000163-0033, 402015000163-0034, 402015000163-0035, 402015000163-0036, 402015000163-0037, 402014000778.7, 29/325,374, 633,244, 000906235-0001, 000906235-0002, 000906235-0003, 000906235-0004, 000906235-0005, 29/469740, 001367676-0001, 001367676-0002, 001367676-0003, 001367676-0004, 001367676-0005, 001367676-0006, 001367676-0007, 001367676-0008, 001367676-0009, 001367676-0010, 001367676-0011, 001367676-0012, 001367676-0013, 003782267-0014, 004378610-0001, 004378610-0002, 004378610-0003, 004378610-0004, 004378610-0005, 004378610-0006, 004378610-0007, 004378610-0008, 004378610-0009, 004378610-0010, 004378610-0011, 30 2008 020 979, 007219959, 30 2012 000 809, 30 2012 000 809.7/09, 1132601, 4.374.183, T1215964J, 30 2012 000 808.9/09, 1132600, T1215963B, 4.374.182, 79/119246, 30703381.3/09, 010027605, 1 102 872, 4,223,847, 79/107,641, T1200414J, 30 2011 028 727.9, T1112330H, 30 2010 057 680, 009903031, 4,156,313, 79/101,490, 1087873, 011065521, 011065513, 1512875, 1667663, 1691606, 1691609, 014961866, 1324479, 79198575, 1817269, 1821273, 011134996, 86/163695, 011415254, 4,986,108, 85/907705, 011415247, 5202489 85/953460, 011415239, 4458185, 85/907763, 011712429, 4998535, 85/883530, 86/036,654, 012152088, 86/129857, 012149621, 86/129781, 012318341, 86/136044, 012149613, 86/129704, 012318333, 4,746,032, 86/135731

General references

This catalogue supersedes all previous issues. We reserve the right to make technical and design changes to improve our products or to meet modified statutory requirements. Current data will be supplied on request. Our continually updated product documentation can be accessed at **www.led-linear.com**.
When assembling all applicable rules and regulations must be followed, i. e. the low Voltage Directive and the relevant norms and standards.
LED Linear™ luminaires are designed, manufactured and tested to the applicable standards and technical regulations of the VDE. The luminous flux values and other photometric data relate to an ambient temperature of 25°C. At other temperatures, deviations from the values stated in the catalogue are possible.
LED Linear™ reserves the right to discontinue any products from its collection at any time whatsoever and without prior notice, without prejudice to the essential characteristics of the models described; LED Linear™ also reserves the right to make technical and photometric modifications as well as to change any parts, details or finishes deemed suitable for improvement purposes or due to construction and commercial requirements.

Details regarding catalogue changes, min. and max. data sheet values and production tolerances

Changes

The values on this data sheet and catalogue can be changed because of technical development and innovation without a special notification.

Min. and max. ratings

Exceeding the minimum and maximum ratings as per data sheet will reduce lifetime or destroy the LED module. According to EN 60598-1, respectively UL 2108 and UL 8750 for North America the temperature of the LED module needs to be measured at the TC-point in a thermally constant status with a temperature sensor or temperature sensitive label (available at e. g. www.rs-components.com).

Production tolerances

Due to the specific conditions of the manufacturing process of LED the typical data of technical parameters in the respective data sheet only reflects statistical figures not necessarily correspond to the actual parameters of every single product which could defer from the technical data.

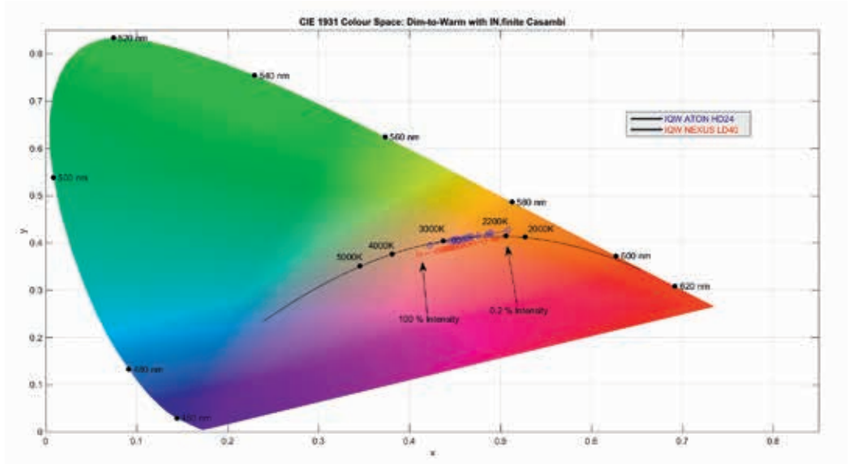
DIM-TO-WARM

"Dim-to-warm" describes the change in color temperature to the reddish area of the CIE (x, y) diagram of a luminaire during dimming. Well-known is this dimming behavior of thermal radiators such as incandescent or halogen lamps. As incandescent and halogen lamps are working with a glowing Wolfram wire. While dimming the wire glows less and less and is getting more reddish, as less current flows through it.

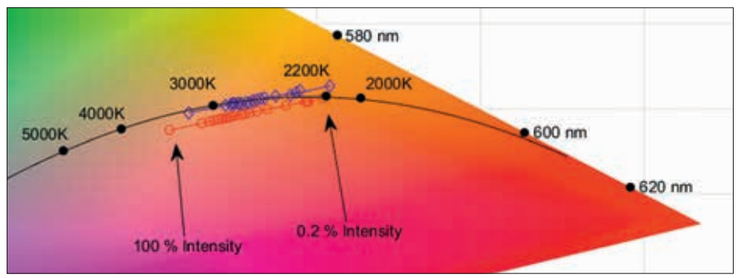
With the IN.finite™ CASAMBI control unit developed by LED Linear™, it is possible to mimic this dimming behavior of thermal radiators. This dimming feature is perceived as pleasant from a historical perspective. IN.finite™ CASAMBI controls warm and cold white LED modules in intensity so that the color temperature during dimming resembles a black body. The special feature is the color temperature shift towards longer wavelengths (= red shift) when dimming. The black body curve represents the ideal color temperature profile for white light and serves as a guideline at the same time.

By mixing cold white and warm white LEDs, each with a color temperature of approx. 5,000 K or 2,000 K, the resulting correlated color temperature can be specifically influenced. The IN.finite™ CASAMBI by LED Linear™ actively controls the mixing ratio of the two LEDs and thus mimics a very accurate color gradient along the black body curve. While color is controlled linear, the intensity is controlled logarithmic at the same time. This intelligent mixing of the parameters results in a Dim to Warm range of approx. 3,500 K down to 2,100 K.
The graph below shows the black body curve within the CIE color chart (XYZ system). At lower color temperatures the proportion of red increases significantly. The measurement of a VarioLED™ Flex IQW ATON HD 24 (4,000 K – 2,000 K) and the VarioLED™ Flex IQW NEXUS LD40 (5,000 K – 2,200 K) controlled by IN.finite™ CASAMBI shows that the ideal curve is nearly complete reproduced.
Blue measurement point represents the VarioLED™ Flex IQW ATON HD24 (4,000 K – 2,000 K)
Red measurement point represents the VarioLED™ Flex IQW NEXUS LD40 (5,000 K – 2,200 K)

For more information about IN.finite™ CASAMBI (Art. # 16000267-ID2473) please visit our website **www.led-linear.com**



CIE-Diagram (XYZ-System) including the Black-Body-Curve



Measurement points along the Black-Body-Curve for VarioLED™ Flex IQW ATON HD24 (Blue) and VarioLED™ Flex IQW NEXUS LD40 (Red).

STANDARDS AND NORMS

STANDARDS AND NORMS SPECIFICALLY FOR LED'S

The importance of standards and norms specifically for LEDs and LED applications continues to grow steadily in the international market. Since the beginning of LED technology the standards and applications of the conventional lighting industry have been applied for many LED-based products. The safety aspects and the functional properties of LEDs are not entirely comparable with existing norms and standards for the conventional bulbs. The LEDs have to be treated as a separate application with separate standards.

To comply with the EU-Directive, according standards have to be applied. The current norms for LED lighting development include the norm for security of LED modules (DIN EN 62031) on the one hand and the photo biological security norm (DIN EN 62471) on the other hand. In addition to that further norms that will define the performance (DIN EN 62717) of LED and their applications for standard lighting applications are being prepared. These norms will include specific test methods and parameters for further LED developments in the future. Part of these norms will be standard test procedures to estimate the reliability and lifetime of LED modules and LED lamps.

For the certification of products with the CE mark, the products have to fulfill various requirements. For our LED Linear™ products especially the Low Voltage Directive 2014/35/EU and the EMC (Electro Magnetic Compatibility) Directive 2014/30/EU apply. In general the EMC Directive for LED modules can only be examined in a complete system connected to a converter and optionally to a control. In order to meet the Low Voltage Directive requirements, considering the security of LED modules, the norms are DIN EN 62031 and DIN EN 62471, which all LED Linear™ products adhere to.

Additionally, LED Linear™ meets the following european directives:

2009/125/EU (Ecodesign)
2011/65/EU (RoHS)
2012/19/EU (WEEE)

Some manufacturers of fixtures with LED modules deliver their products with an unstandardized technical documentation that is not restricted to any specific guideline. The manufacturer defines the parameters for the product and what will be provided with the customer. Besides the typical photometric and electrical data, these also include the reliability and lifetime of the product. Furthermore, it is yet to be determined how and under what circumstances these parameters are defined. This makes it difficult for the customers to compare products from different manufacturers with each other and to decide the most suitable product for their application.

For this reason another norm (DIN EN 62717) is in progress. This norm will specify the performance and the reliability of LED modules. It will apply for LED modules that emit white light with organic LEDs for general illumination. For LED lamps the norm DIN EN 62722 is being created. It will determine the specific requirements for LED lamps. The data supplied by LED Linear™ already covers most of the relevant characteristics of drafted norms.

LED Linear™ fulfills the following standards:

US-Market/UL Standard	Can-Market/CSA Standard
UL 8750	CSA C22.2#250
UL 2108	
Confirmation by certificates	

EU-Market	
LED modules	TM-30-15
	DIN EN 62031
	DIN EN 62471-1
LED luminaires	DIN EN 60598-1
	DIN EN 62722
	EN 55015
	EN 60100
	EN 61547
	EN 62493
	DIN EN 62717
Lifetime + Reliability + Measurement requirements	LM79
	LM80
	ANSI C78.377-2008
	TM-21-11
	IES LM-84
	IES LM-28

