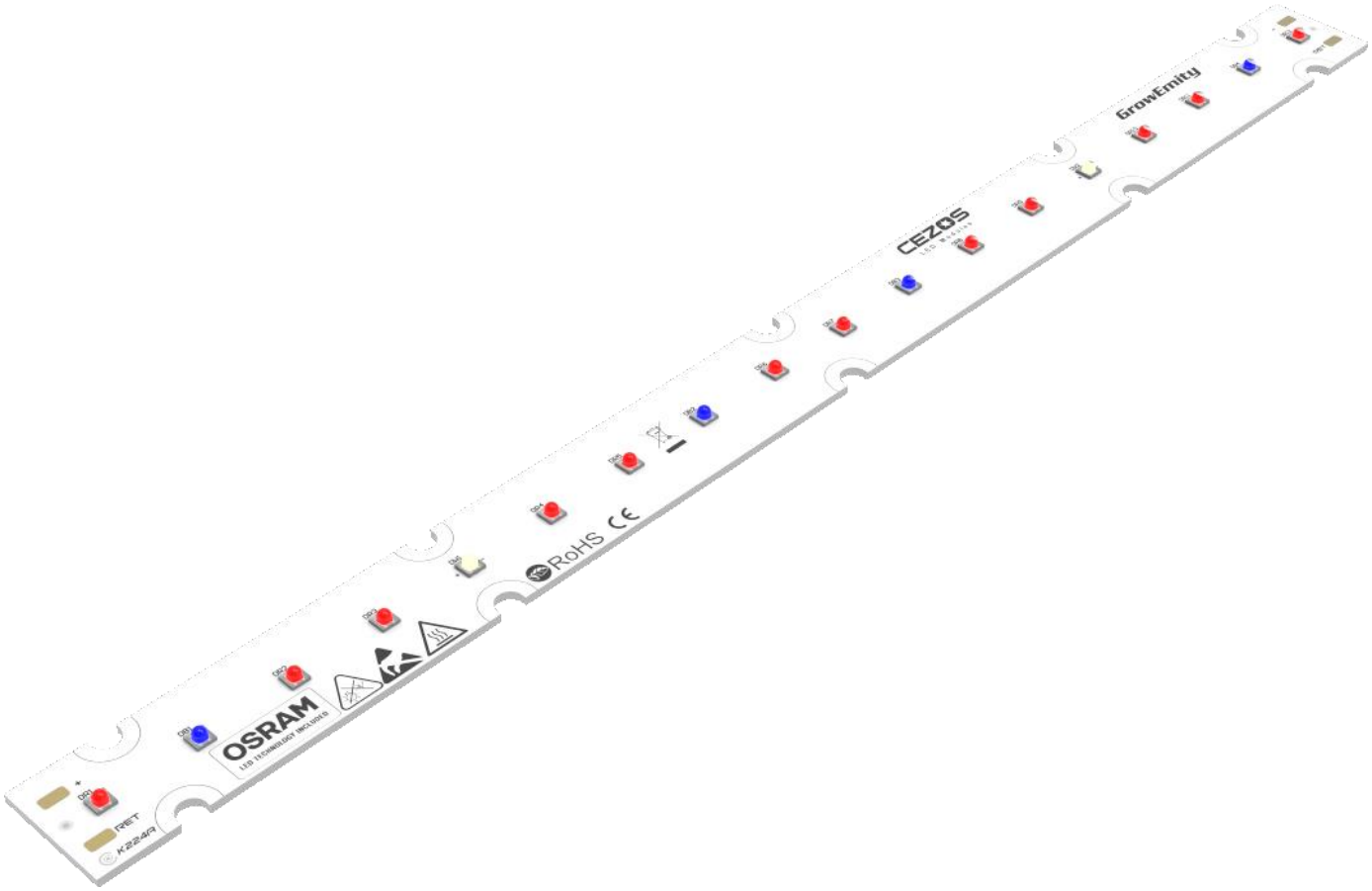
GrowEmity ZH - K224



The GrowEmity LED light source allows to accelerate plant growth and increase harvest. It is even possible to regulate plant growth and blooming time. Unlike an artificial light sources, LED light sources have specially matched spectrum for specific plants. Additionally, LEDs generate more light and less heat than sodium lamp, allow for lighting from side of plants. LED light sources are used in artificial plantation without daylight.

Possibility to choose up to four colors from the following (one set of 2 or a multiple LEDs, total 18 LEDs).

Colour	λ [nm] / CCT [K]	Input Current [mA]	Forward Voltage [V]	Power [W]	Radiant Power [mW] / Luminous Flux [lm]	PPF [µmol/s]	PPF/W [µmol/J]
RED	625	350	4,2	1,5	165	3,76	2,56
		500	4,4	2,2	233	5,32	2,41
		700	4,7	3,3	322	7,36	2,25
		800	4,8	3,8	364	8,31	2,17
		1000	5,0	5,0	447	10,20	2,02
HYPER RED	657	350	4,3	1,5	850	4,61	3,06
		500	4,5	2,3	1199	6,50	2,89
		700	4,8	3,4	1624	8,81	2,62
		800	5,0	4,0	1853	10,05	2,53
		1000	5,1	5,1	2231	12,10	2,35
FAR RED	727	350	4,3	1,5	850	4,61	3,06
		500	3,9	2,0	747	0,45	0,23
		700	4,1	2,9	1012	0,61	0,21
		800	4,2	3,4	1155	0,70	0,21
		1000	4,4	4,4	1391	0,84	0,19
DEEP BLUE	455	350	5,7	2,0	1270	4,70	2,36
		500	5,8	2,9	1765	6,53	2,25
		700	5,9	4,2	2184	8,08	1,94
		800	6,0	4,8	2413	8,93	1,87
		1000	6,1	6,1	3048	11,28	1,84
BLUE	470	350	5,7	2,0	56	3,24	1,62
		500	5,9	2,9	74	4,28	1,46
		700	6,1	4,3	96	5,54	1,30
		800	6,1	4,9	105	6,09	1,25
		1000	6,3	6,3	124	7,20	1,14
TRUE GREEN	528	350	6,7	2,3	242	2,24	0,95
		500	6,9	3,4	315	2,92	0,85
		700	7,1	5,0	402	3,72	0,75
		800	7,1	5,7	440	4,07	0,72
		1000	7,4	7,4	516	4,78	0,65
AMBER	617	350	4,2	1,5	178	3,94	2,68
		500	4,4	2,2	251	5,54	2,51
		700	4,7	3,3	342	7,56	2,31
		800	4,8	3,8	385	8,49	2,22
		1000	5,1	5,1	469	10,36	2,05
YELLOW	590	350	4,4	1,5	164	1,74	1,13
		500	4,6	2,3	224	2,38	1,03
		700	4,9	3,4	287	3,04	0,89
		800	4,9	3,9	307	3,26	0,83
		1000	5,2	5,2	349	3,70	0,71
WHITE	5000	350	5,5	1,9	296	3,92	2,04
		500	5,7	2,9	405	5,24	1,84
		700	5,9	4,1	532	6,80	1,65
		800	6,0	4,8	586	7,48	1,57
		1000	6,6	6,6	679	8,67	1,35

Radiant Power for Hyper Red, Far Red, Deep Blue. Luminous flux for rest of colour.

