

PDL-II POWERLIGHT

Particle Detection UV-A inspection Light

UV-A light
upgraded to
50 min
Operational
use

*The most powerful inspection light
for Cleanroom inspection*

Voor Nederlandse versie klik hier.



Content

No	Item
1	Introduction Particle Detection Light (PDL-II)
2	Main specifications
3	Detailed view & specifications
4	Graphs & tables
5	Features, consumables, options
6	Selling features
7	Questions

Visualisation of particles

1. UV-A light:

- The human eye can roughly see up to 50 microns without any extra outside sources.
- With the PDL-II in UV-A light you can roughly see between 50 and 10 microns (*)

2. Bright light:

- With the PDL-II in bright light you can roughly see between 10 and 2 microns (*)



Standards in Cleanroom industry

High Tech Cleanroom classes

ISO classification number (N)	Maximum concentration limits (particulates/m ³ of air) for particles equal to and larger than the considered sizes shown below (concentration limits are calculated in accordance with equation (1) in 3.2)					
	0.1 µm	0.2 µm	0.3 µm	0.5 µm	1 µm	5 µm
ISO Class 1	10	2				
ISO Class 2	100	24	10	4		
ISO Class 3	1,000	237	102	35	8	
ISO Class 4	10,000	2,370	1,020	352	83	
ISO Class 5	100,000	23,700	10,200	3,520	832	29
ISO Class 6	1,000,000	237,000	102,000	35,200	8,320	293
ISO Class 7				352,000	83,200	2,930
ISO Class 8				3,520,000	832,000	29,300
ISO Class 9				35,200,000	8,320,000	293,000

NOTE: Uncertainties related to the measurement process require that concentration data with no more than three significant figures be used in determining the classification level.

- ISO 1 = the most clean Cleanroom
- ISO 9 = the less clean Cleanroom

Pharma Cleanroom classes

Grade	Maximum permitted number of particles per m ³ equal to or greater than the tabulated size			
	At rest		In operation	
	0.5 µm	5.0 µm	0.5 µm	5.0 µm
A	3,520	20	3,520	20
B	3,520	29	352,000	2,900
C	352,000	2,900	3,520,000	29,000
D	3,520,000	29,000	Not defined	Not defined

- Grade A = the most clean Cleanroom
- Grade D = the less clean Cleanroom

Introduction PDL-II *Particle Detection Light*

Explanation:

- 1) Particle light detector
- 2) Inductive charger
(Cable fixed on adapter)
- 3) Plastic (PE) protective cap
- 4) Plastic PDL table holder

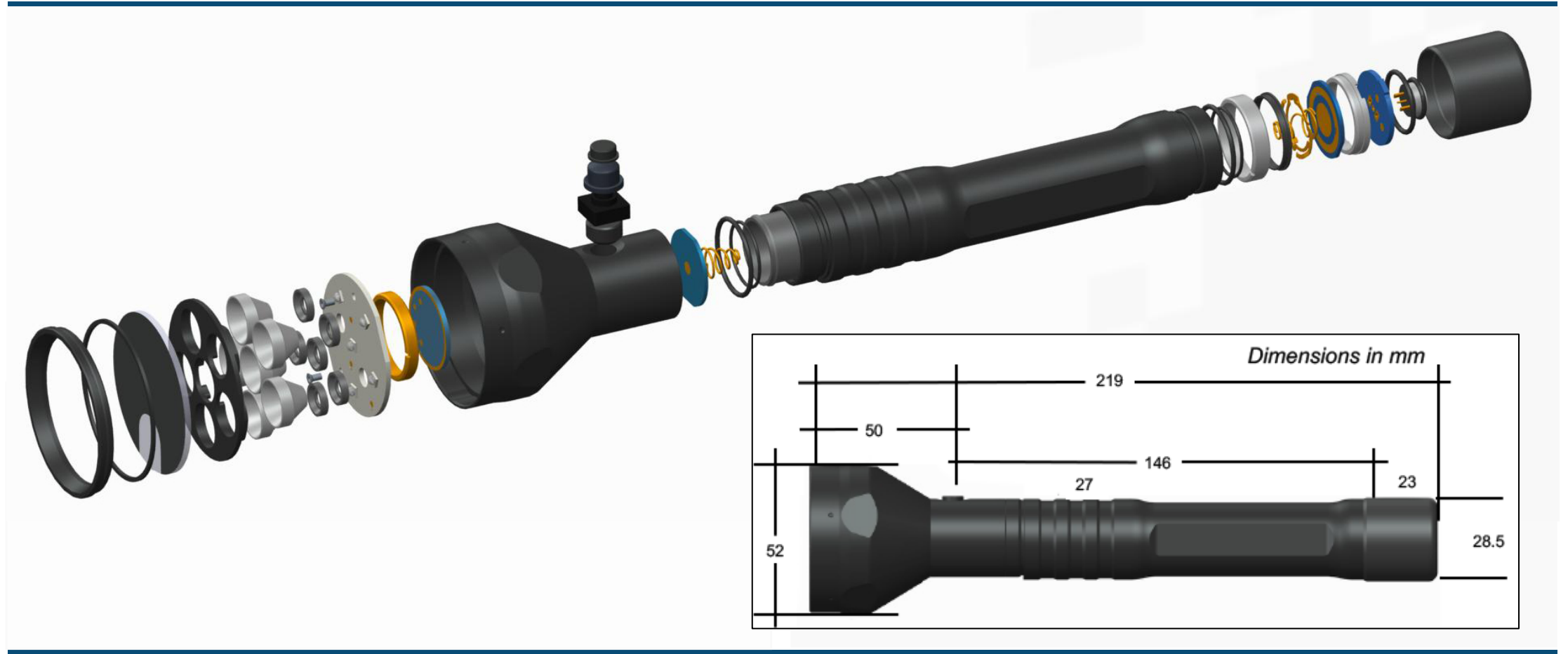


Main specification

No	Item	Spec
1	Power LED's	5x 5 Watt UV-A 365 nm +/- 5nm i.c.w. a centrally placed 5 Watt white LED (300 Lumen)
2	UV-A Light strength	See separate table with intensity data
3	Material	Aluminum T6061, Premium Type III hard anodized abrasive finish
4	Color	Black
5	Weight	App. 336 gram (batteries included)
6	Handling	Full grip, anti drop design
7	Battery life	3 operational hours by means of 1x Panasonic 18650 rechargeable Li-Ion battery (3400 mAh – 7.4 V / battery)
8	Lifetime LED's	20.000 hours
9	Dimensions	219 x 52 mm (L x D (head))
10	IP rating	IP 67
11	Guarantee	2 years on electrical performance



Detailed view



Detailed specifications (1)

No	Item	Spec
1	Electrical supply charger	100-240 V ~ 50-60 Hz
2	Details finish housing	Aluminum T6061, Premium Type III hard-anodized abrasive finish
3	Standards	CE & RoHS compliant
4	Battery type	1 x18650 Li-ion rechargeable battery from Panasonic, 3400 mAh - 7.4 V
5	Switch	Metal executed
6	Charging	Magnetic inductive charger (cable length is min 1,0 m) included
7	Manual	Included in English language
8	Tested drop height	1,2 m improved design on multiple drop tests
9	Quality procedure	ISO 9001
10	Life span	Min. 5 years
11	Certificate	IEC report (IEC 60598-2-8) enclosed in the scope of supply