DETERMINATION MAX. CABLE

Definition of max. cable length between PSU/control unit and LED tape

	Product name	Volt (V)	Watt/meter (W/m)	Lumen/meter (lm/m)	Lumen/Watt (lm/W)	CRI	Beam angle (°)	max. length (mm)
WHITE	VarioLED™ Flex NEXUS LD5	24	4.8	800	167	95	120°	7,500
	VarioLED™ Flex NEXUS LD10	24	9.6	1,570	164	95	120°	5,000
	VarioLED™ Flex NEXUS LD15	24	15	2,260	151	95	120°	5,000
	VarioLED™ Flex NEXUS LD25	24	25	3,620	145	95	120°	3,000
	VarioLED™ Flex NEXUS LD40	24	40	5,560	139	95	120°	2,000
	VarioLED™ Flex NEXUS HD6	24	5.6	850	152	95	160°	7,500
	VarioLED™ Flex NEXUS HD10	24	9.6	1,360	142	95	160°	5,000
	VarioLED™ Flex NEXUS HD15	24	15	2,010	134	95	160°	5,000
	VarioLED™ Flex NEXUS HD25	24	25	3,080	123	95	160°	3,000
	VarioLED™ Flex NEXUS HD40	24	40	4,530	113	95	160°	2,000
	VarioLED™ Flex NEXUS HD60	24	60	6,460	108	95	160°	1,250
	VarioLED™ Flex NEXUS UHD15	24	15	1,860	124	95	160°	4,000
	VarioLED™ Flex NEXUS UHD25	24	25	2,980	119	95	160°	3,000
	VarioLED™ Flex HYDRA SLD3	24	2.9	470	162	85	120°	10,000
	VarioLED™ Flex HYDRA LD5	24	4.8	690	144	95	120°	7,500
	VarioLED™ Flex HYDRA LD10	24	9.6	1,380	144	85	120°	5,000
	VarioLED™ Flex HYDRA LD15	24	15	2,210	147	85	120°	4,000
	VarioLED™ Flex HYDRA LD25	24	25	3,600	144	85	120°	3,000
	VarioLED™ Flex HYDRA LD40	24	40	4,350	109	85	120°	2,000
	VarioLED™ Flex HYDRA HD6	24	5.6	830	148	95	120°	5,000
	VarioLED™ Flex HYDRA HD10	24	9.8	1,380	141	95	120°	5,000
	VarioLED™ Flex HYDRA HD15	24	15	2,210	147	85	120°	4,000
	VarioLED™ Flex HYDRA HD25	24	25	3,600	144	85	120°	3,000
	VarioLED™ Flex HYDRA HD36	24	36	5,260	146	85	120°	2,000
	VarioLED™ Flex SOL LD15	24	15	1,640	109	98	120°	3,000
	VarioLED™ Flex SOL LD25	24	25	2,670	107	98	120°	2,000
	VarioLED™ Flex SOL HD15	24	15	1,640	109	98	120°	3,000
	VarioLED™ Flex SOL HD25	24	25	2,670	107	98	120°	2,000
	VarioLED™ Flex SOL HD36	24	36	3,900	108	98	120°	1,250
	VarioLED™ Flex ATON 3	24	10	910	91	85	120°	5,000
	VarioLED™ Flex ATON AIR	24	15	1,370	91	85	120°	4,000
	VarioLED™ Flex ECO LD4	24	4.4	370	84	80	120°	5,000
	VarioLED™ Flex ECO LD12	24	12	970	81	80	120°	4,000
	VarioLED™ Flex ECO HD8	24	8	600	75	80	120°	5,000
	VarioLED™ Flex ECO HD24	24	24	1,940	81	80	120°	3,000
	VarioLED™ Flex SIDE VIEW LD10	24	10	840	84	80	140°	4,000
	VarioLED™ Flex SIDE VIEW HD20	24	20	1,680	84	80	140°	4,000
IQ WHITE	VarioLED™ Flex IQ White NEXUS LD30	24	30	4,830	161	85	120°	2,000
	VarioLED™ Flex IQ White NEXUS HD12	24	12	1,590	133	85	160°	5,000
	VarioLED™ Flex IQ White NEXUS HD24	24	24	2,990	125	85	160°	3,000
	VarioLED™ Flex IQ White NEXUS HD42	24	42	5,240	125	85	160°	2,000
	VarioLED™ Flex IQ White HYDRA LD25	24	25	3,000	120	85	120°	3,000
	VarioLED™ Flex IQ White SOL LD30	24	30	2,570	86	98	120°	2,000
	VarioLED™ Flex IQ White ATON HD12	24	12	1,030	86	85	140°	5,000
	VarioLED™ Flex IQ White ATON HD24	24	24	2,130	89	85	140°	3,000
	VarioLED™ Flex IQ White ATON HD42	24	42	3,780	90	85	140°	2,000
RGB	VarioLED™ Flex RGB LD15	24	15	672	45	na	120°	5,000
	VarioLED™ Flex RGB HD10	24	10	544	54	na	120°	5,000
	VarioLED™ Flex RGB HD20	24	20	1,016	51	na	120°	4,000
RGBW	VarioLED™ Flex RGBW HD20	24	20	1,540	77	95	120°	4,000
	VarioLED™ Flex RGBW HD40	24	50	3,810	76	95	120°	2,000
COLOR	VarioLED™ Flex ECO P12 R	24	10.3	510	50	na	120°	5,040
	VarioLED™ Flex ECO P12 G	24	10.3	980	95	na	120°	5,040
	VarioLED™ Flex ECO P12 B	24	10.3	160	16	na	120°	5,040

Cable length @ product length of **1 meter** and allowing a voltage drop of 0.85 Volt

Product length	1 meter						
Cable cross section	0.25 mm²	0.34 mm²	0.50 mm²	0.75 mm²	1.00 mm²	1.50 mm²	2.50 mm²
AWG	24	22	20	18	16	14	12
	m	m	m	m	m	m	m
VarioLED™ Flex NEXUS LD5	28.56	38.84	57.12	85.68	114.24	171.36	285.60
VarioLED™ Flex NEXUS LD10	14.28	19.42	28.56	42.84	57.12	85.68	142.80
VarioLED™ Flex NEXUS LD15	9.52	12.95	19.04	28.56	38.08	57.12	95.20
VarioLED™ Flex NEXUS LD25	5.71	7.77	11.42	17.14	22.85	34.27	57.12
VarioLED™ Flex NEXUS LD40	3.57	4.86	7.14	10.71	14.28	21.42	35.70
VarioLED™ Flex NEXUS HD6	23.80	32.37	47.60	71.40	95.20	142.80	238.00
VarioLED™ Flex NEXUS HD10	14.28	19.42	28.56	42.84	57.12	85.68	142.80
VarioLED™ Flex NEXUS HD15	9.52	12.95	19.04	28.56	38.08	57.12	95.20
VarioLED™ Flex NEXUS HD25	5.71	7.77	11.42	17.14	22.85	34.27	57.12
VarioLED™ Flex NEXUS HD40	3.57	4.86	7.14	10.71	14.28	21.42	35.70
VarioLED™ Flex NEXUS HD60	2.38	3.24	4.76	7.14	9.52	14.28	23.80
VarioLED™ Flex NEXUS UHD15	9.52	12.95	19.04	28.56	38.08	57.12	95.20
VarioLED™ Flex NEXUS UHD25	5.71	7.77	11.42	17.14	22.85	34.27	57.12
VarioLED™ Flex HYDRA SLD3	28.00	38.08	56.00	84.00	112.00	168.00	280.00
VarioLED™ Flex HYDRA LD5	28.56	38.84	57.12	85.68	114.24	171.36	285.60
VarioLED™ Flex HYDRA LD10	14.28	19.42	28.56	42.84	57.12	85.68	142.80
VarioLED™ Flex HYDRA LD15	9.52	12.95	19.04	28.56	38.08	57.12	95.20
VarioLED™ Flex HYDRA LD25	5.71	7.77	11.42	17.14	22.85	34.27	57.12
VarioLED™ Flex HYDRA LD40	3.57	4.86	7.14	10.71	14.28	21.42	35.70
VarioLED™ Flex HYDRA HD6	23.80	32.37	47.60	71.40	95.20	142.80	238.00
VarioLED™ Flex HYDRA HD10	14.28	19.42	28.56	42.84	57.12	85.68	142.80
VarioLED™ Flex HYDRA HD15	9.52	12.95	19.04	28.56	38.08	57.12	95.20
VarioLED™ Flex HYDRA HD25	5.71	7.77	11.42	17.14	22.85	34.27	57.12
VarioLED™ Flex HYDRA HD36	3.97	5.39	7.93	11.90	15.87	23.80	39.67
VarioLED™ Flex SOL LD15	9.52	12.95	19.04	28.56	38.08	57.12	95.20
VarioLED™ Flex SOL LD25	5.71	7.77	11.42	17.14	22.85	34.27	57.12
VarioLED™ Flex SOL HD15	9.52	12.95	19.04	28.56	38.08	57.12	95.20
VarioLED™ Flex SOL HD25	5.71	7.77	11.42	17.14	22.85	34.27	57.12
VarioLED™ Flex SOL HD36	3.97	5.39	7.93	11.90	15.87	23.80	39.67
VarioLED™ Flex ATON 3	14.28	19.42	28.56	42.84	57.12	85.68	142.80
VarioLED™ Flex ATON AIR	10.20	13.87	20.40	30.60	40.80	61.20	102.00
VarioLED™ Flex ECO LD4[1]	35.70	48.55	71.40	107.10	142.80	214.20	357.00
VarioLED™ Flex ECO LD12	11.90	16.18	23.80	35.70	47.60	71.40	119.00
VarioLED™ Flex ECO HD8	17.85	24.28	35.70	53.55	71.40	107.10	178.50
VarioLED™ Flex ECO HD24	5.95	8.09	11.90	17.85	23.80	35.70	59.50
VarioLED™ Flex SIDE VIEW LD10	14.28	19.42	28.56	42.84	57.12	85.68	142.80
VarioLED™ Flex SIDE VIEW HD20	7.14	9.71	14.28	21.42	28.56	42.84	71.40
VarioLED™ Flex IQ White NEXUS LD30	3.57	4.86	7.14	10.71	14.28	21.42	35.70
VarioLED™ Flex IQ White NEXUS HD12	11.90	16.18	23.80	35.70	47.60	71.40	119.00
VarioLED™ Flex IQ White NEXUS HD24	5.95	8.09	11.90	17.85	23.80	35.70	59.50
VarioLED™ Flex IQ White NEXUS HD42	3.40	4.62	6.80	10.20	13.60	20.40	34.00
VarioLED™ Flex IQ White HYDRA LD25	5.71	7.77	11.42	17.14	22.85	34.27	57.12
VarioLED™ Flex IQ White SOL LD30	5.71	7.77	11.42	17.14	22.85	34.27	57.12
VarioLED™ Flex IQ White ATON HD12	11.90	16.18	23.80	35.70	47.60	71.40	119.00
VarioLED™ Flex IQ White ATON HD24	5.95	8.09	11.90	17.85	23.80	35.70	59.50
VarioLED™ Flex IQ White ATON HD42	3.40	4.62	6.80	10.20	13.60	20.40	34.00
VarioLED™ Flex RGB LD15	9.52	12.95	19.04	28.56	38.08	57.12	95.20
VarioLED™ Flex RGB HD10	14.28	19.42	28.56	42.84	57.12	85.68	142.80
VarioLED™ Flex RGB HD20	7.14	9.71	14.28	21.42	28.56	42.84	71.40
VarioLED™ Flex RGBW HD20	7.14	9.71	14.28	21.42	28.56	42.84	71.40
VarioLED™ Flex RGBW HD50	3.57	4.86	7.14	10.71	14.28	21.42	35.70
VarioLED™ Flex ECO P12 R	14.28	19.42	28.56	42.84	57.12	85.68	142.80
VarioLED™ Flex ECO P12 G	14.28	19.42	28.56	42.84	57.12	85.68	142.80
VarioLED™ Flex ECO P12 B	14.28	19.42	28.56	42.84	57.12	85.68	142.80

Cable length @ product length of **2 meter** and allowing a voltage drop of 0.85 Volt