CCT only for White colour

Calculated parameters at T_J = 25°C

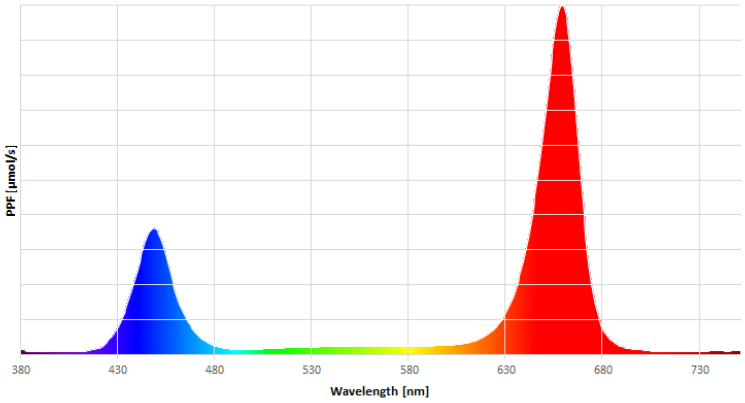
Name	GrowEmity ZH RBW – K224
Size	280x20 mm
Power Supply Type	Constant Current (CC)
Number Of Channels	1
Power Supply Current	Max. 1000 mA
Red LED – 12 pcs	OSRAM - GH CSSPM1.24
Deep Blue LED – 4 pcs	OSRAM - GD CSSPM1.14
White LED – 2 pcs	OSRAM - GW CSHPM1.PM
Ambient Temperature	0 - 40°C
Material Type / Thickness	MCPCB / 1,5 mm

GrowEmity ZH RBW - K224

	Input Current [mA]	Forward Voltage [V]	Power [W]	Colour	λ [nm] / CCT [K]	Radiant Power [mW] / Luminous Flux [lm]	PPF [µmol/s]	PPF/W [µmol/J]	Total PPF [µmol/s]	Total PPF/W [µmol/J]	Article Number
GrowEmity ZH RBW - K224	350	42,7	14,9	RED	657	5100	27,66	3,06	40,98	2,74	L0-280020-RBW-C1000-K224
				DEEP BLUE	455	2540	9,40	2,36			
				WHITE	5000	296	3,92	2,04			
	500	44,3	22,2	RED	657	7191	39,00	2,89	57,31	2,59	L0-280020-RBW-C1000-K224
				DEEP BLUE	455	3531	13,07	2,25			
				WHITE	5000	405	5,24	1,84			
	700	46,6	32,6	RED	657	9741	52,83	2,62	75,80	2,32	L0-280020-RBW-C1000-K224
				DEEP BLUE	455	4369	16,17	1,94			
				WHITE	5000	532	6,8	1,65			
	800	47,7	38,1	RED	657	11118	60,3	2,53	85,64	2,25	L0-280020-RBW-C1000-K224
				DEEP BLUE	455	4826	17,86	1,87			
				WHITE	5000	586	7,48	1,57			

Parameters were calculated for temperatures T_J= 25°C
Radiant power and wavelength for color LEDs; Luminous flux and color temperature for white LEDs.
Values of these parameters were calculated for default bin and with tolerances of 15%.

Different type of plants have different requirements for the best growth, so to maximized effect, GrowEmity light sources have many sets of LEDs configuration. Most commands LED types are: red, far red, hyper red, blue, deep blue and white with different colour temperature. Some examples are below.

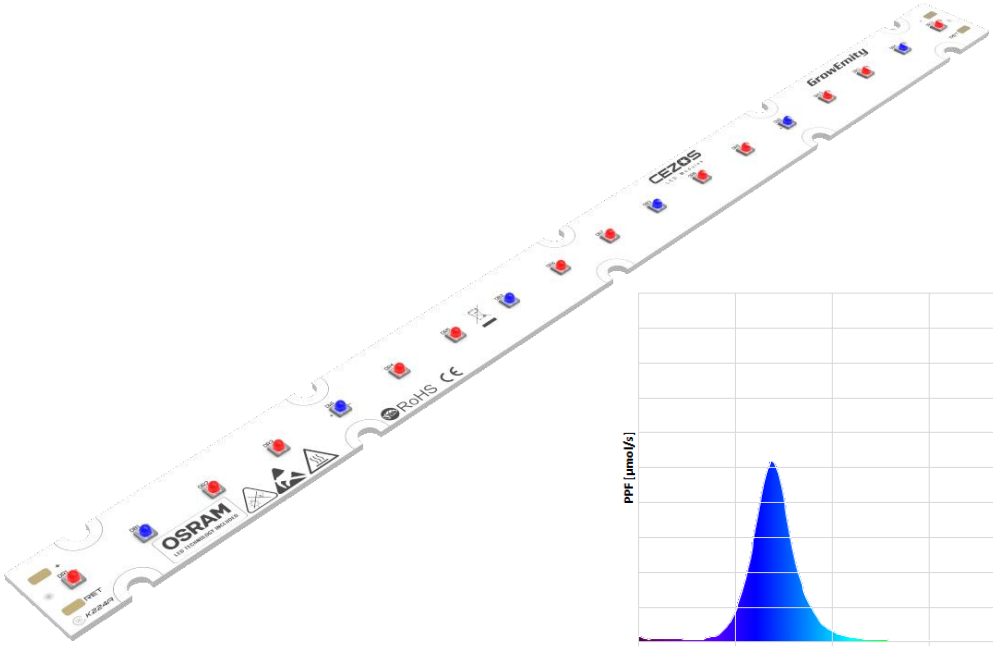


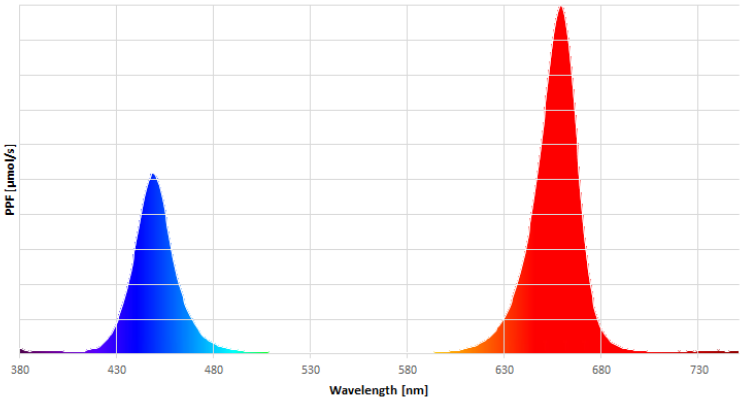
GrowEmity ZH RRB - K224

Name	GrowEmity ZH RRB – K224
Red LED – 12 pcs	OSRAM - GH CSSPM1.24
Deep Blue LED – 6 pcs	OSRAM - GD CSSPM1.14

	Input Current [mA]	Forward Voltage [V]	Power [W]	Colour	λ [nm]	Radiant Power [mW]	PPF [µmol/s]	PPF/W [µmol/J]	Total PPF [µmol/s]	Total PPF/W [µmol/J]	Article Number
GrowEmity ZH RRB - K224	350	42,9	15,0	RED	657	5100	27,66	3,06	41,76	2,78	L0-280020-RRB-C1000-K224
				DEEP BLUE	455	3810	14,10	2,36			
	500	44,4	22,2	RED	657	7191	39,00	2,89	58,60	2,64	L0-280020-RRB-C1000-K224
				DEEP BLUE	455	5296	19,60	2,25			
	700	46,6	32,6	RED	657	9741	52,83	2,62	77,08	2,36	L0-280020-RRB-C1000-K224
				DEEP BLUE	455	6553	24,25	1,94			
	800	47,7	38,2	RED	657	11118	60,3	2,53	87,09	2,28	L0-280020-RRB-C1000-K224
				DEEP BLUE	455	7239	26,79	1,87			

Parameters were calculated for temperatures T_J= 25°C
Values of these parameters were calculated for default bin and with tolerances of 15%.