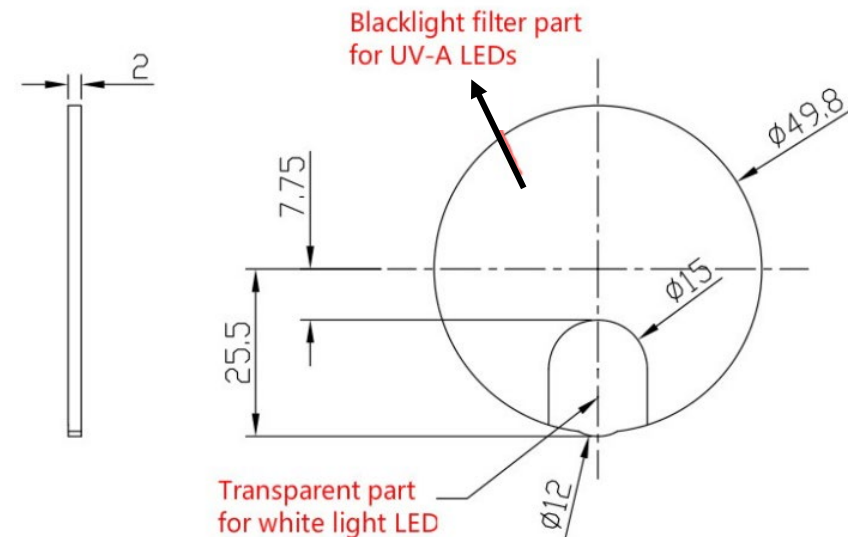


Detailed specifications (2)

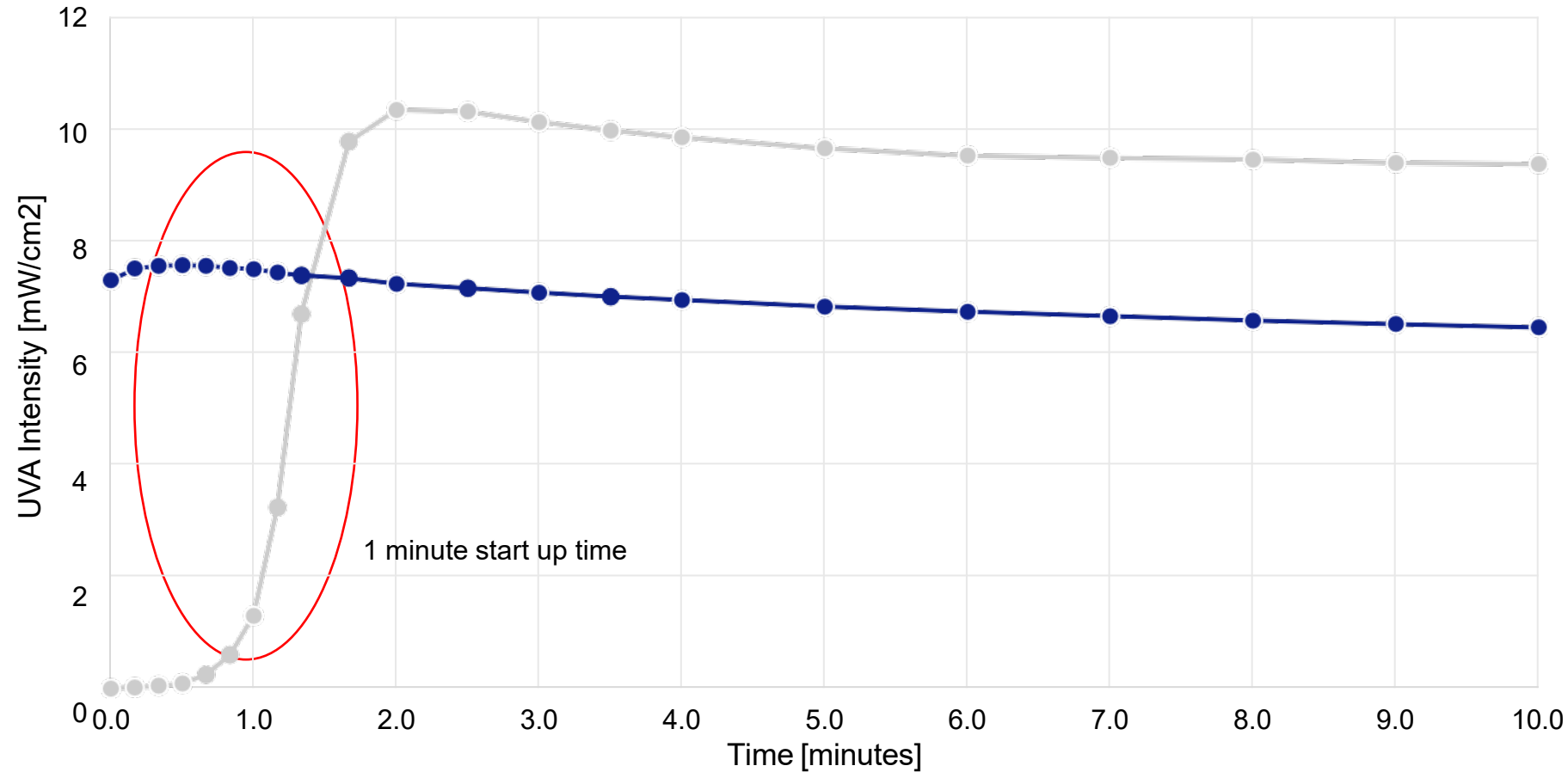
No	Item	Spec
1	Label	Product label or logo (10 x 55 mm) can be placed on the PDL
2	Roll proof design	Yes, by means of flattened head part
3	Serial number	Engraved in the housing: Year-Prod Batch-No: (YY-PB-XXXXX)
4	Temp control	Thermo switch built into the head, set at 50 °C
5	Cable shielding	The inductive connection part is optimized to minimize electric contact with the surroundings
6	Filter	Dichroic interference filter placed in front of the UV-A LED's (see separate sheet)
7	Sealing O-rings	Viton executed
8	Ergonomics	Ergonomic grip included in design (smooth finish)
9	Switching pattern	See separate sheet
10	Lens protection cap	Injection molded design, Plastic: PE / black color

Dichroic interference filter

Spec	Item
Advantage	Reduces fatiguensess of the inspector during inspection
Shock resistance	Drop proof compliant
Temp resistance	Up to 150 °C
Ageing	Anti ageing (no deterioration over time)
Selectiveness	Optimized for 365 nm
Illuminance visible light	≤ 20 lux (in UV setting)