Product length	2 meter						
Cable cross section	0.25 mm²	0.34 mm²	0.50 mm²	0.75 mm²	1.00 mm²	1.50 mm²	2.50 mm²
AWG	24	22	20	18	16	14	12
	m	m	m	m	m	m	m
VarioLED™ Flex NEXUS LD5	14.28	19.42	28.56	42.84	57.12	85.68	142.80
VarioLED™ Flex NEXUS LD10	7.14	9.71	14.28	21.42	28.56	42.84	71.40
VarioLED™ Flex NEXUS LD15	4.76	6.47	9.52	14.28	19.04	28.56	47.60
VarioLED™ Flex NEXUS LD25	2.86	3.88	5.71	8.57	11.42	17.14	28.56
VarioLED™ Flex NEXUS LD40	1.79	2.43	3.57	5.36	7.14	10.71	17.85
VarioLED™ Flex NEXUS HD6	11.90	16.18	23.80	35.70	47.60	71.40	119.00
VarioLED™ Flex NEXUS HD10	7.14	9.71	14.28	21.42	28.56	42.84	71.40
VarioLED™ Flex NEXUS HD15	4.76	6.47	9.52	14.28	19.04	28.56	47.60
VarioLED™ Flex NEXUS HD25	2.86	3.88	5.71	8.57	11.42	17.14	28.56
VarioLED™ Flex NEXUS HD40	1.79	2.43	3.57	5.36	7.14	10.71	17.85
VarioLED™ Flex NEXUS UHD15	4.76	6.47	9.52	14.28	19.04	28.56	47.60
VarioLED™ Flex NEXUS UHD25	2.86	3.88	5.71	8.57	11.42	17.14	28.56
VarioLED™ Flex HYDRA SLD3	14.00	19.04	28.00	42.00	56.00	84.00	140.00
VarioLED™ Flex HYDRA LD5	14.28	19.42	28.56	42.84	57.12	85.68	142.80
VarioLED™ Flex HYDRA LD10	7.14	9.71	14.28	21.42	28.56	42.84	71.40
VarioLED™ Flex HYDRA LD15	4.76	6.47	9.52	14.28	19.04	28.56	47.60
VarioLED™ Flex HYDRA LD25	2.86	3.88	5.71	8.57	11.42	17.14	28.56
VarioLED™ Flex HYDRA LD40	1.79	2.43	3.57	5.36	7.14	10.71	17.85
VarioLED™ Flex HYDRA HD6	11.90	16.18	23.80	35.70	47.60	71.40	119.00
VarioLED™ Flex HYDRA HD10	7.14	9.71	14.28	21.42	28.56	42.84	71.40
VarioLED™ Flex HYDRA HD15	4.76	6.47	9.52	14.28	19.04	28.56	47.60
VarioLED™ Flex HYDRA HD25	2.86	3.88	5.71	8.57	11.42	17.14	28.56
VarioLED™ Flex HYDRA HD36	1.98	2.70	3.97	5.95	7.93	11.90	19.83
VarioLED™ Flex SOL LD15	4.76	6.47	9.52	14.28	19.04	28.56	47.60
VarioLED™ Flex SOL LD25	2.86	3.88	5.71	8.57	11.42	17.14	28.56
VarioLED™ Flex SOL HD15	4.76	6.47	9.52	14.28	19.04	28.56	47.60
VarioLED™ Flex SOL HD25	2.86	3.88	5.71	8.57	11.42	17.14	28.56
VarioLED™ Flex ATON 3	7.14	9.71	14.28	21.42	28.56	42.84	71.40
VarioLED™ Flex ATON AIR	5.10	6.94	10.20	15.30	20.40	30.60	51.00
VarioLED™ Flex ECO LD4	17.85	24.28	35.70	53.55	71.40	107.10	178.50
VarioLED™ Flex ECO LD12	5.95	8.09	11.90	17.85	23.80	35.70	59.50
VarioLED™ Flex ECO HD8	8.93	12.14	17.85	26.78	35.70	53.55	89.25
VarioLED™ Flex ECO HD24	2.98	4.05	5.95	8.93	11.90	17.85	29.75
VarioLED™ Flex SIDE VIEW LD10	7.14	9.71	14.28	21.42	28.56	42.84	71.40
VarioLED™ Flex SIDE VIEW HD20	3.57	4.86	7.14	10.71	14.28	21.42	35.70
VarioLED™ Flex IQ White NEXUS LD40	1.79	2.43	3.57	5.36	7.14	10.71	17.85
VarioLED™ Flex IQ White NEXUS HD12	5.95	8.09	11.90	17.85	23.80	35.70	59.50
VarioLED™ Flex IQ White NEXUS HD24	2.98	4.05	5.95	8.93	11.90	17.85	29.75
VarioLED™ Flex IQ White NEXUS HD42	1.70	2.31	3.40	5.10	6.80	10.20	17.00
VarioLED™ Flex IQ White HYDRA LD25	2.86	3.88	5.71	8.57	11.42	17.14	28.56
VarioLED™ Flex IQ White SOL LD25	2.86	3.88	5.71	8.57	11.42	17.14	28.56
VarioLED™ Flex IQ White ATON HD12	5.95	8.09	11.90	17.85	23.80	35.70	59.50
VarioLED™ Flex IQ White ATON HD24	2.98	4.05	5.95	8.93	11.90	17.85	29.75
VarioLED™ Flex IQ White ATON HD42	1.70	2.31	3.40	5.10	6.80	10.20	17.00
VarioLED™ Flex RGB LD15	4.76	6.47	9.52	14.28	19.04	28.56	47.60
VarioLED™ Flex RGB HD10	7.14	9.71	14.28	21.42	28.56	42.84	71.40
VarioLED™ Flex RGB HD20	3.57	4.86	7.14	10.71	14.28	21.42	35.70
VarioLED™ Flex RGBW HD20	3.57	4.86	7.14	10.71	14.28	21.42	35.70
VarioLED™ Flex RGBW HD40	1.79	2.43	3.57	5.36	7.14	10.71	17.85
VarioLED™ Flex ECO P12 R	7.14	9.71	14.28	21.42	28.56	42.84	71.40
VarioLED™ Flex ECO P12 G	7.14	9.71	14.28	21.42	28.56	42.84	71.40
VarioLED™ Flex ECO P12 B	7.14	9.71	14.28	21.42	28.56	42.84	71.40

Cable length @ product length of **3 meter** and allowing a voltage drop of 0.85 Volt

Product length	3 meter						
Cable cross section	0.25 mm²	0.34 mm²	0.50 mm²	0.75 mm²	1.00 mm²	1.50 mm²	2.50 mm²
AWG	24	22	20	18	16	14	12
	m	m	m	m	m	m	m
VarioLED™ Flex NEXUS LD5	9.52	12.95	19.04	28.56	38.08	57.12	95.20
VarioLED™ Flex NEXUS LD10	4.76	6.47	9.52	14.28	19.04	28.56	47.60
VarioLED™ Flex NEXUS LD15	3.17	4.32	6.35	9.52	12.69	19.04	31.73
VarioLED™ Flex NEXUS LD25	1.90	2.59	3.81	5.71	7.62	11.42	19.04
VarioLED™ Flex NEXUS HD6	7.93	10.79	15.87	23.80	31.73	47.60	79.33
VarioLED™ Flex NEXUS HD10	4.76	6.47	9.52	14.28	19.04	28.56	47.60
VarioLED™ Flex NEXUS HD15	3.17	4.32	6.35	9.52	12.69	19.04	31.73
VarioLED™ Flex NEXUS HD25	1.90	2.59	3.81	5.71	7.62	11.42	19.04
VarioLED™ Flex NEXUS UHD15	3.17	4.32	6.35	9.52	12.69	19.04	31.73
VarioLED™ Flex NEXUS UHD25	1.90	2.59	3.81	5.71	7.62	11.42	19.04
VarioLED™ Flex HYDRA SLD3	9.33	12.69	18.67	28.00	37.33	56.00	93.33
VarioLED™ Flex HYDRA LD5	9.52	12.95	19.04	28.56	38.08	57.12	95.20
VarioLED™ Flex HYDRA LD10	4.76	6.47	9.52	14.28	19.04	28.56	47.60
VarioLED™ Flex HYDRA LD15	3.17	4.32	6.35	9.52	12.69	19.04	31.73
VarioLED™ Flex HYDRA LD25	1.90	2.59	3.81	5.71	7.62	11.42	19.04
VarioLED™ Flex HYDRA HD6	7.93	10.79	15.87	23.80	31.73	47.60	79.33
VarioLED™ Flex HYDRA HD10	4.76	6.47	9.52	14.28	19.04	28.56	47.60
VarioLED™ Flex HYDRA HD15	3.17	4.32	6.35	9.52	12.69	19.04	31.73
VarioLED™ Flex HYDRA HD25	1.90	2.59	3.81	5.71	7.62	11.42	19.04
VarioLED™ Flex SOL LD15	3.17	4.32	6.35	9.52	12.69	19.04	31.73
VarioLED™ Flex SOL HD15	3.17	4.32	6.35	9.52	12.69	19.04	31.73
VarioLED™ Flex ATON 3	4.76	6.47	9.52	14.28	19.04	28.56	47.60
VarioLED™ Flex ATON AIR	3.40	4.62	6.80	10.20	13.60	20.40	34.00
VarioLED™ Flex ECO LD4	11.90	16.18	23.80	35.70	47.60	71.40	119.00
VarioLED™ Flex ECO LD12	3.97	5.39	7.93	11.90	15.87	23.80	39.67
VarioLED™ Flex ECO HD8	5.95	8.09	11.90	17.85	23.80	35.70	59.50
VarioLED™ Flex ECO HD24	1.98	2.70	3.97	5.95	7.93	11.90	19.83
VarioLED™ Flex SIDE VIEW LD10	4.76	6.47	9.52	14.28	19.04	28.56	47.60
VarioLED™ Flex SIDE VIEW HD20	2.38	3.24	4.76	7.14	9.52	14.28	23.80
VarioLED™ Flex IQ White NEXUS HD12	3.97	5.39	7.93	11.90	15.87	23.80	39.67
VarioLED™ Flex IQ White NEXUS HD24	1.98	2.70	3.97	5.95	7.93	11.90	19.83
VarioLED™ Flex IQ White HYDRA LD25	1.90	2.59	3.81	5.71	7.62	11.42	19.04
VarioLED™ Flex IQ White ATON HD12	3.97	5.39	7.93	11.90	15.87	23.80	39.67
VarioLED™ Flex IQ White ATON HD24	1.98	2.70	3.97	5.95	7.93	11.90	19.83
VarioLED™ Flex RGB LD15	3.17	4.32	6.35	9.52	12.69	19.04	31.73
VarioLED™ Flex RGB HD10	4.76	6.47	9.52	14.28	19.04	28.56	47.60
VarioLED™ Flex RGB HD20	2.38	3.24	4.76	7.14	9.52	14.28	23.80
VarioLED™ Flex RGBW HD20	2.38	3.24	4.76	7.14	9.52	14.28	23.80
VarioLED™ Flex ECO P12 R	4.76	6.47	9.52	14.28	19.04	28.56	47.60
VarioLED™ Flex ECO P12 G	4.76	6.47	9.52	14.28	19.04	28.56	47.60
VarioLED™ Flex ECO P12 B	4.76	6.47	9.52	14.28	19.04	28.56	47.60

Cable length @ product length of **4 meter** and allowing a voltage drop of 0.85 Volt