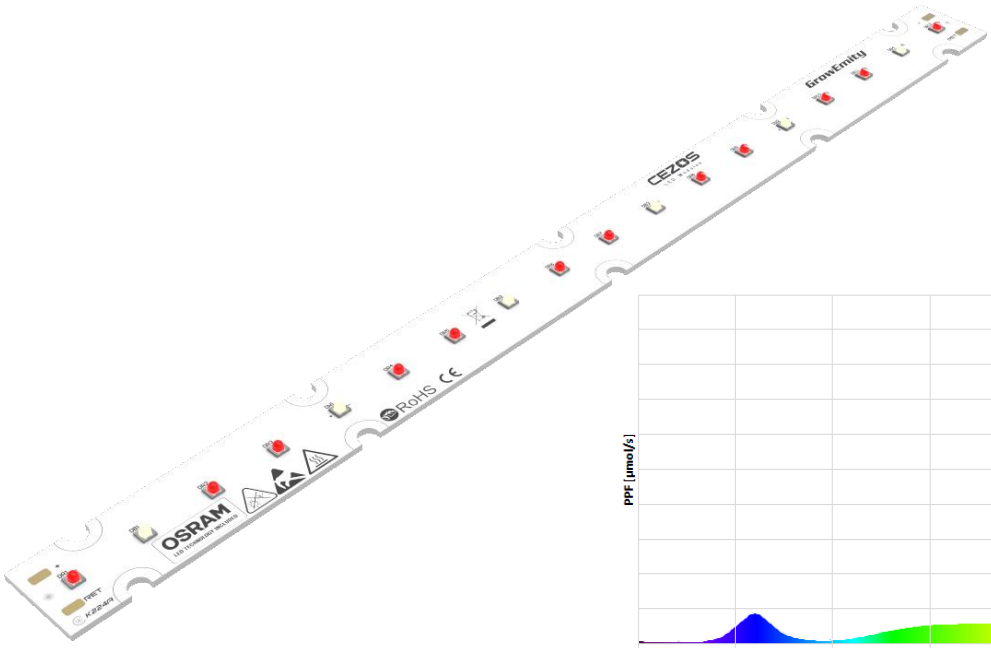


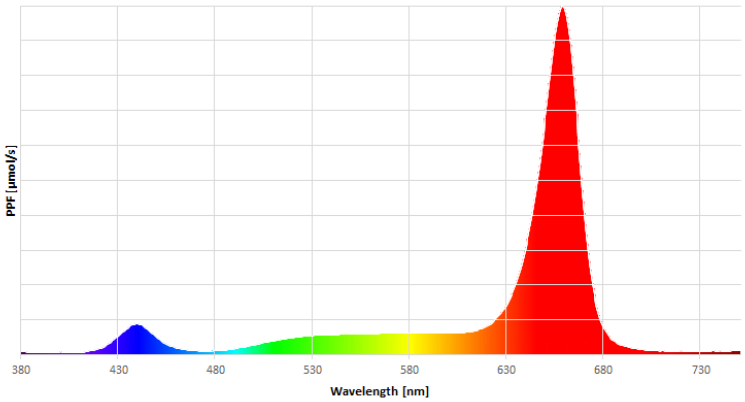
GrowEmity ZH RRW - K224

Name	GrowEmity ZH RRW – K224
Red LED – 12 pcs	OSRAM - GH CSSPM1.24
White LED – 6 pcs	OSRAM - GW CSHPM1.PM

	Input Current [mA]	Forward Voltage [V]	Power [W]	Colour	λ [nm] / CCT [K]	Radiant Power [mW] / Luminous Flux [lm]	PPF [µmol/s]	PPF/W [µmol/J]	Total PPF [µmol/s]	Total PPF/W [µmol/J]	Article Number
GrowEmity ZH RRW - K224	350	42,3	14,8	RED	657	5100	27,66	3,06	39,42	2,66	L0-280020-RRW-C1000-K224
				WHITE	5000	887	11,76	2,04			
	500	44,1	22,1	RED	657	7191	39,00	2,89	54,72	2,48	L0-280020-RRW-C1000-K224
				WHITE	5000	1216	15,72	1,84			
	700	46,5	32,6	RED	657	9741	52,83	2,62	73,23	2,25	L0-280020-RRW-C1000-K224
				WHITE	5000	1597	20,40	1,65			
	800	47,6	38,1	RED	657	11118	60,3	2,53	82,74	2,17	L0-280020-RRW-C1000-K224
				WHITE	5000	1757	22,44	1,57			

Parameters were calculated for temperatures T_J= 25°C
Radiant power and wavelength for color LEDs; Luminous flux and color temperature for white LEDs.
Values of these parameters were calculated for default bin and with tolerances of 15%.