Start up time lamp types

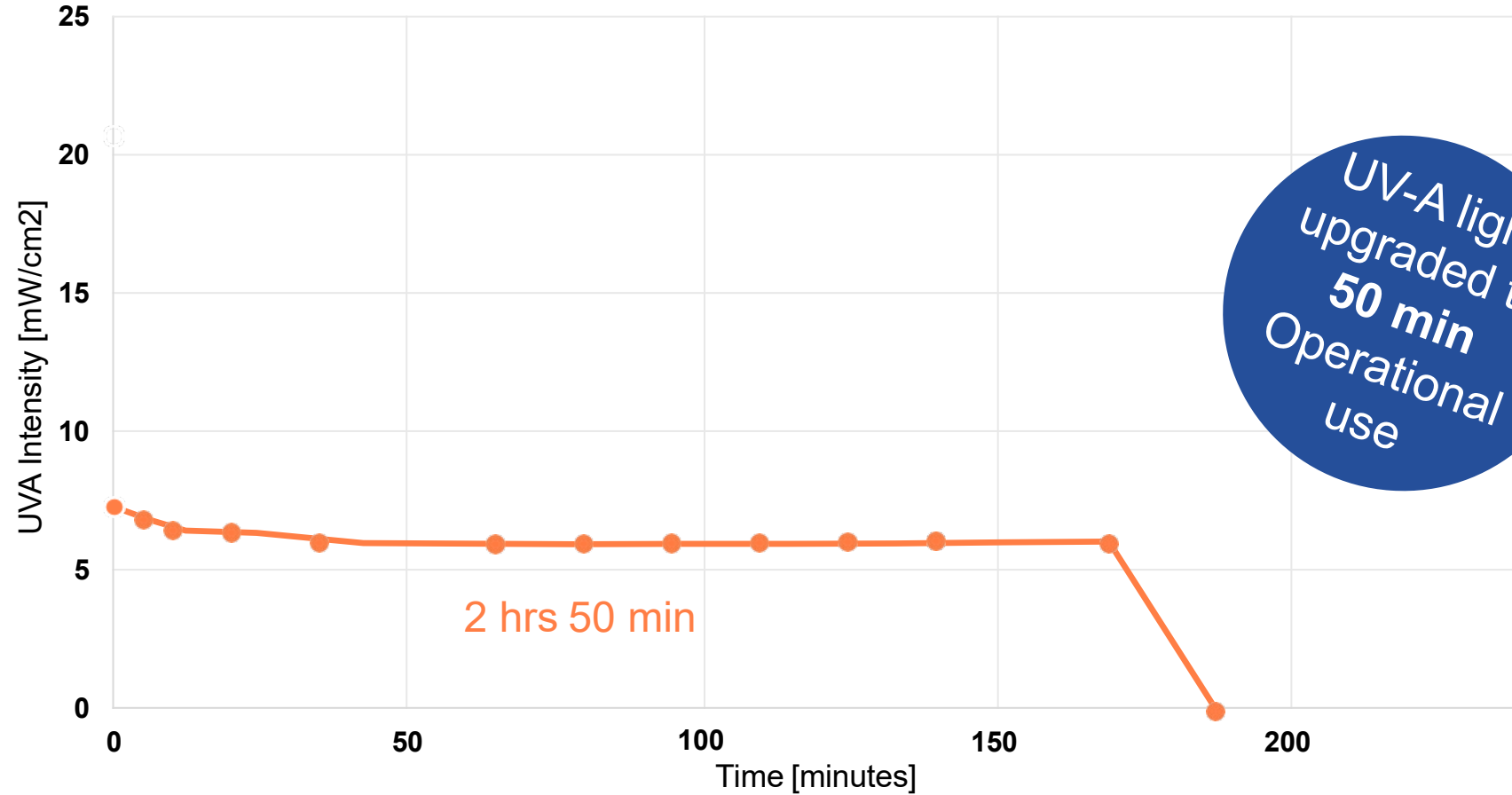


—●— Fluorescent UV lamp

—●— PDL-II UV LED



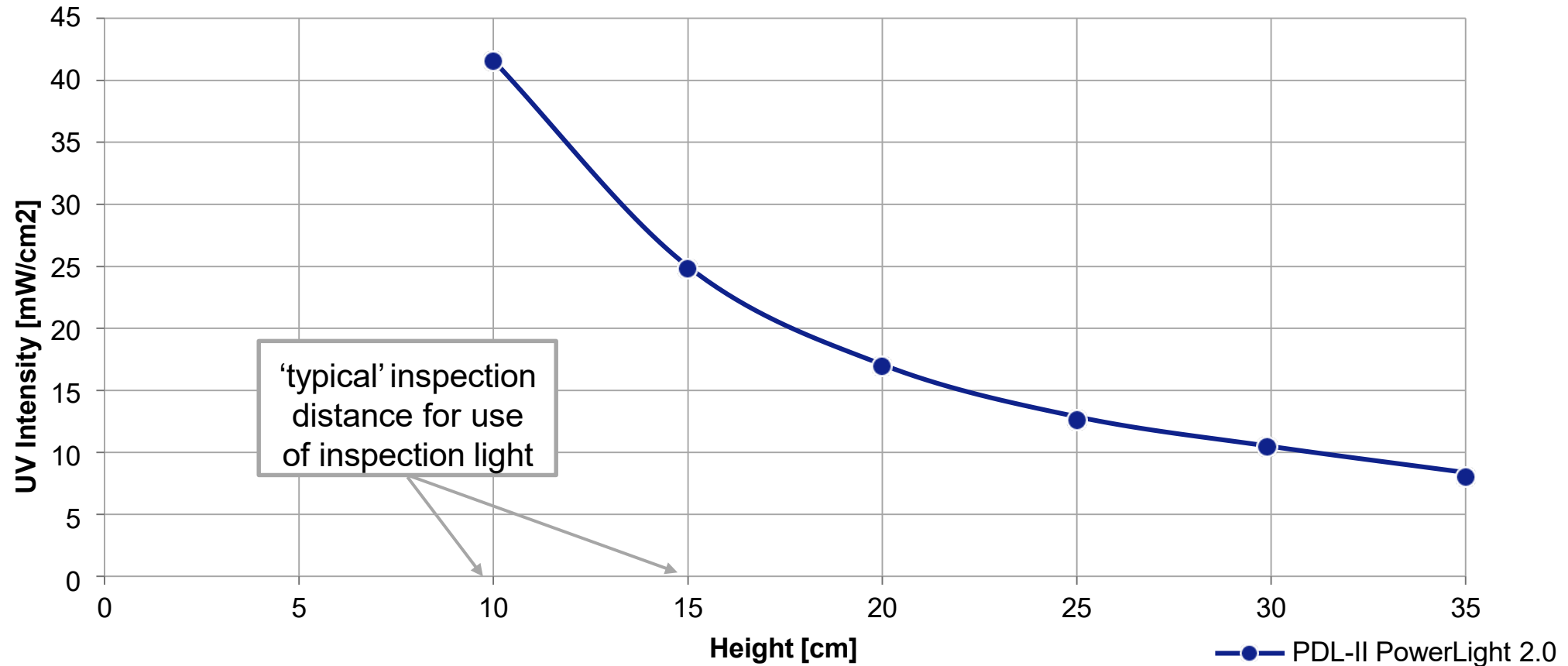
Battery lifetime *PDL-II* POWERLIGHT



—●— PDL accu / 50 min in UV-A mode and 2 hours in white light mode

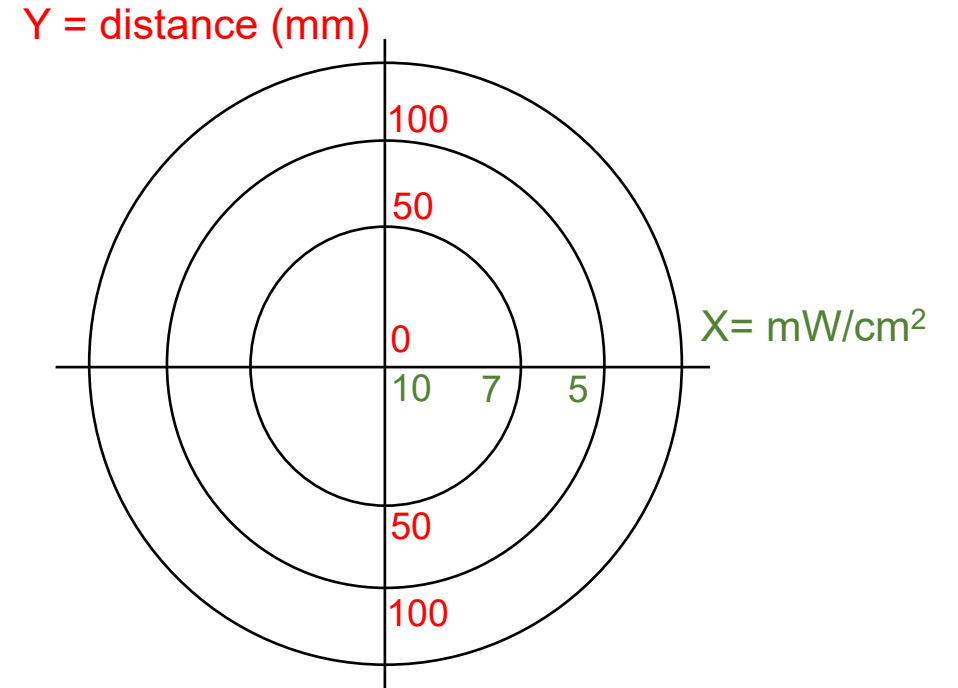


Inspection height vs UV intensity



Minimum UV intensity graph

Diameter	150 mm	300 mm	350 mm	400 mm	450 mm	500 mm
Central point	35	10	7	6	4.5	3.5
100 mm	12	7	4.5	4	3.5	2.5
200 mm	1	5	3	3	3	2.5



Data in graph given in mW/cm² of 365 nm

D = 30 cm

Switching pattern

No	Hard Switching pattern
	When lamp is off:
A	White light 100% strength & UV light off
B	White light 50% strength & UV light off
C	UV light 100% strength & White light off (The visible light strength is than ≤ 15 lux)



UV-A light LED

Specifications	Item
Power	5x 5 Watt
Wavelength	365nm \pm 5nm
Intensity	See separate graph
FWHM	\leq 30 nm
Temperature stability	\leq 5 nm drift at temp 10-50 °C

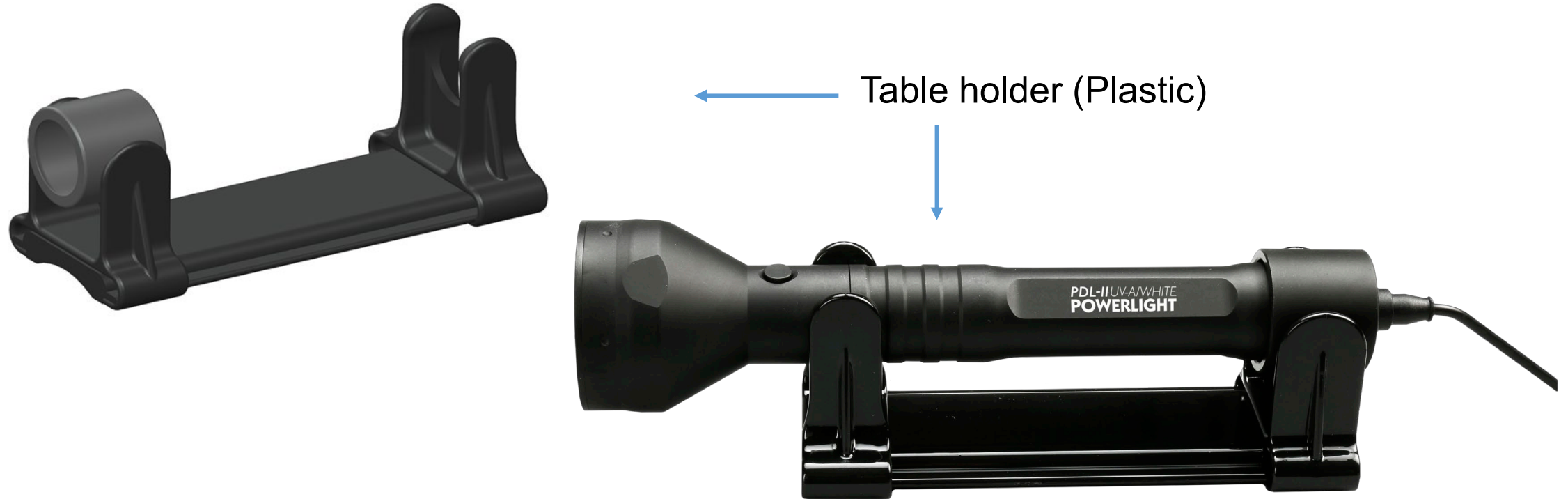


White light LED

Specifications	Item
Brand	Cree
Power Output	5 Watt
Colour temperature	6500K
Output	300 Lumen
At 100% Strength	At 50cm: 10.000 Lux At 70cm: 6.400 Lux
At 50% Strength	At 50cm: 4.900 Lux At 70cm: 3.060 Lux



Holder / Inductive charger



Casing PDL-II

Item	Spec
Dimension	280 x 220 x 80 mm
Color	Black
Material casing	PPC (Polypropylene carbonate)
Material inlay	EVA (Evatane) foam
Weight	528 gram
Lock	2x hinge lock (Red color)