Product length				**4 meter**			
Cable cross section	0.25 mm²	0.34 mm²	0.50 mm²	0.75 mm²	1.00 mm²	1.50 mm²	2.50 mm²
AWG	24	22	20	18	16	14	12
	m	m	m	m	m	m	m
VarioLED™ Flex NEXUS LD5	7.14	9.71	14.28	21.42	28.56	42.84	71.40
VarioLED™ Flex NEXUS LD10	3.57	4.86	7.14	10.71	14.28	21.42	35.70
VarioLED™ Flex NEXUS LD15	2.38	3.24	4.76	7.14	9.52	14.28	23.80
VarioLED™ Flex NEXUS HD6	5.95	8.09	11.90	17.85	23.80	35.70	59.50
VarioLED™ Flex NEXUS HD10	3.57	4.86	7.14	10.71	14.28	21.42	35.70
VarioLED™ Flex NEXUS HD15	2.38	3.24	4.76	7.14	9.52	14.28	23.80
VarioLED™ Flex NEXUS UHD15	2.38	3.24	4.76	7.14	9.52	14.28	23.80
VarioLED™ Flex HYDRA SLD3	7.00	9.52	14.00	21.00	28.00	42.00	70.00
VarioLED™ Flex HYDRA LD5	7.14	9.71	14.28	21.42	28.56	42.84	71.40
VarioLED™ Flex HYDRA LD10	3.57	4.86	7.14	10.71	14.28	21.42	35.70
VarioLED™ Flex HYDRA LD15	2.38	3.24	4.76	7.14	9.52	14.28	23.80
VarioLED™ Flex HYDRA HD6	5.95	8.09	11.90	17.85	23.80	35.70	59.50
VarioLED™ Flex HYDRA HD10	3.57	4.86	7.14	10.71	14.28	21.42	35.70
VarioLED™ Flex HYDRA HD15	2.38	3.24	4.76	7.14	9.52	14.28	23.80
VarioLED™ Flex ATON 3	3.57	4.86	7.14	10.71	14.28	21.42	35.70
VarioLED™ Flex ATON AIR	2.55	3.47	5.10	7.65	10.20	15.30	25.50
VarioLED™ Flex ECO LD4	8.93	12.14	17.85	26.78	35.70	53.55	89.25
VarioLED™ Flex ECO LD12	2.98	4.05	5.95	8.93	11.90	17.85	29.75
VarioLED™ Flex ECO HD8	4.46	6.07	8.93	13.39	17.85	26.78	44.63
VarioLED™ Flex SIDE VIEW LD10	3.57	4.86	7.14	10.71	14.28	21.42	35.70
VarioLED™ Flex SIDE VIEW HD20	1.79	2.43	3.57	5.36	7.14	10.71	17.85
VarioLED™ Flex IQ White NEXUS HD12	2.98	4.05	5.95	8.93	11.90	17.85	29.75
VarioLED™ Flex IQ White ATON HD12	2.98	4.05	5.95	8.93	11.90	17.85	29.75
VarioLED™ Flex IQ White ATON HD24	1.49	2.02	2.98	4.46	5.95	8.93	14.88
VarioLED™ Flex RGB LD15	2.38	3.24	4.76	7.14	9.52	14.28	23.80
VarioLED™ Flex RGB HD10	3.57	4.86	7.14	10.71	14.28	21.42	35.70
VarioLED™ Flex RGB HD20	1.79	2.43	3.57	5.36	7.14	10.71	17.85
VarioLED™ Flex RGBW HD20	1.79	2.43	3.57	5.36	7.14	10.71	17.85
VarioLED™ Flex ECO P12 R	3.57	4.86	7.14	10.71	14.28	21.42	35.70
VarioLED™ Flex ECO P12 G	3.57	4.86	7.14	10.71	14.28	21.42	35.70
VarioLED™ Flex ECO P12 B	3.57	4.86	7.14	10.71	14.28	21.42	35.70

Cable length @ product length of **5 meter** and allowing a voltage drop of 0.85 Volt

Product length				**5 meter**			
Cable cross section	0.25 mm²	0.34 mm²	0.50 mm²	0.75 mm²	1.00 mm²	1.50 mm²	2.50 mm²
AWG	24	22	20	18	16	14	12
	m	m	m	m	m	m	m
VarioLED™ Flex NEXUS LD5	5.71	7.77	11.42	17.14	22.85	34.27	57.12
VarioLED™ Flex NEXUS LD10	2.86	3.88	5.71	8.57	11.42	17.14	28.56
VarioLED™ Flex NEXUS LD15	1.90	2.59	3.81	5.71	7.62	11.42	19.04
VarioLED™ Flex NEXUS HD6	4.76	6.47	9.52	14.28	19.04	28.56	47.60
VarioLED™ Flex NEXUS HD10	2.86	3.88	5.71	8.57	11.42	17.14	28.56
VarioLED™ Flex NEXUS HD15	1.90	2.59	3.81	5.71	7.62	11.42	19.04
VarioLED™ Flex HYDRA SLD3	5.60	7.62	11.20	16.80	22.40	33.60	56.00
VarioLED™ Flex HYDRA LD5	5.71	7.77	11.42	17.14	22.85	34.27	57.12
VarioLED™ Flex HYDRA LD10	2.86	3.88	5.71	8.57	11.42	17.14	28.56
VarioLED™ Flex HYDRA HD6	4.76	6.47	9.52	14.28	19.04	28.56	47.60
VarioLED™ Flex HYDRA HD10	2.86	3.88	5.71	8.57	11.42	17.14	28.56
VarioLED™ Flex ATON 3	2.86	3.88	5.71	8.57	11.42	17.14	28.56
VarioLED™ Flex ATON AIR	2.04	2.77	4.08	6.12	8.16	12.24	20.40
VarioLED™ Flex ECO LD4	7.14	9.71	14.28	21.42	28.56	42.84	71.40
VarioLED™ Flex ECO HD8	3.57	4.86	7.14	10.71	14.28	21.42	35.70
VarioLED™ Flex SIDE VIEW LD10	2.86	3.88	5.71	8.57	11.42	17.14	28.56
VarioLED™ Flex IQ White NEXUS HD12	2.38	3.24	4.76	7.14	9.52	14.28	23.80
VarioLED™ Flex IQ White ATON HD12	2.38	3.24	4.76	7.14	9.52	14.28	23.80
VarioLED™ Flex RGB HD10	2.86	3.88	5.71	8.57	11.42	17.14	28.56
VarioLED™ Flex RGB HD20	1.43	1.94	2.86	4.28	5.71	8.57	14.28
VarioLED™ Flex ECO P12 R	2.86	3.88	5.71	8.57	11.42	17.14	28.56
VarioLED™ Flex ECO P12 G	2.86	3.88	5.71	8.57	11.42	17.14	28.56
VarioLED™ Flex ECO P12 B	2.86	3.88	5.71	8.57	11.42	17.14	28.56

Cable length @ product length of **6 meter** and allowing a voltage drop of 0.85 Volt

Product length				**6 meter**			
Cable cross section	0.25 mm²	0.34 mm²	0.50 mm²	0.75 mm²	1.00 mm²	1.50 mm²	2.50 mm²
AWG	24	22	20	18	16	14	12
	m	m	m	m	m	m	m
VarioLED™ Flex NEXUS LD5	4.76	6.47	9.52	14.28	19.04	28.56	47.60
VarioLED™ Flex NEXUS HD6	3.97	5.39	7.93	11.90	15.87	23.80	39.67
VarioLED™ Flex HYDRA SLD3	4.67	6.35	9.33	14.00	18.67	28.00	46.67
VarioLED™ Flex HYDRA LD5	4.76	6.47	9.52	14.28	19.04	28.56	47.60

Cable length @ product length of **7 meter** and allowing a voltage drop of 0.85 Volt

Product length				**7 meter**			
Cable cross section	0.25 mm²	0.34 mm²	0.50 mm²	0.75 mm²	1.00 mm²	1.50 mm²	2.50 mm²
AWG	24	22	20	18	16	14	12
	m	m	m	m	m	m	m
VarioLED™ Flex NEXUS LD5	4.08	5.55	8.16	12.24	16.32	24.48	40.80
VarioLED™ Flex NEXUS HD6	3.40	4.62	6.80	10.20	13.60	20.40	34.00
VarioLED™ Flex HYDRA SLD3	4.00	5.44	8.00	12.00	16.00	24.00	40.00
VarioLED™ Flex HYDRA LD5	4.08	5.55	8.16	12.24	16.32	24.48	40.80

Cable length @ product length of **7.5 meter** and allowing a voltage drop of 0.85 Volt

Product length				**7.5 meter**			
Cable cross section	0.25 mm²	0.34 mm²	0.50 mm²	0.75 mm²	1.00 mm²	1.50 mm²	2.50 mm²
AWG	24	22	20	18	16	14	12
	m	m	m	m	m	m	m
VarioLED™ Flex NEXUS LD5	3.81	5.18	7.62	11.42	15.23	22.85	38.08
VarioLED™ Flex NEXUS HD6	3.17	4.32	6.35	9.52	12.69	19.04	31.73
VarioLED™ Flex HYDRA SLD3	3.73	5.08	7.47	11.20	14.93	22.40	37.33
VarioLED™ Flex HYDRA LD5	3.81	5.18	7.62	11.42	15.23	22.85	38.08

Cable length @ product length of **10 meter** and allowing a voltage drop of 0.85 Volt

Product length				**10 meter**			
Cable cross section	0.25 mm²	0.34 mm²	0.50 mm²	0.75 mm²	1.00 mm²	1.50 mm²	2.50 mm²
AWG	24	22	20	18	16	14	12
	m	m	m	m	m	m	m
VarioLED™ Flex HYDRA SLD3	2.80	3.81	5.60	8.40	11.20	16.80	28.00

LUMINAIRE CLASSIFICATION ACCORDING TO DIN 5040

LED Linear™ luminaires are classified according to DIN 5040 and thus represent a simple tool for the lighting design. The corresponding indication of the subdivision can be found in the relevant data sheet of the optic or of the luminaire. With the luminaire classification according to DIN 5040 lights are classified according to the distribution of the luminous flux in the upper and lower hemisphere of the luminaire. For this, a standard room S was defined which space is based on the room index k = 1.25 and a standard regular arrangement of luminaires, as seen in Figure 1. The definition of the room index k depending on the reflectance combinations for ceiling, walls and floor can be found in the publication LiTG 3.5.

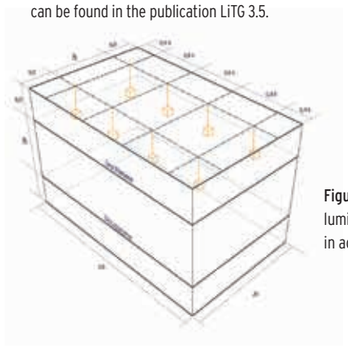


Figure 1 - Standard room S with luminaire standard arrangement in accordance with DIN 5040

The total luminous flux of the luminaire Φ_L is composed of the partial luminous fluxes in the upper hemisphere Φ_O and the lower hemisphere Φ_U. A part of the luminous flux in the lower hemisphere Φ_U falls directly on the used space of the standard room and forms the luminous flux Φ_{SN} which generates the direct illuminance E_{dir} there. This illuminance is considered usable illuminance in order to realize, for example, a task lighting (office work). Similarly, the ceiling luminous flux in the standard room is described with Φ_{SD}.

Based on the values defined above, the following parameters for the luminous flux distribution of a luminaire can be defined:

$\varphi_U = \Phi_U/\Phi_L$ Luminous flux in the lower hemisphere

$\varphi_O = \Phi_O/\Phi_L$ Luminous flux in the upper hemisphere

Further are defined:

$\varphi_{SU} = \Phi_{SN}/\Phi_U$ Usable luminous flux in the standard room S

$\varphi_{SO} = \Phi_{SD}/\Phi_O$ Luminous flux on the ceiling in the standard room S

By integrating the light intensity distribution, the relative partial luminous fluxes are determined and the luminaire can be categorized in a DIN 5040 table, as shown in Figure 2.
The code letter informs about the basic nature of the luminaires light distribution:

A = direct illumination
B = predominantly direct illumination
C = direct-indirect illumination
D = predominantly indirect illumination
E = indirect illumination

The 1. code number arranges the luminaires according to the proportion of the direct luminous flux on the usable working plane in the standard room S φ_{SU} at the spatial luminous flux in the lower hemisphere φ_U (Direct illuminating component).

The 2. code number arranges the luminaires according to the proportion of the luminous flux on the ceiling of the standard room S φ_{SO} at the spatial luminous flux in the upper hemisphere φ_O (Indirect illuminating component).
If there is no luminous flux in the upper or lower hemisphere of the luminaire, the corresponding code is specified with 0.