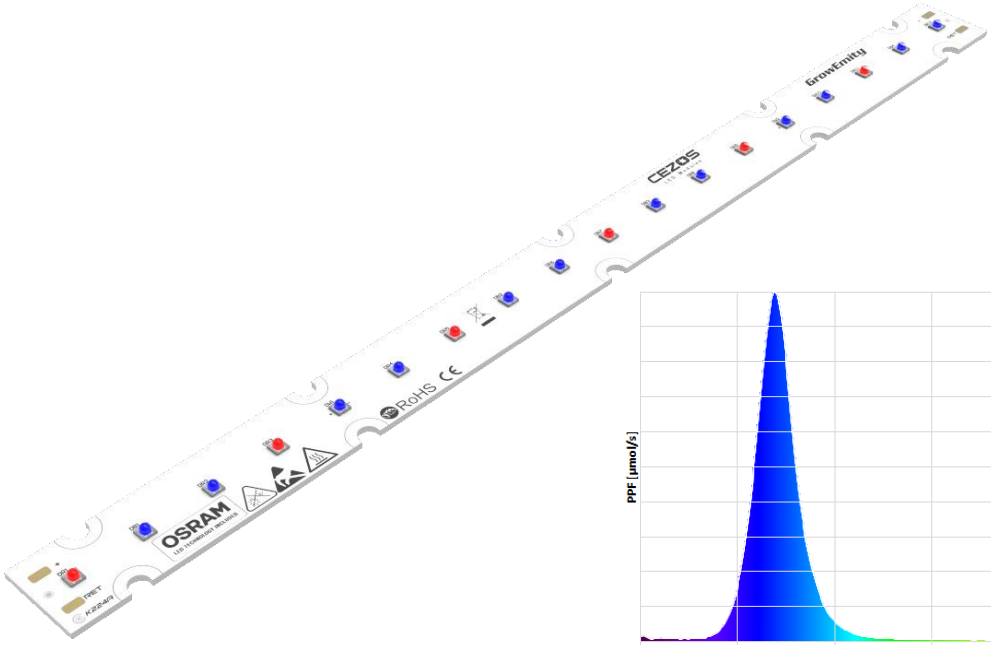


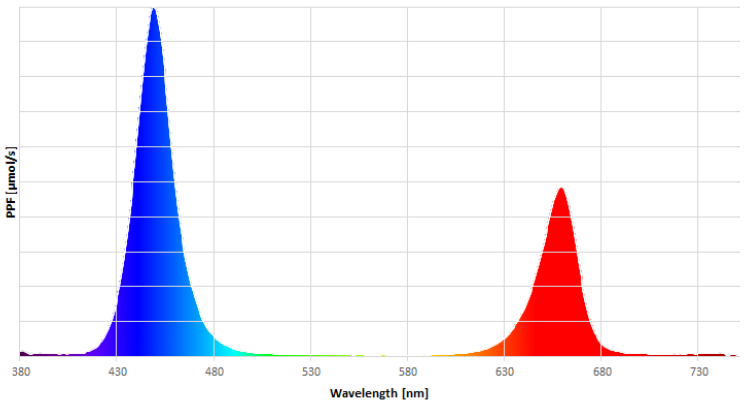
GrowEmity ZH RBB - K224

Name	GrowEmity ZH RBB – K224
Red LED – 6 pcs	OSRAM - GH CSSPM1.24
Deep Blue LED – 12 pcs	OSRAM - GD CSSPM1.14

	Input Current [mA]	Forward Voltage [V]	Power [W]	Colour	λ [nm]	Radiant Power [mW]	PPF [µmol/s]	PPF/W [µmol/J]	Total PPF [µmol/s]	Total PPF/W [µmol/J]	Article Number
GrowEmity ZH RBB - K224	350	47,1	16,5	RED	657	2550	13,83	3,06	42,03	2,55	L0-280020-RBB-C1000-K224
				DEEP BLUE	455	7620	28,20	2,36			
	500	48,3	24,2	RED	657	3596	19,50	2,89	58,70	2,43	L0-280020-RBB-C1000-K224
				DEEP BLUE	455	10592	39,20	2,25			
	700	50,0	35,0	RED	657	4871	26,42	2,62	74,92	2,14	L0-280020-RBB-C1000-K224
				DEEP BLUE	455	13106	48,50	1,94			
	800	50,8	40,6	RED	657	5559	30,1	2,53	83,73	2,06	L0-280020-RBB-C1000-K224
				DEEP BLUE	455	14478	53,58	1,87			

Parameters were calculated for temperatures T_J= 25°C
Values of these parameters were calculated for default bin and with tolerances of 15%.



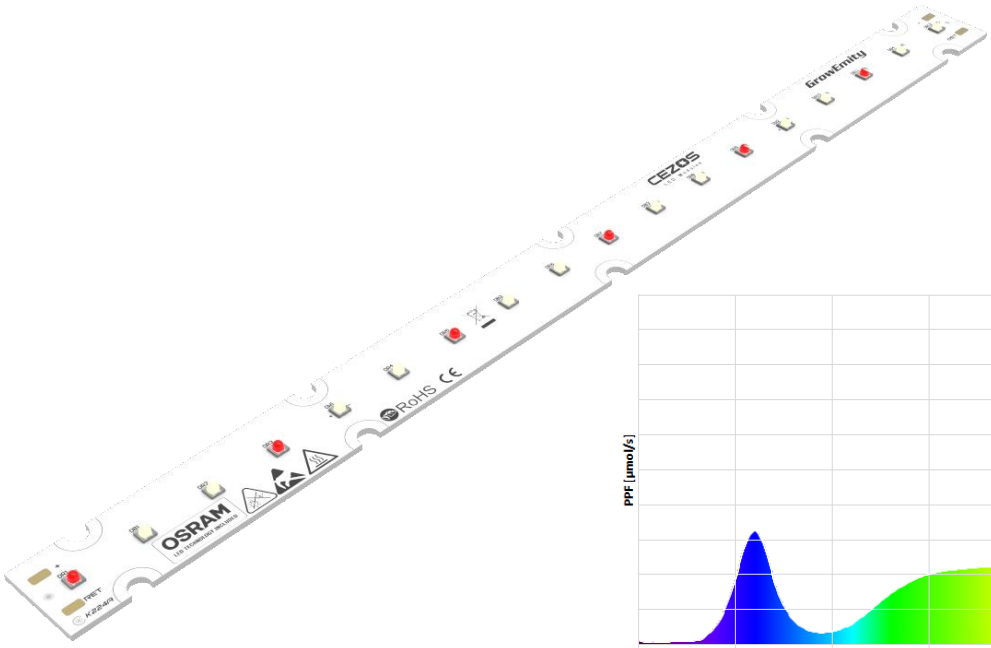


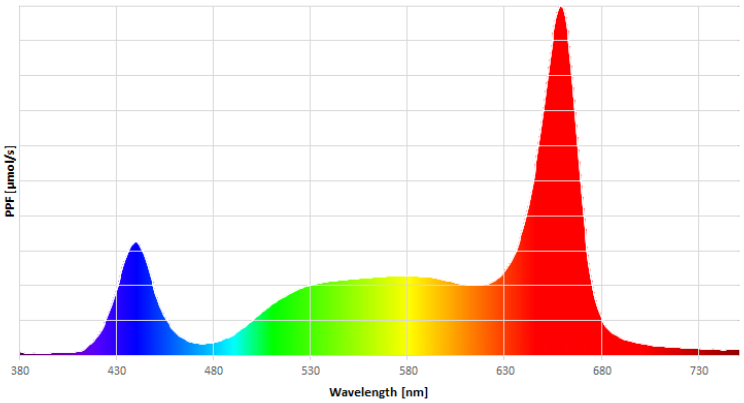
GrowEmity ZH RWW - K224

Name	GrowEmity ZH RWW – K224
Red LED – 6 pcs	OSRAM - GH CSSPM1.24
White LED – 12 pcs	OSRAM - GW CSHPM1.PM

	Input Current [mA]	Forward Voltage [V]	Power [W]	Colour	λ [nm] / CCT [K]	Radiant Power [mW] / Luminous Flux [lm]	PPF [µmol/s]	PPF/W [µmol/J]	Total PPF [µmol/s]	Total PPF/W [µmol/J]	Article Number
GrowEmity ZH RWW - K224	350	45,9	16,1	RED	657	2550	13,83	3,06	37,35	2,32	L0-280020-RWW-C1000-K224
				WHITE	5000	1775	23,52	2,04			
	500	47,7	23,9	RED	657	7191	39,00	2,89	54,72	2,29	L0-280020-RWW-C1000-K224
				WHITE	5000	1216	15,72	1,84			
	700	49,8	34,9	RED	657	9741	52,83	2,62	73,23	2,10	L0-280020-RWW-C1000-K224
				WHITE	5000	1597	20,40	1,65			
	800	50,6	40,5	RED	657	11118	60,3	2,53	82,74	2,04	L0-280020-RWW-C1000-K224
				WHITE	5000	1757	22,44	1,57			

Parameters were calculated for temperatures T_J= 25°C
Radiant power and wavelength for color LEDs; Luminous flux and color temperature for white LEDs.
Values of these parameters were calculated for default bin and with tolerances of 15%.