Option A – (Spare) battery

Item	Spec
Brand	Panasonic
Type	18650 Li-ion
Capacity	3400 mAh – 7.4 V or 2x 3400 mAh 3.7 V
Safety	Protection circuit included in battery design
Quality	Class A / Optimized for serial charge
RoHS compliant	Yes



Option B - Battery charger set



**Rapid charging station
battery for 2 batteries**
(not in scope of supply)

- CE / ROHS compliant
- 2x 1,5 A charger
- 100-240 V ~ 50-60 Hz

Available from aug. 2021

- New ESD safe container (supplied in yellow IDP bag) for PDL-II
- Material: **Inherently Dissipative Polymers**
- Dimensions: 29 x 18 x 12 cm (L x D x H)
- Color container: Yellow



Summarizing the PDL-II

No	Item
1	Highly effective most powerful UV-A / White inspection light in high quality finish
2	Scratch-proof, Drop-proof, Hose-proof; meets the highest mechanical standards
3	Instant use (instant On / Off)
4	Optimized design for long term use of detection of dust particles
5	1x Lion rechargeable Panasonic Li-ion battery
6	Table top standard included in scope of supply
7	Inductive charging (3 to 3,5 hours required for full charging)
8	Round aesthetic finish, light design
10	Original Cree LED's suited for 20.000 hours of use

Particle Detection Light



*The most powerful flashlight available
for the Cleanroom industry*



Questions



PDL-II POWERLIGHT

Particle Detection UV-A inspection Light

UV-A licht
nu met 50 min
operationeel
gebruik

*De krachtigste zaklamp
voor Cleanroom-inspectie*

Voor Engelse versie, klik hier.