Code letter	φ_U	φ_O	1. Code number	φ_{SU}	2. Code number	φ_{SO}
A	$0.9 \le \varphi_U \le 1.0$	$0 \le \varphi_O \le 0.1$	0	$\varphi_{SU} = 0$	0	$\varphi_{SO} = 0$
B	$0.6 \le \varphi_U \le 0.9$	$0.1 \le \varphi_O \le 0.4$	1	$0 \le \varphi_{SU} \le 0,3$	1	$0 \le 000 \le 0.3$
C	$0.4 \le \varphi_U \le 0.6$	$0.4 \le \varphi_O \le 0.6$	2	$0.3 \le \varphi_{SU} \le 0.4$	2	$0.5 \le 000 \le 0.7$
D	$0.1 \le \varphi_U \le 0.4$	$0.6 \le \varphi_O \le 0.9$	3	$0.4 \le \varphi_{SU} \le 0.5$	3	$0.7 \le 000 \le 0.9$
E	$0 \le \varphi_U \le 0.1$	$0.9 \le \varphi_O \le 1.0$	4	$0.5 \le \varphi_{SU} \le 0.6$	4	$0.9 \le 000 \le 1.0$
			5	$0.6 \le \varphi_{SU} \le 0.7$		
			6	$0.7 \le \varphi_{SU} \le 0.8$		
			7	$0.8 \le \varphi_{SU} \le 0.9$		
			8	$0.9 \le \varphi_{SU} \le 1.0$		
A			6		0	

Figure 2 - Classification of luminous flux distribution of the luminaire in accordance with DIN 5040

An example, for a luminous flux distribution classified in accordance with DIN 5040 is shown in Figure 3.

Figure 3 - Example for a luminous flux distribution A60 according DIN 5040

PHOTOMETRIC CODE ACCORDING TO DIN EN 62717

All LED lamps of LED Linear™ are marked with a photometric code on the data sheet. The photometric code provides information on photometric quantities of the used LED modules with white light emitting LEDs. The first 3 numbers indicate the general color rendering (CRI index) and color temperature (CCT) of the modules. The subsequent 3 numbers handle the changes of color coordinates based on MacAdams ellipses and the lumen maintenance depending on the operating time.

Key for the photometric code:

Letter	1. Code number		2. + 3. Code number		4. Code number		5. Code number		6. Code number	
White	Code	Initial CRI-Index	Code	Initial correlated color temperature in Kelvin	Code	Initial MacAdams ellipsis	Code	MacAdams after 25% of the operating time (max. 6,000 h)	Code	Remaining lumen output after 25% of the operating time (max. 6,000 h)
W	7	70 - 79	20	2,000 K	2	2 step MacAdams ellipse	2	2 step MacAdams ellipse	7	≧ 70%
	8	80 - 89	22	2,200 K	3	3 step MacAdams ellipse	3	3 step MacAdams ellipse	8	≧ 80%
	9	90 - 99	24	2,400 K	4	4 step MacAdams ellipse	4	4 step MacAdams ellipse	9	≧ 90%
			25	2,500 K	5	5 step MacAdams ellipse	5	5 step MacAdams ellipse		
			27	2,700 K						
			30	3,000 K						
			35	3,500 K						
			40	4,000 K						
			50	5,000 K						
W	8		27		3		3		9	

Example of the photometric code based on the VarioLED™ Flex HYDRA HD15 with a correlated color temperature of 2,700 K and a color rendering index of CRI > 85. The photometric code always starts with "W" White.

Wxxx/
339

W827 / 339

Figure 4 - VarioLED™ Flex HYDRA HD15 W827

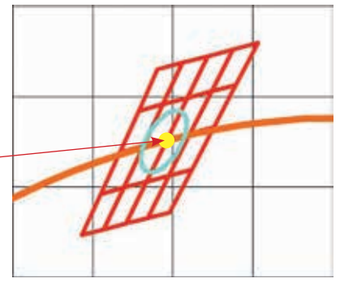


Figure 2 - 3 step MacAdams ellipse and 16 ANSI binnings for 2,700 K

LM 79 AND LM 80

LM 79 compliant

LM 80 compliant

LM 79 and LM 80

Light emitting diodes (LEDs) are a relatively new and unique source for outdoor lighting. They are more reliant upon effective thermal management than any previous source, more of a directional source, and have to be designed and tested as an entire lighting system.

Therefore, LEDs require new guidelines and practices for testing. There also needs to be a correlation between how LED manufacturers test their LEDs and how fixture manufacturers test their LED fixtures. In response, the Illuminating Engineering Society of North America or IESNA developed LM-79-08 and LM-80-08 for LED fixture and LED device testing.

As a high quality LED Linear™ lighting module and system supplier, LED Linear™ remains at the forefront of LED Linear™ lighting technology.
LED Linear™ only uses high quality LED from Japanese manufacturers, who apply LM-80-08 to the LEDs delivered to LED Linear™.

LED Linear™ applies LM-79-08 to their LED lighting modules, systems and fixtures.

The IESNA

The IESNA is a 100+ year old lighting industry group with membership that includes manufacturers (both sources and fixtures), lighting in IESNA designers and architects, utilities, and others affiliated with lighting such as consultants, government, researchers and educators.

LM-80-08 for the LEDs themselves

LM-80-08 Approved Method: Measuring Lumen Maintenance of LED Light Sources was published by the IESNA Solid State Lighting (SSL) Subcommittee in the third quarter of 2008. Simply referred to as LM-80, this document covers lumen maintenance measurement for inorganic LED-based packages, arrays, and modules; it does not cover any other aspect of LED performance.

One of the key reasons for the development of LM-80 is due to differences in measuring LED performance criteria. LED manufacturers typically measure LEDs in pulse mode operation with no heat sink. The pulse is very short – typically 10 or 20 milliseconds (that is, thousands of a second) – which will not heat up the LED; therefore, no heat sink is required and Tj can be assumed to be equal to ambient temperature TA (typically held constant at 25°C). This is useful for doing high yield LED measurements quickly. This also explains why LED manufacturer data sheets typically show LED performance for Tj = 25°C.

In contrast, LED fixture manufacturers measure LED performance in situ, which means while it is in their fixture. Under these conditions, the LED is operated in constant DC mode and there are typically numerous LEDs configured together often in close proximity to one another, elevating Tj above 25°C. This elevated Tj affects the photometric and colorimetric performance of the LEDs. In order to compare "apples to apples", a new testing criteria needed to be developed: LM-80-08.

LM-80-08 prescribes uniform test methods for LED manufacturers under controlled conditions for measuring LED lumen maintenance while controlling the LEDs TS or case temperature, the DC forward voltage and forward current to the LED. LM-80-08 requires 55°C, 85°C and one other TS chosen by the LED manufacturer. It also requires lumen maintenance data out to at least 6,000 hours of constant DC mode (not pulse mode) operation 4.

Many of LED Linear™ Japanese LED suppliers chose 120°C for the third TS for their LED and they have recorded data out to 10,000 hours which is the preferred duration in LM-80. Based upon LM-80-08 data, LED manufacturers then extrapolate lumen maintenance out to ten thousands of hours.

Our LED suppliers go out to 60,000 hours and beyond. While LM-80-08 does not specify the extrapolation method, many LED manufacturers use more conservative exponential extrapolation due to the exponential behavior of LEDs and most electronic components. The SSL Subcommittee is working on TM-21 which will standardize this extrapolation method.

The data resulting from LM-80-08 measurements are matrices of lumen maintenance values. LED fixture manufacturers use this data in combination with their UL in-situ thermal testing to predict the lumen maintenance of the LEDs when used in their fixtures and, subsequently, the lumen maintenance of the LED fixtures themselves. For example, if we measure 85°C TS at the hottest LED Linear™ LED in one of our fixtures, then we look up that particular data set from our Japanese suppliers to determine the LED fixture's lumen maintenance based upon and correlated with the LEDs lumen maintenance at that same TS. Fixture manufacturers also use the data to predict LED color stability over time at the various TS temperatures.

LM-79-08 for the LED fixture

CIE S 025 test method for LED lamps, LED luminaires and LED modules.
LED lumen maintenance and color stability are only part of the puzzle. It is helpful to characterize the performance of LEDs in fixtures so that the entire system is considered. That's where LM-79-08 comes in.
LM-79-08 Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products was published by the IESNA Solid State Lighting (SSL) Subcommittee in the first quarter of 2008. LM-79-08 covers photometric and colorimetric performance as well as electrical power measurements for inorganic LED fixtures 5. LM-79-08 prescribes uniform test methods for LED fixture manufacturers under controlled conditions using LED fixtures as they would be manufactured for production.

Unlike traditional sources which are typically tested using relative photometry with test lamps and ballasts, LED fixtures are tested using absolute photometry with production LEDs and fixtures in the orientation in which it will be installed to ensure a more true test of LED performance when in situ. As previously discussed, LEDs operated in situ will perform differently due to the elevated Tj which will be further impacted by fixture orientation and thermal conditions; if the LED array or module were removed from the fixture, its performance would change. This is precisely why absolute photometry is a must for LED fixtures.

LM-79-08 testing is typically performed with either an integrating sphere for all photometric and colorimetric measurements or an integrating sphere in combination with a goniophotometer. The integrating sphere is recommended for colorimetric measurements; alternately, a goniospectroradiometer or gonio-colorimeter may be used. LED Linear™ has an integration sphere for all colorimetric, radiometric and photometric measurements for single LEDs and a custom designed goniophotometer lab and equipment where we test LED fixtures following LM-79-08 procedures. We also test key LED fixtures in independent DOE approved labs – look for the .ies photometric files on our web site that indicate LM-79-08.

In 2015 CIE S 025 was published that focuses on test methods for LED fixtures.

SECURITY AND ENVIRONMENTAL PROTECTION

Protection classes with regard to insulation

Protection class	Symbol	Meaning
I		Luminaires in which protection is based not solely on the basic insulation but also on a protective earth conductor that is connected to exposed conductive parts.
II		Luminaires in which protection is based not solely on the basic isolation but also on an additional or reinforced insulation or which there is no protective earth connection.
III		Luminaires in which protection is based not solely on safety extra low voltage (SELV/PELV). There must be no voltage higher than the safety extra-low voltage in the luminaire. 50 V AC, 120 V DC

The protection class of a luminaire for mains voltage indicates the way in which an electric shock to the user is prevented in the event of a fault. A luminaire in protection class II does not have a protective earth so it places great demands on the design because in this case double isolations have to be available on electrically conductive parts.

More protection classes

Symbol	Meaning
	Luminaires with this identifier are suitable according to DIN VDE 0710 Part 14 for installation in and on furniture, the material of which have normal or reduced flammability as per DIN 4102.
	Luminaires with this identifier are suitable according to DIN VDE 0710 Part 14 for installation in and on furniture with unknown flammability.

The glow wire test

Symbol	Meaning
960°C	For general-purpose luminaires installed in enclosed horizontal escape routes and stairwells.
850°C	For general-purpose luminaires installed in buildings open to the general public if the entire visible area of the ceiling covered by the luminaires is more than 25% of the building area.
750°C	For other general-purpose luminaires installed in buildings open to the general public

External parts of fixed or suspended luminaires must be subjected to a glow wire test at the temperatures indicated above, based on their location and purpose. The above values are binding for France, otherwise a temperature of 650°C is usual.

More information and specifications can be taken from the DIN EN 60598-1.