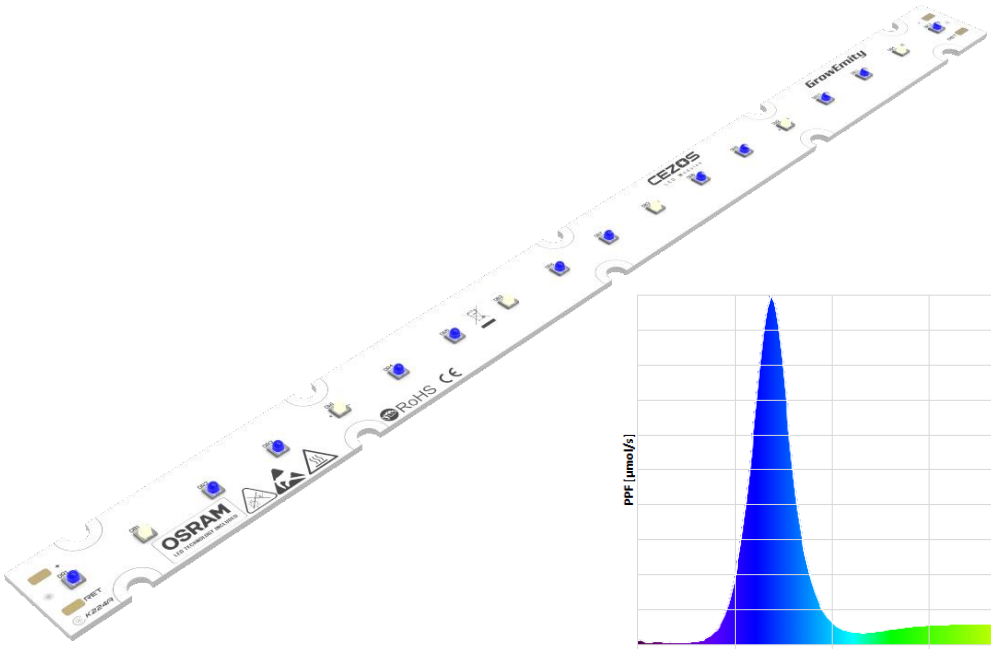


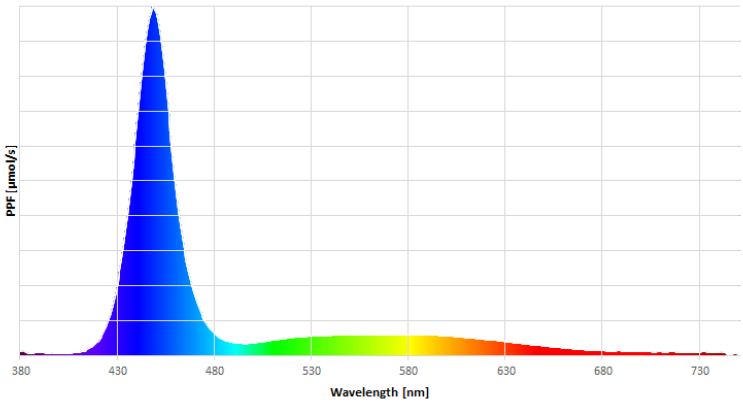
GrowEmity ZH BBW - K224

Name	GrowEmity ZH BBW – K224
Deep Blue LED – 12 pcs	OSRAM - GD CSSPM1.14
White LED – 6 pcs	OSRAM - GW CSHPM1.PM

	Input Current [mA]	Forward Voltage [V]	Power [W]	Colour	λ [nm] / CCT [K]	Radiant Power [mW] / Luminous Flux [lm]	PPF [µmol/s]	PPF/W [µmol/J]	Total PPF [µmol/s]	Total PPF/W [µmol/J]	Article Number
GrowEmity ZH BBW - K224	350	50,7	17,7	DEEP BLUE	455	7620	28,20	2,36	39,96	2,25	L0-280020-BBW-C1000-K224
				WHITE	5000	887	11,76	2,04			
	500	51,9	26,0	DEEP BLUE	455	10592	39,20	2,25	54,92	2,12	L0-280020-BBW-C1000-K224
				WHITE	5000	1216	15,72	1,84			
	700	53,3	37,3	DEEP BLUE	455	13106	48,50	1,94	68,90	1,85	L0-280020-BBW-C1000-K224
				WHITE	5000	1597	20,4	1,65			
	800	53,8	43,0	DEEP BLUE	455	14478	53,6	1,87	76,02	1,77	L0-280020-BBW-C1000-K224
				WHITE	5000	1757	22,44	1,57			

Parameters were calculated for temperatures T_J= 25°C
Radiant power and wavelength for color LEDs; Luminous flux and color temperature for white LEDs.
Values of these parameters were calculated for default bin and with tolerances of 15%.



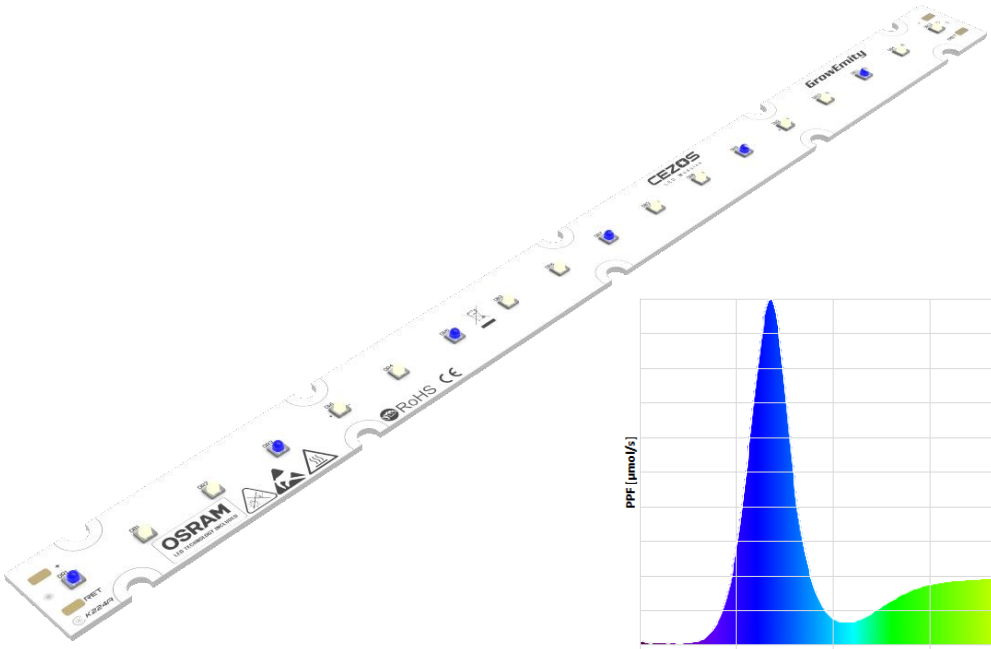


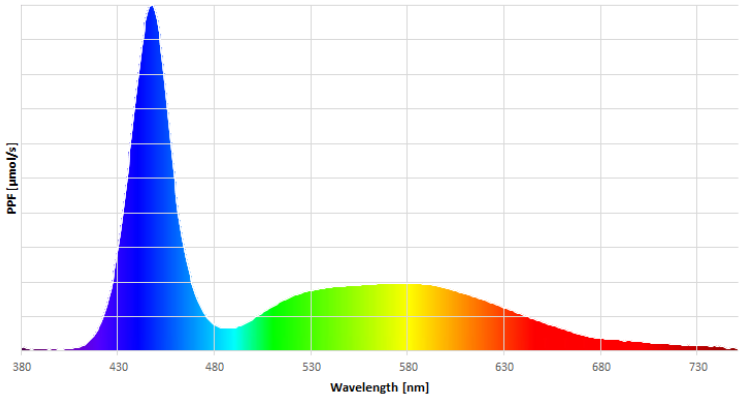
GrowEmity ZH BWW - K224

Name	GrowEmity ZH BWW – K224
Deep Blue LED – 6 pcs	OSRAM - GD CSSPM1.14
White LED – 12 pcs	OSRAM - GW CSHPM1.PM