Inhoud

No	Item
1	Introductie Particle Detection Light (PDL-II)
2	Belangrijkste kenmerken
3	Gedetailleerd overzicht & kenmerken
4	Grafieken & tabellen
5	Functies, verbruiksgoederen, opties
6	Verkoopfuncties
7	Vragen

Visualiseren van deeltjes

1. UV-A licht:

- Het menselijk oog kan grofweg tot 50 micron zien zonder extra externe bronnen.
- Met de PDL-II in UV-A-licht kunt u ongeveer tussen 50 en 10 micron zien (*)

2. WIT licht:

- Met de PDL-II in fel licht kunt u ongeveer tussen 10 en 2 micron zien (*)



Cleanroom standaard

Hightech Cleanroom-klasse

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- ISO 9 = De minst schone Cleanroom

Pharma Cleanroom-klasse

Grade	Maximum permitted number of particles per m ³ equal to or greater than the tabulated size			
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- Grade A = De schoonste Cleanroom
- Grade D = De minst schone Cleanroom

Introductie Particle Detection Light



Uitleg:

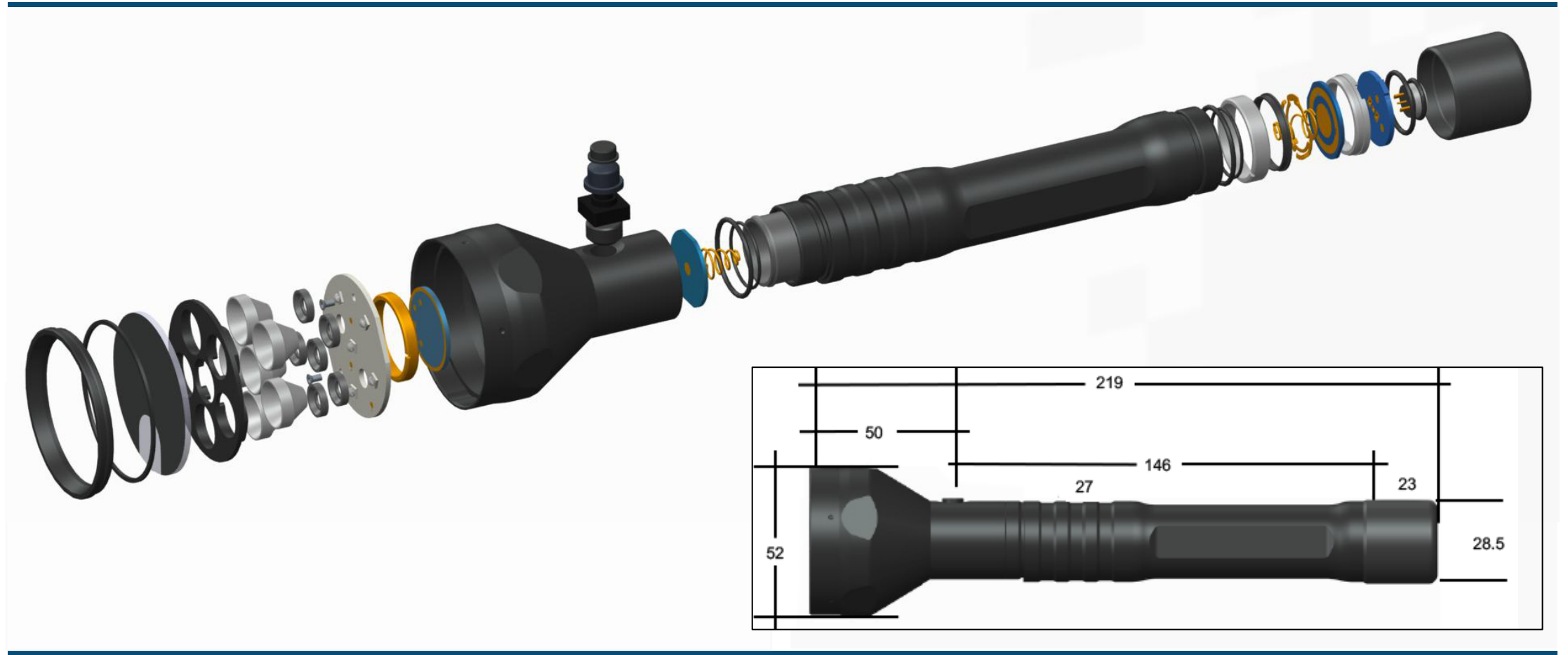
- 1) PDL-II inspectielamp
- 2) Inductieve lader
(Kabel vast aan adapter)
- 3) Plastic (PE) beschermkap
- 4) Plastic PDL-tafelhouder

Belangrijkste kenmerken

No	Item	Spec
1	Power LED's	5x 5 Watt UV-A 365 nm +/- 5nm in combinatie met een centraal geplaatste 5 Watt witte LED (300 Lumen)
2	UV-A Lichtsterkte	Zie de aparte tabel met intensiteitsgegevens
3	Materiaal	Aluminium T6061, Premium Type III hard geanodiseerde schuurafwerking
4	Kleur	Zwart
5	Gewicht	336 gram (inclusief batterijen)
6	Omgang	Volle grip, anti-drop ontwerp
7	Levensduur van de batterij	3 operationele uren d.m.v. 1x Panasonic 18650 oplaadbare Li-Ion batterij (3400 mAh / 7.4 V batterij)
8	Levensduur LED's	20.000 uur
9	Afmeting	219 x 52 mm
10	IP-classificatie	IP 67
11	Garantie	2 jaar op elektrische prestaties



Gedetailleerd overzicht



Gedetailleerde kenmerken (1)

No	Item	Spec
1	Oplader voor elektrische voeding	100-240 V ~ 50-60 Hz
2	Details afwerking behuizing	Aluminium T6061, Premium Type III hard geanodiseerde schuurafwerking
3	Normen	Voldoet aan CE & RoHS
4	Batterij type	1 x18650 Li-ion oplaadbare batterij van Panasonic, 3400 mAh – 7.4 V
5	Schakelaar	Metalen uitvoering
6	Opladen	Inclusief magnetische inductieve oplader (kabel lengte is min. 1,0 m)
7	Handboek	Inbegrepen in Engelse taal
8	Geteste valhoogte	1,2 m
9	Kwaliteitsprocedure	ISO 9001
10	Levensduur	Min. 5 jaar
11	Certificaat	IEC-rapport (IEC 60598-2-8) bij de levering inbegrepen