Intertek

ETL-Label

Historically, structures and contents of the safety standards in the U.S. have developed different to the standards in the European market.
The ETL label is a mark of quality that guarantees the proof of compliance with the relevant UL standards in the United States and the Canadian Standards in accordance with CSA standard. This label has a high acceptance in the U.S. and Canada. It is attributed to the Electrical testing laboratories, which are established by Thomas Alva Edison in 1896.
The ETL Label is the second largest and fastest-growing certification label in the North American market.

CE label

The CE label confirms that the product complies with the relevant EU directives, such as the Low-Voltage Directive 2014/35/EU or the EMC directive 2014/30/EU. Of course, LED Linear™ luminaires meet the requirements of the relevant EC directives and therefore carry the CE label.

Compliance with safety regulations and other standards

Luminaires should not only look good and provide good light, they must also be protected against injury and fire. Safety is guaranteed by compliance with a variety of regulations and standards. Luminaires from LED Linear™ meet all relevant national and international regulations and this can be indicated by approval marks from independent test institutes such as the ones shown above. This is documented by additional approval marks, such as the VDE or ENEC certificate, if the customer wishes..

German "Elektrogesetz"

The icon with crossed-out wastebasket on a EEE states that the product should not be disposed of with household waste at its end of life. Instead, it can be returned free of charge at an appropriate collection point nearby. Please check the available collection points in your city or local government. If the old unit contains personal data, please act responsibly and delete before disposing of it.

The registration number of LED Linear: WEEE-Reg.-Nr. DE 12683737.

Safety of the human eye with LED products

In 2006 the International Electrotechnical Commission (IEC) has committed the IEC 62471:2006 to set up the photo biological safety with lamps and lamp systems. This standard can be applied to LEDs, too.
In Germany and Europe the DIN EN 62471 must be applied to lamps and lamp systems. In this standard different risk groups are defined. The risk group classification includes the different spectral ranges and exposure time which takes effect to the human eye, especially for the blue and white light emitting LEDs. According to this definition most of our products are within the exempt group. In this case additional markings and protective actions are not necessary.
Nevertheless, never look into the light source directly. Keep in mind that increasing the current or adding optical components can change the risk group and can damage the human eye.

EU-ENERGY LABEL

EU Regulation 874/2012 – energy labeling of electrical lamps and luminaires

The EU Regulation 874/2012 supplementing Directive 2010/30/ EU of the European Parliament deals with energy labeling of electrical lamps and luminaires. The stated aim of Regulation 874/2012 is to promote efficient products through clear information regarding their energy efficiency.

In the European Union energy-related products, such as lighting equipment, are marked with a label for electric power consumption – the EU Energy Label. The Energy Label for lamps provides information about the energy efficiency class, the respective lamp is assigned, and what demand for energy it has in 1,000 operating hours. This ensures an easy comparison of products in terms of energy consumption in the competition.

For us it is important to develop environmentally designed products, for thereby contributing to the sustainable conservation of resources. LED Linear™ develops and manufactures high quality products, which are characterized by high energy efficiency and a long lifetime. Starting with the product idea to the recycling of our products, we ensure that the environmental impact will be reduced continuously throughout the entire product life cycle.

- The EU Energy Labels are ready for download on the relevant product page at **www.led-linear.com**.
- EU Energy Label based on VarioLED™ Flex HYDRA SLD3 W850 with a product length of 1 m.

REACH AND ROHS COMPLIANCE

Since 1 June 2007 the regulation (EC) no. 1907/2006, the so-called REACH regulation (REACH-Registration, Evaluation, Authorisation and Restriction of Chemicals) has been in force.

To put it in plain words, the REACH regulation distinguishes between chemical products ("substances on their own and in preparations") and non-chemical products ("substances in articles").

LED Linear™ GmbH as a manufacturer of non-chemical products (linear lighting solutions with LED) is a "producer of articles" according to the REACH regulation. As such a producer LED Linear™ GmbH would be in principle obliged to (pre-)register if, when using our products, chemical substances were released under normal and reasonably foreseeable conditions. But as this is not the case, only the provisions concerning the "candidate list" (substances of very high concern) are important for us.

According to these provisions, producers and importers of articles containing a substance from the "candidate list" in a concentration above 0.1 % by mass per article must provide their professional recipients with sufficient information to allow safe use of the products including, as a minimum, the name of that substance. If the articles contain more than 1 t/a of the substance, the European Chemicals Agency (EChA) must be informed.

The candidate list according to article 59 (1, 10) REACH (EC regulation no. 1907/2006) has been published in the meantime (see internet address of the European Chemicals Agency (EChA) http://echa.europa.eu/). However, we do not have any information that substances from the candidate list are contained in a concentration above 0.1 % by mass per article in the products delivered to you.

We want to clarify that for the manufacture of our products chemicals are of course used. If they contain substances liable to registration, the duty to register, however, exclusively applies to our suppliers and not to us as a "downstream user". We have contacted the corresponding suppliers to ensure that we are supplied, if possible, with the required chemicals.

We know, of course, the requirements of the RoHS guideline directive concerning lead, cadmium, mercury, hexavalent chromium, polybrominated biphenyl (PBB) and polybrominated diphenyl ethers (PBDE) and their implementation into national law.
Our products are always conform to the current RoHS-policy.

HIGH COLOR RENDITION, HIGH R9

The color rendition is a quality characteristic of light. The most natural of all light sources, the sun, has a color rendering index of CRI = 100. This means that all known colors are 100 % reproduced by the spectral emission of the sunlight. We have set ourselves the aim to perceive this characteristic of the sun with our products. Many LED Linear™ products provide a color rendering index of up to 98 and feature a R9 value of up to 90. Red shades are very powerful colors. The accurate color renderings of these deep red shades are measured in the R9 color spectrum. Many LEDs have a high overall CRI value, the critical R9 performance may be missing. Therefore selected LED Linear™ products based on the VarioLED™ Flex HYDRA LD5, HD6 and HD10 use special, purpose-optimized LEDs to ensure a higher color rendering in critical R9 range and thus reproduce strong colors in all facets of life.

Use this page to test the color rendering of our LED light lines.

LED LINEAR LABORATORY: CLIMATE AND TEMPERATURE TEST CHAMBERS

To ensure and test our high level of product reliability and lifetime we have expanded our laboratory with modern climate and temperature shock test chambers. To have an impression of the performance of the chambers a few technical details are shown below.

Climatic Test Chamber 2 x VCL4010

Temperature mode

- Temperature range: -40°C - +180°C
- Temperature deviation: ± 1°C
- Temperature homogeneity: ± 2°C

Climate mode

- Temperature range: 10°C - 95°C
- Humidity range: 10% - 98%
- Humidity range: ± 3%
- Temperature deviation: ± 0.5°C
- Temperature homogeneity: ± 1.5°C

General info

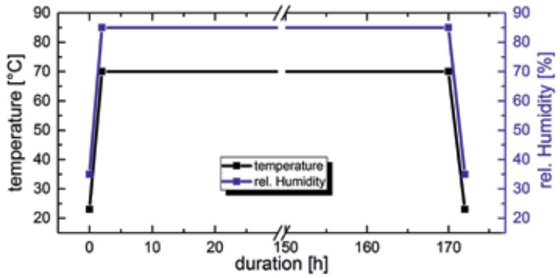
- Testing volume: 100 l
- Dimension of test chamber: 50 cm x 49 cm x 40 cm (H x W x L)
- 1 opening for electrical contacts
- Annual maintenance and calibration

Changing rate:

- Heating: 3.5°C/min
- Cooling: 5°C/min

Typical tests at LED Linear™

- Temperature Humidity Bias Test (THBT)
- 70°C & 85 % r. H.
- Severity level depends on duration
- I: 168 h
- II: 504 h
- III: 1,000 h
- IV: 2,000 h



Climatic Test Chamber 1 x VC[3]4100

Temperature mode

- Temperature range: -42°C - 180°C
- Temperature deviation: ± 1°C
- Temperature homogeneity: ± 2°C

Climate mode

- Temperature range: 10°C - 95°C
- Humidity range: 10% - 98%
- Humidity range: ± 3%
- Temperature deviation: ± 0.5°C
- Temperature homogeneity: ± 1.5°C

General info

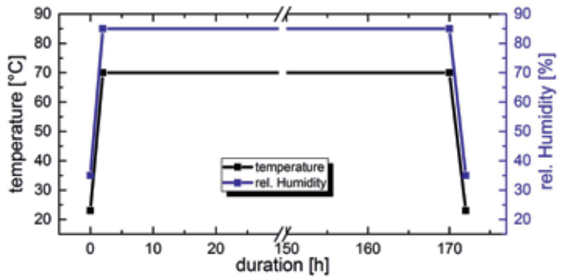
- Testing volume: 990 l
- Dimension of test chamber: 95 cm x 110 cm x 95 cm (H x W x L)
- 2 openings for electrical contacts
- Annual maintenance and calibration

Changing rate:

- Heating: 3.5°C/min
- Cooling: 5°C/min

Typical tests at LED Linear™

- Temperature Humidity Bias Test (THBT)
- 70°C & 85 % r. H.
- Severity level depends on duration
- I: 168 h
- II: 504 h
- III: 1,000 h
- IV: 2,000 h



Temperature Shock Chamber VT[3]701252

Hot chamber

- Temperature range: +50°C - +220°C
- Temperature deviation: ± 1°C
- Temperature homogeneity: ± 2°C

Changing rate:

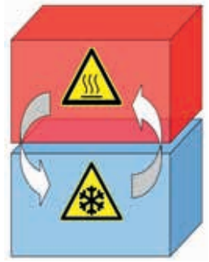
- Heating: 14 K/min

Cold chamber

- Temperature range: -80°C - +70°C
- Temperature deviation: ± 1°C
- Temperature homogeneity: ± 2°C

Changing rate:

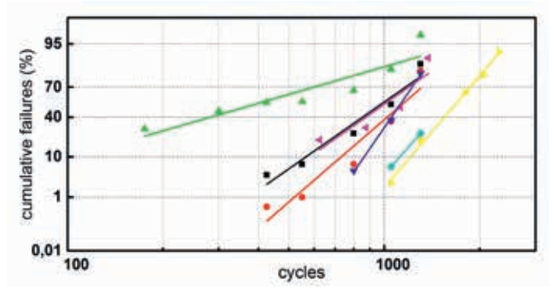
- Heating: 2 K/min
- Cooling: 6.3 K/min



Schematic

Typical tests at LED Linear™

- Testing of interconnections of components
- -25°C; 85°C ; 30 min; 24 cycles
- reliability of the solder joints
- -55°C; 125°C; 30 min; ≤3,000 cycles
- (weibull distribution)



NEW

PHOTOMETRIC MEASUREMENTS

LED LINEAR™ SERVICE OFFER: IN HOUSE LABORATORY PHOTOMETRIC MEASUREMENTS

Since 2018 we are able to offer you photometric measurements and several tests as a new service of our in house laboratory. The main measurement and test equipment is shown below.

For applying these or additional measurements and tests do not hesitate to ask your contact partner of LED Linear™.