	Input Current [mA]	Forward Voltage [V]	Power [W]	Colour	λ [nm] / CCT [K]	Radiant Power [mW] / Luminous Flux [lm]	PPF [µmol/s]	PPF/W [µmol/J]	Total PPF [µmol/s]	Total PPF/W [µmol/J]	Article Number
GrowEmity ZH BWW - K224	350	50,1	17,5	DEEP BLUE	455	3810	14,10	2,36	37,62	2,15	L0-280020-BWW-C1000-K224
				WHITE	5000	1775	23,52	2,04			
	500	51,6	25,8	DEEP BLUE	455	5296	19,60	2,25	51,04	1,98	L0-280020-BWW-C1000-K224
				WHITE	5000	2431	31,44	1,84			
	700	53,2	37,3	DEEP BLUE	455	6553	24,25	1,94	65,05	1,75	L0-280020-BWW-C1000-K224
				WHITE	5000	3195	40,8	1,65			
	800	53,7	43,0	DEEP BLUE	455	7239	26,8	1,87	71,67	1,67	L0-280020-BWW-C1000-K224
				WHITE	5000	3514	44,88	1,57			

Parameters were calculated for temperatures T_J= 25°C
Radiant power and wavelength for color LEDs; Luminous flux and color temperature for white LEDs.
Values of these parameters were calculated for default bin and with tolerances of 15%.



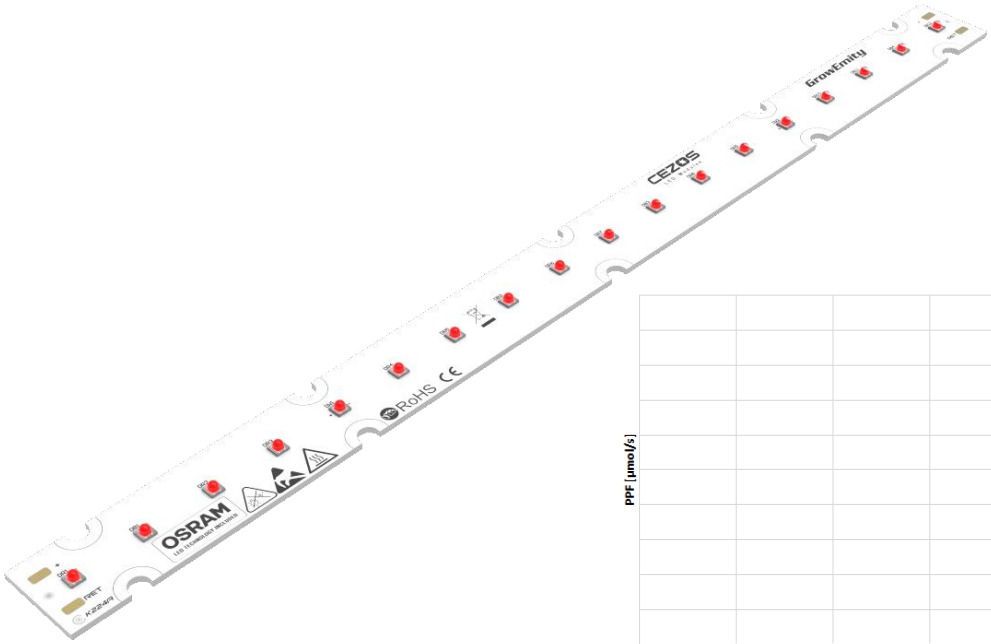


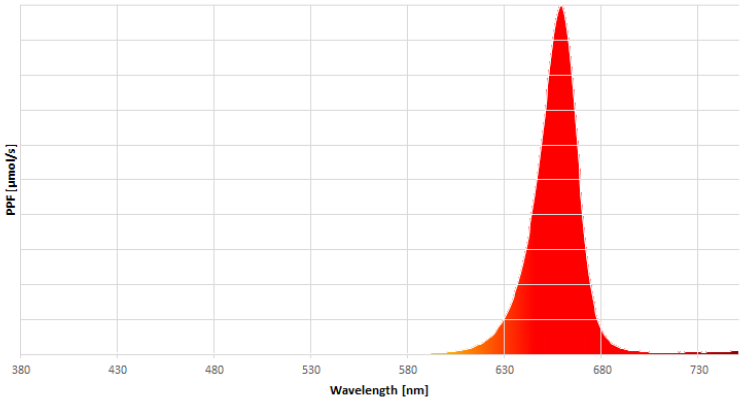
GrowEmity ZH RRR - K224

Name	GrowEmity ZH RRR – K224
Red LED – 18 pcs	OSRAM - GH CSSPM1.24

	Input Current [mA]	Forward Voltage [V]	Power [W]	Colour	λ [nm]	Radiant Power [mW]	PPF [µmol/s]	PPF/W [µmol/J]	Article Number
GrowEmity ZH RRR - K224	350	38,7	13,5	RED	657	7650	41,49	3,06	L0-280020-RRR-C1000-K224
	500	40,5	20,3	RED	657	10787	58,50	2,89	L0-280020-RRR-C1000-K224
	700	43,2	30,2	RED	657	14612	79,25	2,62	L0-280020-RRR-C1000-K224
	800	44,6	35,7	RED	657	16677	90,4	2,53	L0-280020-RRR-C1000-K224

Parameters were calculated for temperatures T_J= 25°C
Values of these parameters were calculated for default bin and with tolerances of 15%.