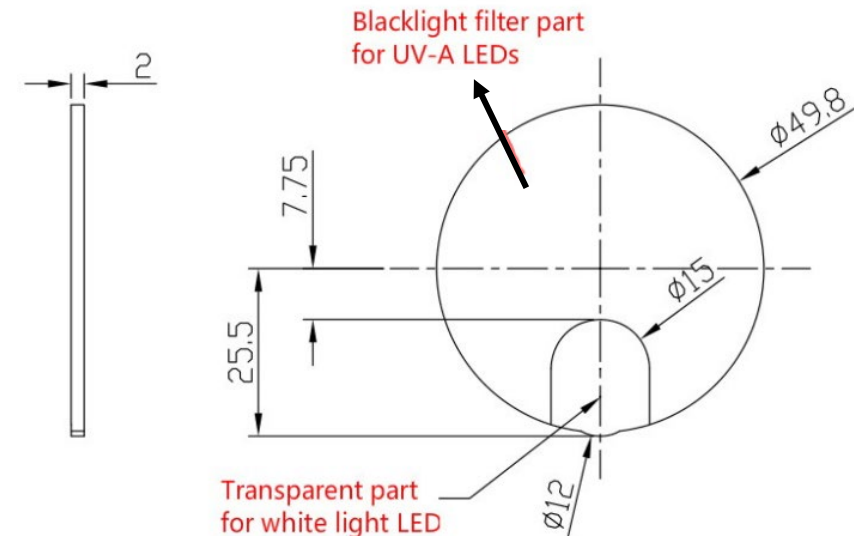


Gedetailleerde kenmerken (2)

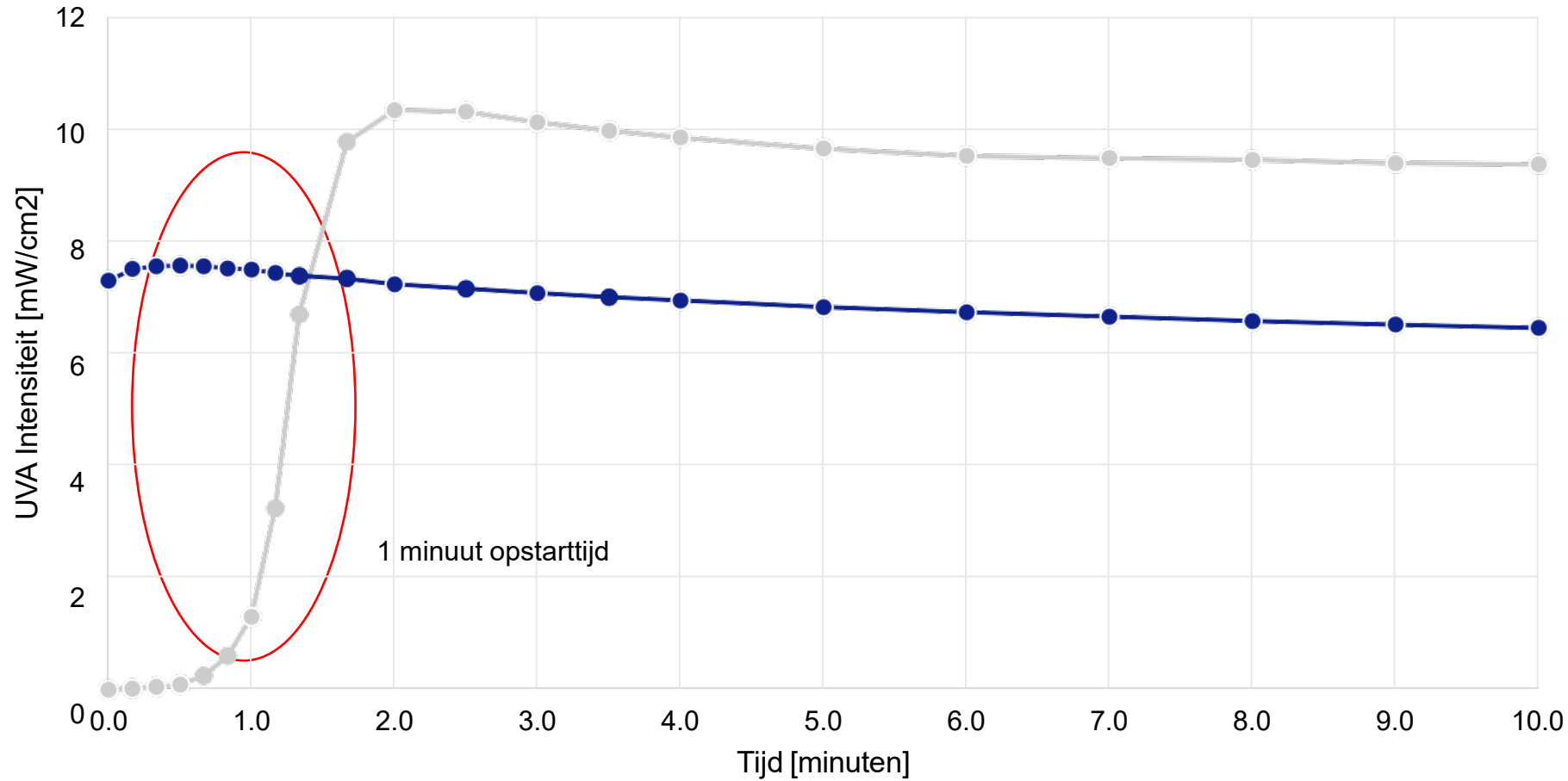
No	Item	Spec
1	Etiket	Product etiket of logo (10 x 55 mm) kan op de PDL worden geplaatst
2	Rolbestendig ontwerp	Ja, door middel van een afgevlakt kopdeel
3	Serienummer	Gegraveerd in de behuizing: Year-Prod Batch-No: (YY-PB-XXXXX)
4	Temp. regeling	Thermo-schakelaar ingebouwd in de kop, ingesteld op 50 °C
5	Kabelafscherming	Het inductieve verbindingsgedeelte is geoptimaliseerd om elektrisch contact met de omgeving te minimaliseren
6	Filter	Dichroic interferentiefilter geplaatst voor de UV-A LED's (zie apart blad)
7	Afdichting o-ringen	Viton
8	Ergonomie	Ergonomische grip inbegrepen in het ontwerp (gladde afwerking)
9	Schakelpatroon	Zie apart blad
10	Lensbeschermer	Spuitsgiet ontwerp, plastic: PE / zwarte kleur

Dichroic interferentiefilter

Spec	Item
Voordeel	Vermindert vermoeidheid van de inspecteur tijdens inspectie
Schokbestendigheid	Valbestendig
Temp. weerstand	Tot 150 °C
Veroudering	Anti veroudering (geen verslechtering na verloop van tijd)
Selectiviteit	Geoptimaliseerd voor 365 nm
Verlichtingssterkte zichtbaar licht	≤ 20 lux (in UV stand)