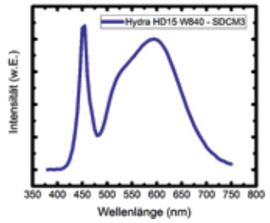
Lighting Measurements[A]

Goniometer

- Measurement of the light distribution curve up to gamma = 120°[A]
- Luminous flux
- Measurement of angle dependent colorimetric values
- Photometric results available as IES- or EULUMDAT Files

Integration sphere

- Luminous flux
- Measurement of colorimetric values like: CCT, CRI etc.
- Measurement of spectral radiant flux



Climatic Tests and Thermal Shock[B]

Temperature mode

- Temperature range: -40°C - +180°C
- Temperature deviation: ± 1°C
- Temperature homogeneity: ± 2°C

Changing rate

- Heating: 3.5°C/min
- Cooling: 5°C/min

Climate mode

- Temperature range: 10°C - 95°C
- Humidity range: 10% - 98%
- Humidity range: ± 3 %
- Temperature deviation: ± 0.5°C
- Temperature homogeneity: ± 1.5°C

Thermal shock on demand

Thermography[C]

- Thermographic measurement of devices and components

Template Test Report

[A] Measurements according to DIN EN 13032-4:2015-08, CIE S 025:2015; DIN EN ISO/IEC 17025 (works in progress)

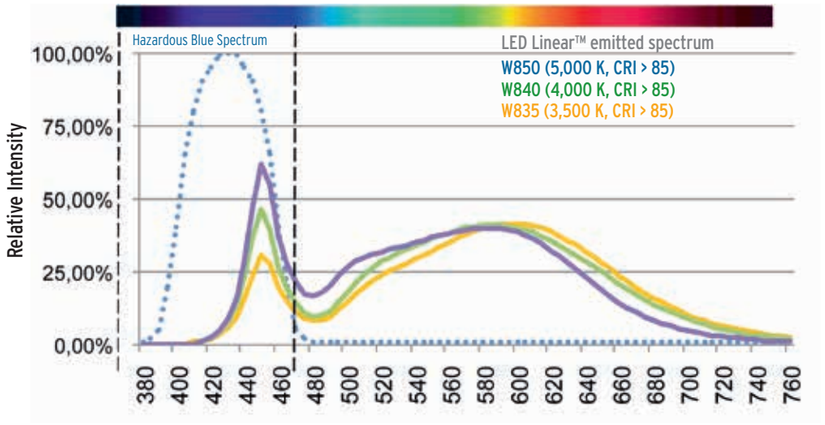
[B] Diverse Standards possible, please ask

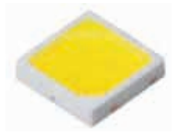
[C] With ITC level 2 certified personnel

PHOTOBIOLOGICAL SAFETY OF LED LINEAR LIGHT SOURCES

(HAZARDOUS BLUE INDEX ACCORDING TO IEC 62471)

Photobiological safety is a constant and highly frequented topic in the lighting industry. Most discussions are about hazardous radiation in certain wavelength ranges, on radical radiation angles and high luminances.
Especially for the LED technology these topics are always on top due to the fact, that LEDs often have high luminous intensities on a small surface and a high blue component of the emitted light in the wavelength range of 380 nm – 480 nm which can harm the eyes, especially the retina of humans. High luminances can be easily reduced by optical systems. It looks different with the high blue light part of the LED. Most LEDs for general lighting have a blue emitting chip-die on which a phosphor conversion layer enriched with color particles is applied. This combination creates white light through additive color mixing.





The IEC 62471 standard deals with the photobiological safety of light sources as well as the blue light hazard between 380 nm and 480 nm. To distinguish, four groups are defined in IEC 62471 to give the people an indication of the danger. LED Light engines by LED Linear™ do not pose any harm to humans due to the low blue component of the emitted light within 380 nm – 480 nm. LED Linear™ light engines are principle for any type of lighting application.

LED Linear VarioLED™ Flex			
Exempt Group	**Risk Group I***	Risk group II	Risk Group III
Lamp or luminaire does not constitute a danger in the sense of Photobiological safety. Labeling is not required.	Lamp or luminaire does not constitute a danger in the sense of Photobiological safety. Labeling is not required.	Lamp or luminaire does not constitute a danger in the sense of Photobiological safety. Labeling is not required.	Not permitted in general lighting

* LED Linear™ LED light engines with "risk group I" according to IEC 62471 are correspondingly labeled or marked.

PHOTOBIOLOGICAL SAFETY OF LED LINEAR LIGHT SOURCES

(VARIOLED FLEX HYDRA SERIES – HAZARDOUS BLUE INDEX ACCORDING TO IEC 62471)

This document certifies on behalf of LED Linear that, to the best of LED Linear's knowledge that the products based on VarioLED Flex™ HYDRA series was tested and evaluated by LED Linear™ in compliance with IEC 62471(2006) assigned to the risk group specified as follows:

Details of Evaluation:
Based on VarioLED Flex HYDRA Series up to $I_f = 65\ mA$

Hazard Name	Symbol	Measurement Value	Emission Limits			Units	Risk Group
			Exempt	Low-Risk	Mod-Risk		
Actinic UV	E_s	$*^2$	10^{-3}	$3x10^{-3}$	$3x10^{-2}$	$\frac{W}{m^2}$	Exempt group $*^3$
Near UV	E_{UVA}	$*^2$	10	33	10^2	$\frac{W}{m^2}$	Exempt group $*^3$
Retinal blue-light	L_B	N/A	10^2	10^4	$4x10^6$	$\frac{W}{m^2}/_{sr}$	
Retinal blue-light, small source	E_B	$2.50x10^{-1}\ *^4$ $3.17x10^{-1}\ *^5$	1	1	$4x10^2$	$\frac{W}{m^2}$	Exempt group $*^4$ Exempt group $*^5$
Retinal thermal	L_R	$3.80x10^4\ *^4$ $4.62x10^4\ *^5$	$8.2x10^6\ *^4$ $6.9x10^6\ *^5$	$8.2x10^6\ *^4$ $6.9x10^6\ *^5$	$2.1x10^7\ *^4$ $1.7x10^7\ *^5$	$\frac{W}{m^2}/_{sr}$	Exempt group $*^4$ Exempt group $*^5$
Retinal thermal, weak visual stimulus	L_{IR}	$*^2$	$5.5x10^5\ *^4$ $5.5x10^5\ *^5$	$5.5x10^5\ *^4$ $5.5x10^5\ *^5$	$5.5x10^5\ *^4$ $5.5x10^5\ *^5$	$\frac{W}{m^2}/_{sr}$	Exempt group $*^3$
IR radiation, eye	E_{IR}	$*^2$	10^2	$5.7x10^2$	$3.2x10^3$	$\frac{W}{m^2}$	Exempt group $*^3$

$*^1$ Only if the hazard is considered when determining the Risk Group(s) assigned to the product, the measurement values for this hazard is provided.
$*^2$ This product has not been evaluated for the hazard due to no emission in the applicable wavelength range.
$*^3$ This product has been classified as Exempt Group due to no emission in the applicable wavelength range.
$*^4$ For general lighting service lamps Measurement distance: 240 mm, Aperture size: 7 mm, Angular subtense: 3.39 mrad, Ambient: 25°C/40%RH
$*^5$ For all other light sources Measurement distance: 200 mm, Aperture size: 7 mm, Angular subtense: 4.07 mrad, Ambient: 25°C/40%RH
$*^6$ This product is not applicable to this hazard.

Notes
In accordance with the classification for lamps intended for general lighting service (GLS), this product was classified as Exempt Group. The measurement value for each hazard was below the emission limit for Exempt Group.
In accordance with the classification for all other light sources, this product was classified as Exempt Group. The measurement value for each hazard was below the emission limit for Exempt Group.

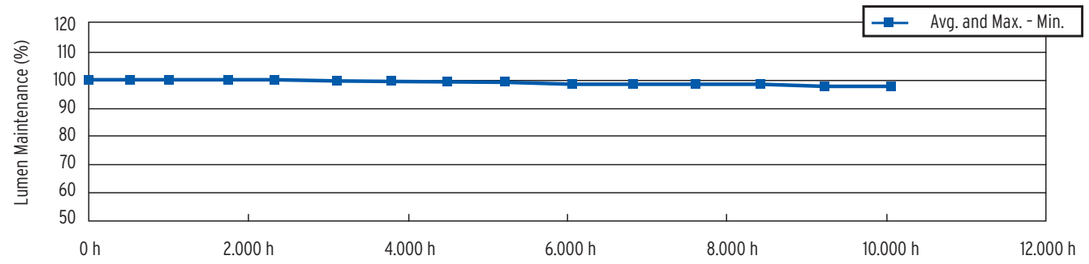
* LED Linear™ LED light engines with "risk group I" according to IEC 62471 are correspondingly labeled or marked.

LUMEN MAINTENANCE ACCORDING TO LM-80-08

The standard LM-80-08 "Measuring Lumen Maintenance of LED Light Sources" provides methods of the measurement of lumen maintenance of LED packages and LED modules.
The products shall be tested for at least 6,000 hours with data collection at a minimum of every 1,000 hours. Test must include three case temperatures, recommending nominal case temperatures: 55°C, 85°C and a third temperature which can be freely chosen by the manufacturer and is in our case mostly at 105°C. Depending on the application with corresponding current an additional case temperature is selected. Chromaticity or voltage shift is also reported over the measurement time.

LM 80

LM 80 compliant



LIFETIME PREDICTION ACCORDING TO TM-21-11

The TM-21-11 standard „Projecting Long Term Lumen Maintenance of LED Light Sources" provides a calculation tool to interpret the data collected from LM-80-08 testing. LED Linear™ provides users with lumen maintenance life projection or to predict estimated lumen output values at a given time duration by interpolating lumen maintenance behaviors for the in-situ temperature which are different from testing temperature.

For example the lumen maintenance life projection L80 in hours is estimated when 80% from primarily lumen output is given. Or the predicted lumen maintenance can be calculated within a given lifetime.
LED Linear™ calculates all lifetime data according to the standard TM-21-11 and are documented on all data sheets. Do not hesitate to ask for detailed test reports.

NEW STANDARDS

Lumen maintenance according to IES LM-84

This standard provides the method for reproducible measurements of lumen and color maintenance of LED lamps, light engines and LED luminaires. It does not provide performance requirements or predictive estimations or extrapolation for lumen maintenance beyond the limits of the lumen maintenance determined from actual measurements.

Lifetime prediction according to IES LM-28

The typical minimum test duration is 6,000 h. If at least 6,000 h of LM-84 data are available, a TM-21 like projection based on these data can be used. LM-84 data may be used in conjunction with LM-80 data for the same type of LEDs to reduce the test duration to 3,000 h. Some specification allows 3,000 hour test results to be used for prequalification.

VarioLED™ Flex VENUS White TV IP67

Private residence, Davos

Photo: Daniel Kessler, Zürich

IES TM-30-15 REPORT: VARIOLED™ FLEX WHITE

In May 2015 the Illuminating Engineering Society proposed a new calculation method for the color rendering of LEDs. This new method is described in detail in the technical memorandum IES TM-30-15. This novel method assesses the spectral power distribution (SPD) of white light sources near the Planck locus regarding the color fidelity, color discrimination and color preference. The TM-30-15 method utilizes 99 color evaluation samples (CES) – each represented by a spectral reflectance factor function – to quantify the difference in color rendition between the test source and reference source. This allows for a much more differentiated assessment of the color rendering of a light source compared to the CRI method utilizing only 8 reference colors. The introduced Fidelity Index R_f and the Gamut Index R_g characterizing the light source will help our customers to specify our luminaires more easily for certain applications or for projects with given design rules.

This report details the findings of the tests conducted on the color rendering of the product families VarioLED™ Flex HYDRA, SOL, NEXUS and ATON as well as XOOMINESCENT™. The tests and calculation methods are fully compliant with the novel IES standard TM-30-15. The results can be transferred without restrictions of any kind to system luminaires, that are using the HYDRA White tapes as light engine, in particular:

- VarioLED™ Flex NEXUS / HYDRA / SOL / ATON / ECO
- XOOMINESCENT™ CC
- VarioLED™ Flex VENUS / PHOBOS / SKYLLA TV IP67*
- VarioLED™ Flex VENUS / PHOBOS / SKYLLA SV IP67*
- VarioLED™ Flex VENUS True Color TV/3D
- ADONIS True Color IP67* / KALYPSO True Color IP67
- VarioLED™ OCEANOS True Color IP67
- XOOLINE™ IP40/IP67
- LYRA IP40
- LYRA 36 NANO IP40
- XOOLUX™ NANO IP67
- LUNA IP40
- XOOLUM™ IP40/IP67 / XOOLUM™ R IP20/IP67
- MARS CV / MARS CC IP40
- XOOTUBE™ 38 IP40
- XOOTOO IP40

*) The LED tapes in IP67 products are encapsulated in Polyurethane (PU). This can cause a specific CCT shift of about 200 – 400 K into the cold white spectrum along the Planck locus. The PU encapsulation has no impact on the integral index R_f.
However, the CCT shift may influence individual R_f of the 99 CES. We will provide CES diagrams of the IP67 products on request.