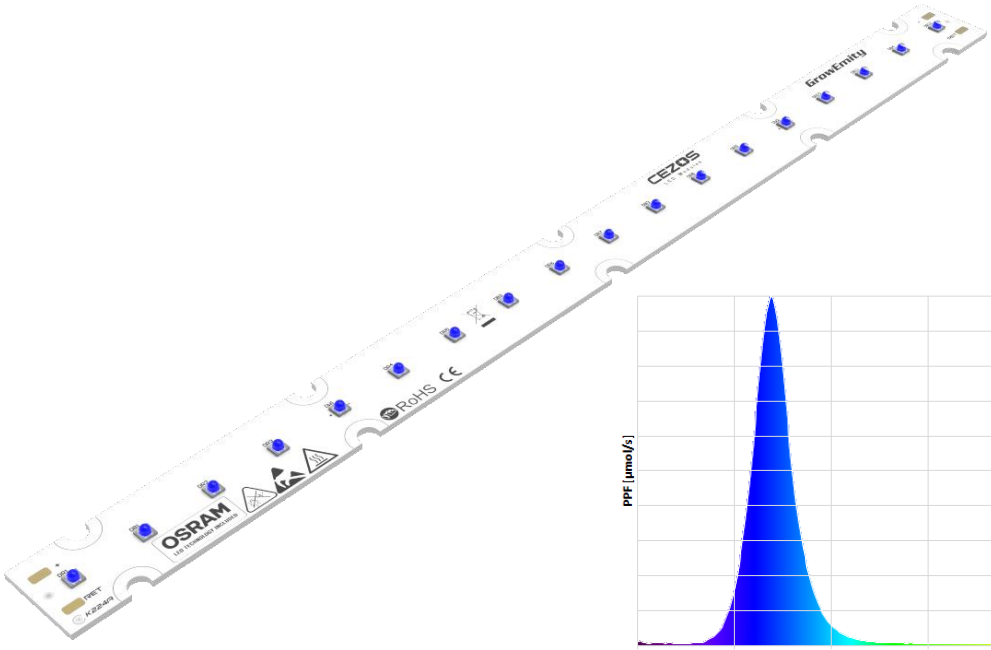


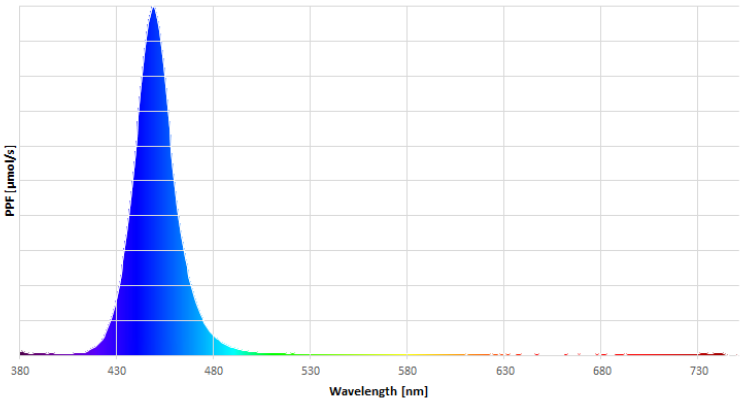
GrowEmity ZH BBB - K224

Name	GrowEmity ZH BBB – K224
Deep Blue LED – 18 pcs	OSRAM - GD CSSPM1.14

	Input Current [mA]	Forward Voltage [V]	Power [W]	Colour	λ [nm]	Radiant Power [mW]	PPF [µmol/s]	PPF/W [µmol/J]	Article Number
GrowEmity ZH BBB - K224	350	51,3	18,0	DEEP BLUE	455	11430	42,30	2,36	L0-280020-BBB-C1000-K224
	500	52,2	26,1	DEEP BLUE	455	15888	58,80	2,25	L0-280020-BBB-C1000-K224
	700	53,5	37,4	DEEP BLUE	455	19660	72,76	1,94	L0-280020-BBB-C1000-K224
	800	53,8	43,1	DEEP BLUE	455	21717	80,4	1,87	L0-280020-BBB-C1000-K224

Parameters were calculated for temperatures T_J= 25°C
Values of these parameters were calculated for default bin and with tolerances of 15%.