Opstarttijd lampen

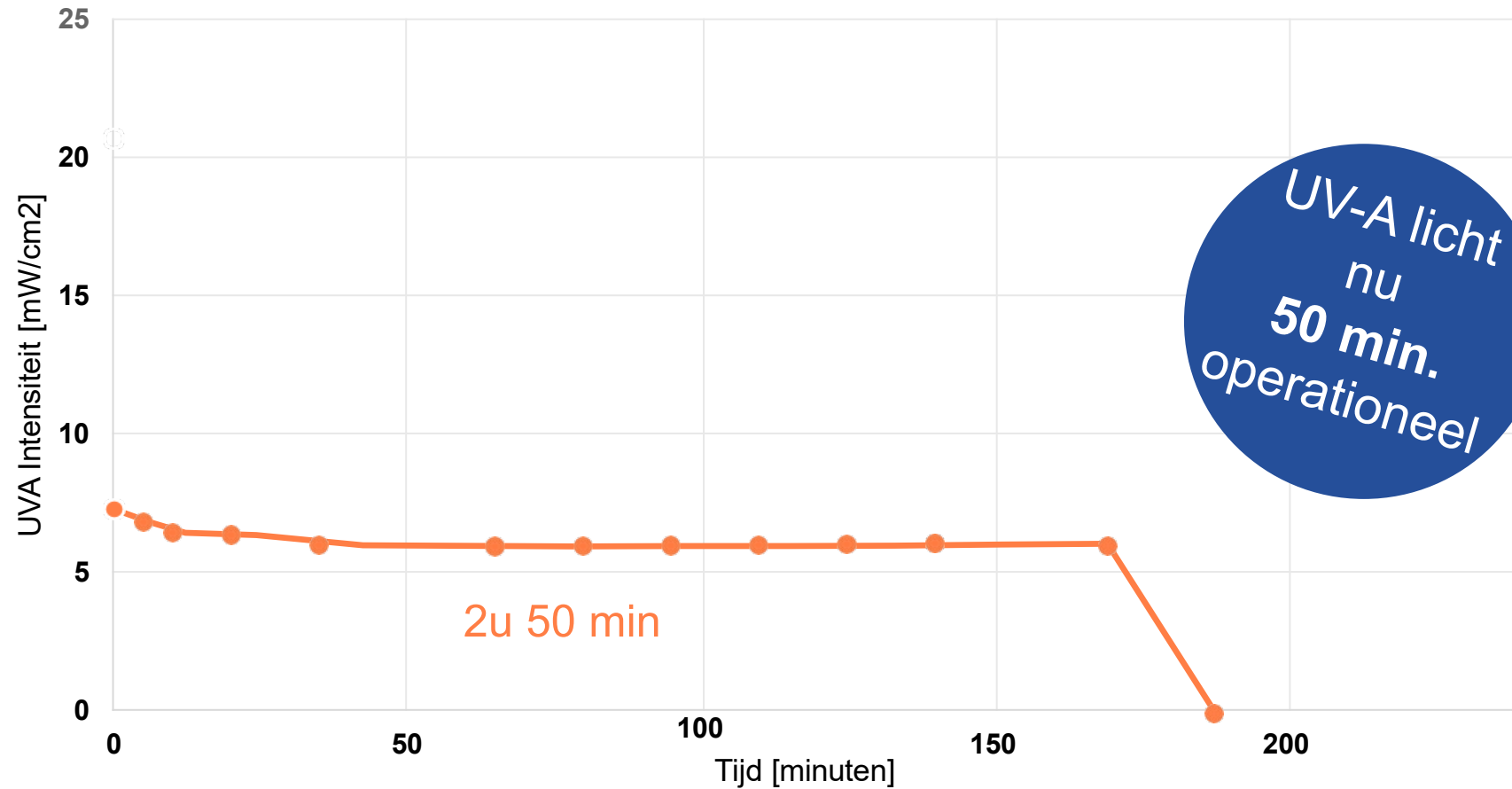


—●— Fluorescerende UV-lamp

—●— PDL UV LED

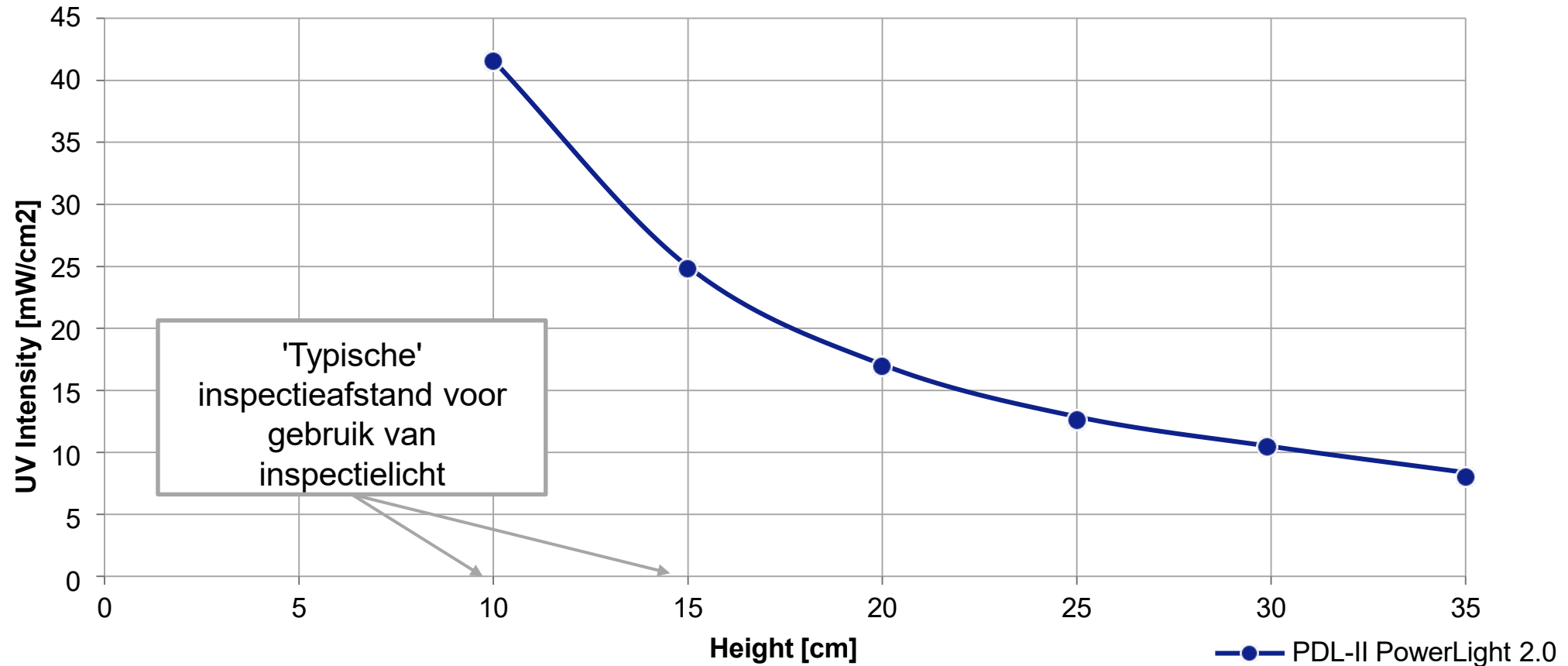


Levensduur batterij *PDL-II*



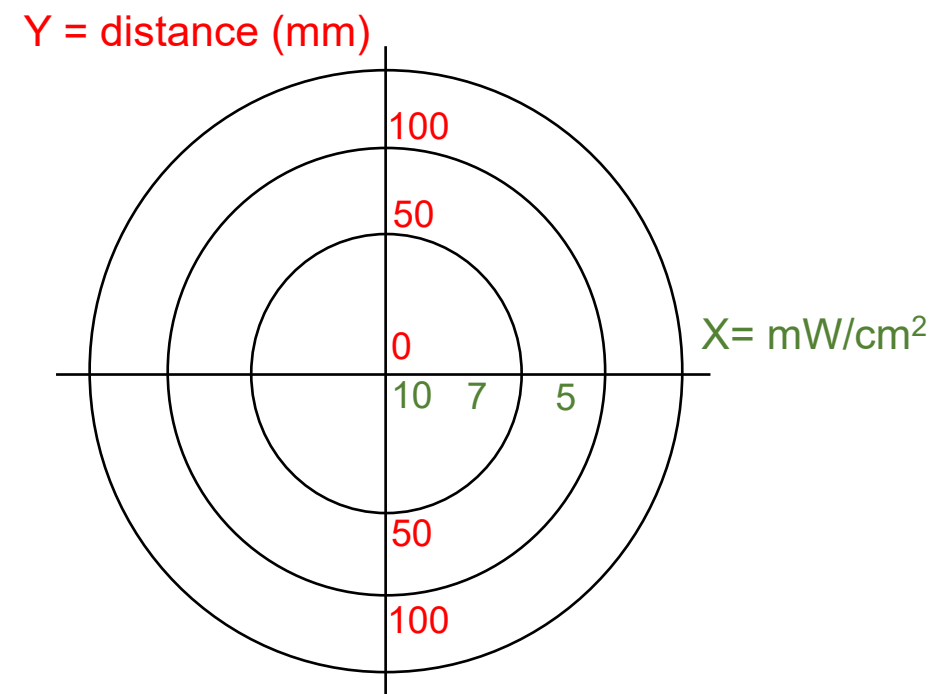
—●— PDL accu / 50 min in UV-A modus en 2 uur in wit licht modus

Inspectie hoogte vs intensiteit



Minimale intensiteitsgrafiek

Diameter	150 mm	300 mm	350 mm	400 mm	450 mm	500 mm
Centraal punt	35	10	7	6	4.5	3.5
100 mm	12	7	4.5	4	3.5	2.5
200 mm	1	5	3	3	3	2.5



Data in grafiek gegeven in mW/cm² van 365 nm

D = 30 cm

Schakelpatroon

No	Schakelpatroon
	Wanneer de lamp uit staat:
A	Wit licht 100% sterkte & UV licht uit
B	Wit licht 50% sterkte & UV licht uit
C	UV licht 100% sterkte & Wit licht uit Lichtsterkte zichtbaar licht is dan ≤ 15 Lux



UV-A LED licht

Specificaties	Item
Vermogen	5 x 5 Watt
Golflengte	365 nm \pm 5 nm
Intensiteit	Zie separate grafiek
FWHM	\leq 30 nm
Temperatuur stabiliteit	\leq 5 nm spreading bij temp 10-50 °C

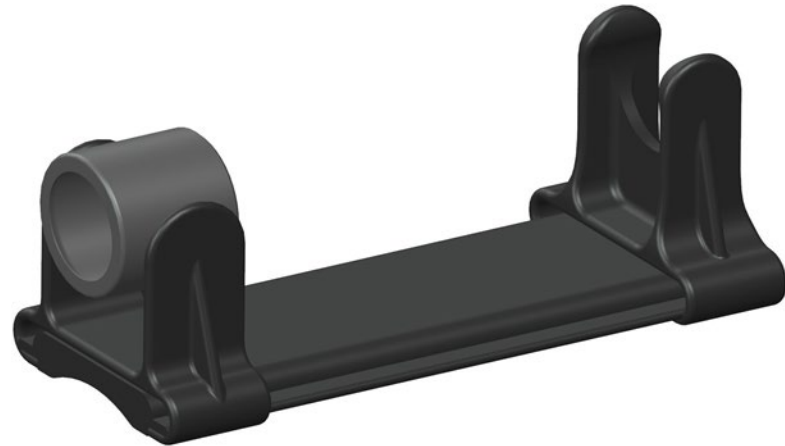


Wit LED licht

Specificaties	Item
Merk	Cree
Vermogen	5 Watt
Kleur temperatuur	6500K
Licht opbrengst	300 Lumen
bij 100% sterkte	op 50 cm: 10.000 Lux op 70 cm: 6.400 Lux
bij 50% sterkte	op 50 cm: 4.900 Lux op 70 cm: 3.060 Lux



Houder / inductieve lader



← Tafelhouder (Kunststof)



Koffer PDL-II

Item	Spec
Afmeting	280 x 220 x 80 mm
Kleur	Zwart
Materiaal koffer	PPC (Polypropyleen carbonaat)