The measurements of the spectral power distribution are conducted at 25°C ambient temperature in the photometric laboratory of LED Linear™ using an absolute calibrated spectrometer BTS256-LED in the integrating sphere ISD-100HF-V01 (both Gigahertz Optik, Germany). The tested CRI 95+ and CRI 85+ LED types are tested with the photometric codes W830, W930, W940. TM30 reports for the other CCTs are available on request.

This report is based on calculations processed with the IES TM-30-15 Advanced Calculation Tool (version 1.01 as of 2015-10-02), provided by the Illuminating Engineering Society (IES).

OUTDOOR LINEAR LIGHTING WITH HIGH INGRESS PROTECTION FOR ROUGH ENVIRONMENTS

The entire VarioLED™ Flex Tape Portfolio is as well designed for the application in rough environmental conditions. We offer up to IP68 protect LED Lighting products. Based on our patented process technology we seal our products in a continuous cover of highly resistant polyurethane.

With our design we protect the products against the immersion of water.

The used material itself is resistant against UV-A, UV-B, fuel, acid, solvents and salt water. Thermal shock, heat, high temperature, abrasion and flammability resistance guarantee a high product quality and durability, too.

TOLERANCE OF THE COLOR TEMPERATURE AT IP67/IP68 PRODUCTS

The values mentioned in the data sheets and in the photometric files represent statistical variables. The values do not necessarily represent the exact parameters of an individual product, so the actual color temperature can be different from averages indicated in the data sheets.

The tolerance of the color temperature of IP67 products are caused by

- the LED
- the production process
- the encapsulation material
- the measurement

The LED:
The LED are classified in binnings according to their color temperature, i. e. divided into different finely graduated classes. The human eye perceives color temperatures within one MacAdam binning as absolutely homogeneous. In case of cool white LEDs, the tolerance of the color temperature within one binning is larger than in case of warm white LEDs.

Encapsulation material:
Due to the encapsulation material polyurethane the respective spectral regions are affected differently. The optical path through the encapsulation material affects the color temperature on the basis of wavelength-dependent absorption. Here, the blue part of the spectrum passes out preferably from the encapsulation material. The light is therefore overall colder due to the shift to higher color temperatures. This effect is more pronounced in warm white LED strips.

Production process:
The production of our LED strips is based on several process steps that are all subject to a tolerance. Especially during the encapsulation tolerances affecting the color temperature can occur. For some products, multilayer systems from different encapsulation materials are generated leading to the increase in the CCT value. In the technical process, deviations of the layer compositions due to machine tolerances are unavoidable.

Measurement:
The color temperature is determined by measuring instruments in the lighting laboratory. As in any measurement, the absolute accuracy of laboratory measurements is limited due to statistics and the given measurement inaccuracy of instruments and devices.

POLYURETHANE ENCAPSULATION SYSTEM FOR LEDS

Outdoor Resistance

Tests	Ref. Method	Test Conditions	Results
Florida Test	SAE J 1976	Direkt Inland, 45° South	Good (after 2 years)
Arizona Test	SAE J 1976	Direkt Weathering, 45° South	Good (after 2 years)
Xenon WOM	SAE J1960-89 2000h	65 °C - cycle 102 min. UV + 18 min. UV/water spray	no color change, minimal gloss change
Weatherometer QUV-B	SAE J 2020	(8 h UV 60° - 4 h cond. 50 °C)	no color change, minimal gloss change
Weatherometer QUV-A	SAE J 2020	2.000 h (8 h UV 70° - 4 h cond. 50 °C)	no color change, minimal gloss change

Water and Chemical Resistance

Tests	Ref. Method	Test Conditions	Results
Fuel Resistance	G.M.6073	Immersion	No gloss change/No degradation
Acid Resistance	MS-CG12	Spot Test 0.5 - 10 % conc.	No gloss change/No degradation
Solvent Resistance	GM 6121 M	Various types of used chemicals	No gloss change/No degradation
Water Immersion	WSK-M3G178	240 h @ 45°C	No gloss change/No degradation
Salt Spray Resistance	ASTM B117-95	2.000 h @ 38 °C 5 % NaCl	No gloss change/No degradation
Humidity Resistance	MS-CG12	250 h @ 40 °C 100 % R. H.	No gloss change/No degradation
Environmental Cycle	G.M.6073	Three Cycles	No gloss change/No degradation

Heat Resistance

Tests	Ref. Method	Test Conditions	Results
Heat Resistance	MS-CG12	250 h @ 80 °C	No gloss change/No degradation
High Temperature Resistance	G.M.6073	60 min. @ 93°C	No gloss change/No degradation
Thermal Shock	ESK-M99P16-A:3.5.5	16 h @ - 40 °C+ water @ 70 °C/10 cycles	No gloss change/No degradation

Abrasion Resistance

Tests	Ref. Method	Test Conditions	Results
Stone Chip Resistance	SAE J400:85	0.47 L of 250 - 300 graded gravel fired @ sample @ 480 KPa in 5 - 10 s	Chipping rating 10- No chipping to substrate

Flammability Resistance

Tests	Ref. Method	Test Conditions	Results
Flammability Resistance	FMVSS 302	ISO 3795	Flame self extinguishing

Electrical Properties

Tests	Ref. Method	Test Conditions	Results
Surface Resistivity	ASTM D257	500 V - spec. thickness 2 mm	2 x 10E15 Ohm
Volume Resistivity	ASTM D257	500 V - spec. thickness 2 mm	1 x 10E15 Ohm cm

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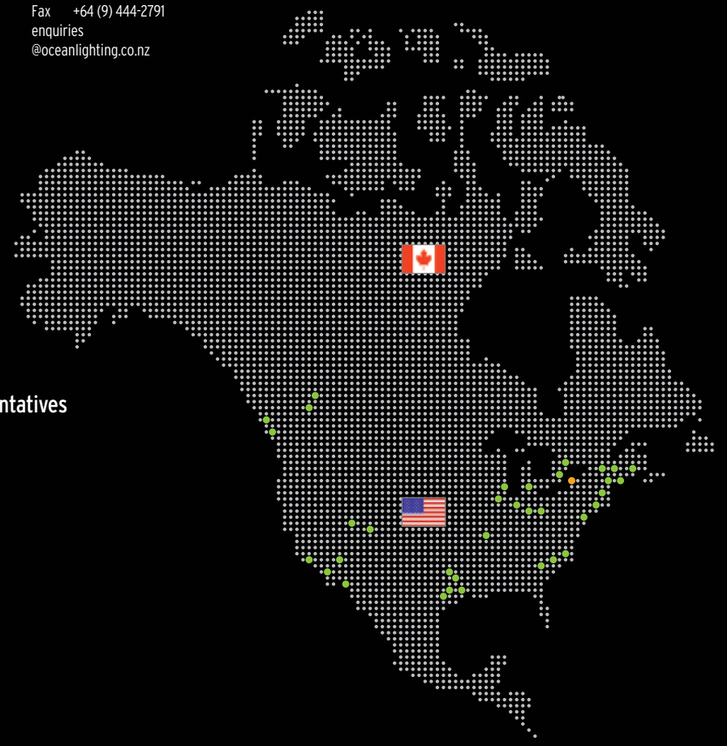

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An overview of the current Representatives of our branch offices in Canada and the United States you will find here:
www.led-linear.com/distribution

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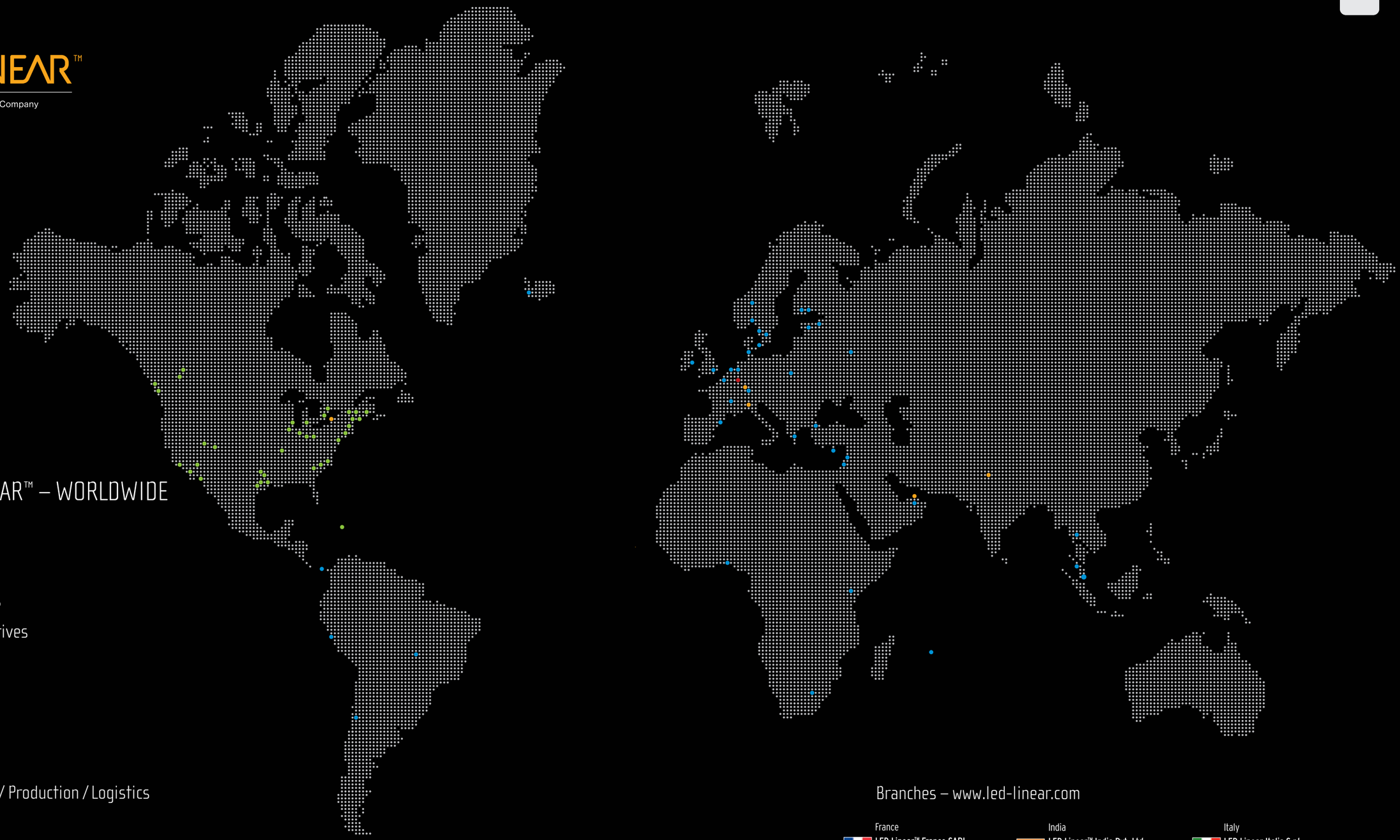

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For authorized channel partner please view **www.led-linear.com**

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