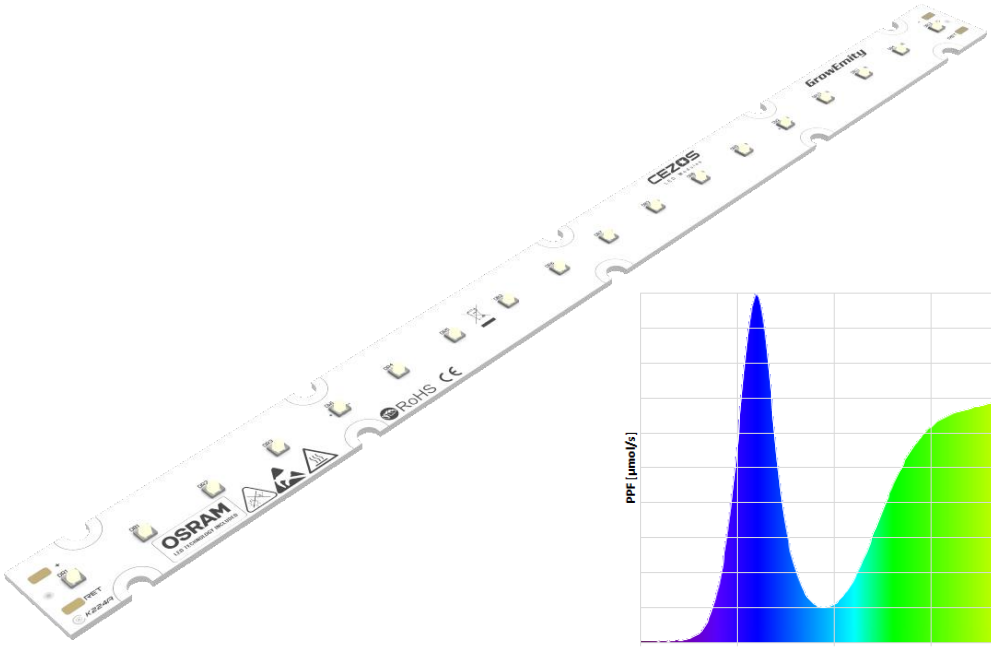


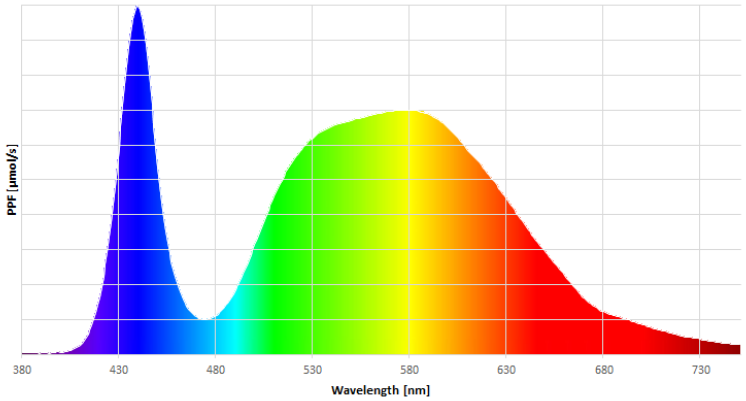
GrowEmity ZH MONO - K224

Name	GrowEmity ZH MONO – K224
White LED – 18 pcs	OSRAM - GW CSHPM1.PM

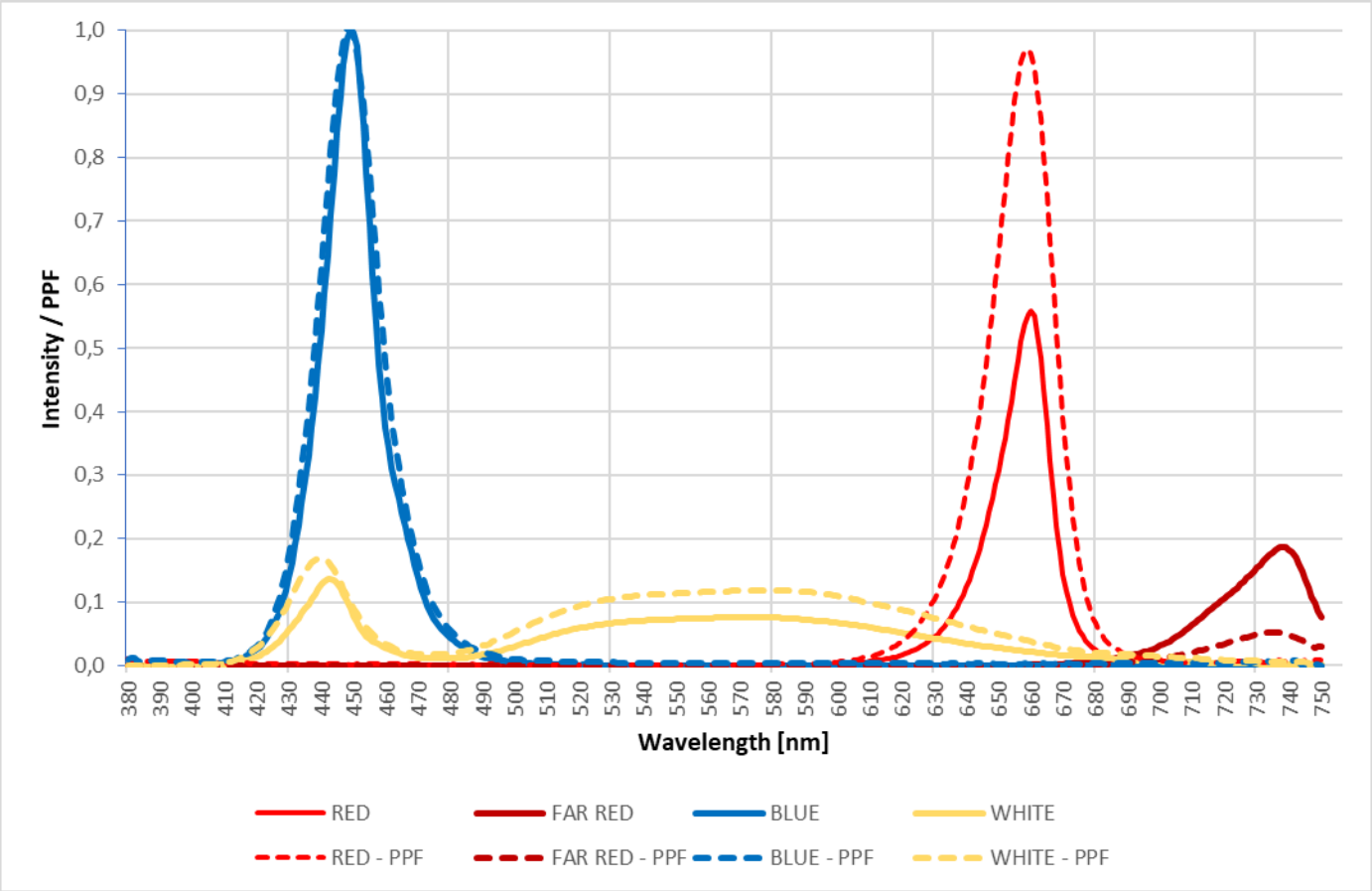
	Input Current [mA]	Forward Voltage [V]	Power [W]	Colour	CCT [K]	Luminous Flux [lm]	PPF [µmol/s]	PPF/W [µmol/J]	Article Number
GrowEmity ZH MONO - K224	350	49,5	17,3	WHITE	5000	2662	35,28	2,04	L0-280020-MONO-C1000-K224
	500	51,3	25,7	WHITE	5000	3647	47,16	1,84	L0-280020-MONO-C1000-K224
	700	53,1	37,2	WHITE	5000	4792	61,20	1,65	L0-280020-MONO-C1000-K224
	800	53,6	42,9	WHITE	5000	5271	67,3	1,57	L0-280020-MONO-C1000-K224

Parameters were calculated for temperatures T_J= 25°C
Values of these parameters were calculated for default bin and with tolerances of 15%.





Spectrum of LEDs



Spectrum graph of the red, far red, blue and white LEDs at 350 mA current. Spectrum can be changed by choosing LEDs and power output.

Cooling

GrowEmity light source isn't self-cooling and additional heat-sink is required. The lifetime of the light source depends on the operating temperature and used LEDs. The temperature should be measured in the middle of the board. The temperature can be measured with thermocouple or simple temperature probe. Lifetime of LEDs decreases with the rise of temperature and luminous intensity in higher temperatures may be lower than nominal. Construction of the lamp or any place of installation should ensure correct heat dissipation from LED light sources. Overheat can damage or destroy some elements or entire LED light source. Never use overheated light source again as it may be damaged and can cause losses or even fire. We are not responsible for any loss, or damage resulting from overheating! Guarantee become void in such cases.

Safety

LED light source can change light intensity, but even dimmed LEDs generate high-intensity light. Looking into LEDs beam is unhealthy and may cause irreversible injury to eye's retina. Never look into the beam without protection glasses with an appropriate filter. Additionally, they may change LEDs light intensity almost immediately. If people are photosensitive, LEDs light may be a trigger to epileptic seizures and alter the perception, especially when light change very fast.

LED light source can work on high power supply current, so never touch components and wires of LED light source when power supply is on.

PROTECTION MEASURES AGAINST DAMAGE

LED light sources are delicate, even small mechanical stress may damage them. Such stresses should be avoided. If it is impossible, it should be kept to the minimum. Mechanical stresses such as pressure, bending, breaking, drilling, etc. may cause irreversible damage. Damaged LED light source aren't suitable for use.

Electrostatic Discharge (ESD) is a serious threat to electronics devices. The human body can accumulate very high electrostatic charge which can decrease the lifetime of electronics significantly and in worst cases may destroy electronic components. To avoid damages use of electrostatic protection is required. It is needed to follow ESD precautions during manipulation of these devices. Do not touch electronic components directly to avoid damages. Observe the official regulations for electrical devices (like DIN, VDE, EN). It is necessary to isolate components like controllers, LED light sources, power supply, wires etc. from any metal parts which can conduct electrostatic charges or cause a short circuit. LED light source aren't equipped with short circuit protection. During a short circuit, very high current is flowing from a power supply and can destroy it, causing risk of fire. Electronics must not be modified. Any modification causes loss of guarantee. The electric wiring/connection must comply with all current and valid national requirements, be constructed by a certified electrical tradesman, and comply with all the requirements set forth in this manual. We are not responsible for any loss, or damage resulting from electrostatic voltage discharge and a short circuit caused by inappropriate handling or wrong construction of the lamp! Guarantee become void in such cases.

Additionally LED light source can be damaged by some chemical substances. Depends on elements the damage may be different. It is important not to use chemical substances like acids, organic acids, sulphur, alkalis, organic solvents, mineral oils, vegetable oils and synthetic oils, etc. We are not responsible for any loss, or damage resulting from improper use of LED light source! Guarantee become void in such cases.

Do not operate LED light source when they aren't working properly. If LED light source are working incorrectly, turn off a power supply. Damaged LED light source may cause electric shock or short circuit.

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Subject to errors and technical changes.