Materiaal inleg	EVA (Evatane) schuim
Gewicht	528 gram
Slot	2x scharnierslot (Rode kleur)



Optie A – (Reserve) batterijen

Item	Spec
Merk	Panasonic
Type	18650 Li-ion
Capaciteit	3400 mAh – 7.4 V or 2x 3400 mAh 3.7 V
Veiligheid	Beschermingscircuit inbegrepen in batterijontwerp
Kwaliteit	Klasse A
RoHS-conformiteit	Ja



Optie B – Batterijoplader set



**Snellaadstation
voor 2 batterijen**
(niet standard meegeleverd)

- CE / ROHS compliant
- 2x 1,5 A oplader
- 100-240 V ~ 50-60 Hz

Beschikbaar vanaf aug. 2021:

- Nieuwe ESD-veilige container (geleverd in gele IDP-zak) voor PDL-II
- Materiaal: Inherently **D**issipative **P**olymers
- Afmeting: 29 x 18 x 12 cm (L x B x H)
- Kleur van box: Geel



De PDL in het kort

No	Item
1	Uiterst effectieve, meest krachtige UV-A / Wit inspectielicht in hoogwaardige afwerking
2	Krasbestendig, valbestendig, slangbestendig; voldoet aan de hoogste mechanische normen
3	Direct gebruik (aan / uit)
4	Geoptimaliseerd ontwerp voor langdurig gebruik van detectie op stofdeeltjes
5	1x Lion oplaadbare Panasonic Li-ion batterij
6	Standaard voor tafelblad bij levering inbegrepen
7	Inductief opladen (3 tot 3,5 uur nodig voor volledig opladen)
8	Ronde esthetische afwerking, licht ontwerp
10	Originele Cree LED's zijn geschikt voor 20.000 gebruiksuren

Particle Detection Light



*De krachtigste zaklamp beschikbaar voor
de Cleanroom-industrie*



Vragen?

