

PRODUCT DATASHEET CA13156_EMERALD-A

EMERALD-A

Asymmetric beam. Assembly with installation tape.

SPECIFICATION:

Dimensions	Ø 21.6 mm
Height	7.3 mm
Fastening	tape, pin
ROHS compliant	yes 🛈



MATERIALS:

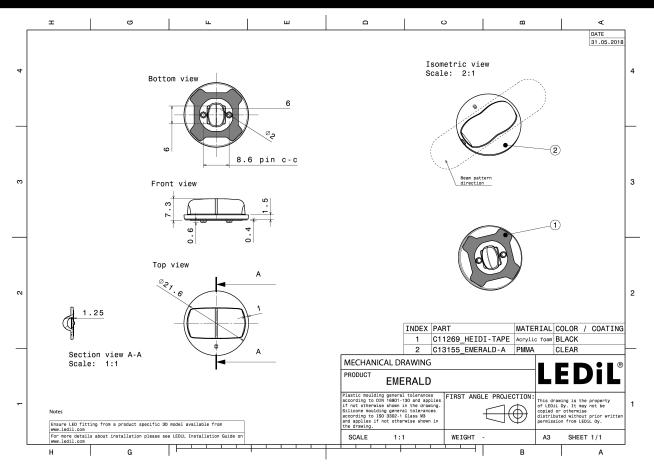
Component	Туре	Material	Colour	Finish
EMERALD-A	Single lens	PMMA	clear	
HEIDI-TAPE	Таре	Acrylic foam	black	

ORDERING INFORMATION:

Component		Qty in box	MOQ	MPQ	Box weight (kg)
CA13156_EMERALD-A	Single lens	2128	336	112	4.9
» Box size: 480 x 280 x 300 mm					



PRODUCT DATASHEET CA13156_EMERALD-A



See also our general installation guide: www.ledil.com/installation_guide



		90* 90*
LED	XB-D	
FWHM / FWTM	150.0 + 63.0°	730 000 78"
Efficiency	88 %	
Peak intensity	2.3 cd/lm	60 ⁴ 60 ⁴
LEDs/each optic	1	$\vee \times / \wedge \times \vee$
Light colour	White	45* 2100
Required compone		2200
		\times / \times /
		000
		30* 30* 30*
		90* 90*
LED	XM-L	
FWHM / FWTM	152.0 + 81.0°	750 400 75°
Efficiency	91 %	
Peak intensity	1.2 cd/im	
LEDs/each optic	1	1220
Light colour	White	51 57
Required compone	nts:	100
		XIIX
		2450
		150 00 150
		90* 90*
LED	XM-L2	
FWHM / FWTM	167.0 + 71.0°	75° 400 75°
Efficiency	92 %	
Peak intensity	1.2 cd/lm	60* 50*
LEDs/each optic	1	1220
Light colour	White	45* 65*
Required compone	nts:	1600
		30* 2490 30*
CREE 🔶		30 12 ⁵ 0 ⁶ 12 ⁶
LEDS		90* 90*
LED	XP-E	
FWHM / FWTM	152.0 + 71.0°	734
Efficiency	93 %	1570
	2.8 cd/lm	60° 60°
Peak intensity		
Peak intensity LEDs/each optic	1	$ X \times \times \times $
LEDs/each optic	1 White	45* 3200 457
	White	61 <u>ID</u> 61
LEDs/each optic Light colour	White	6° 320 60
LEDs/each optic Light colour	White	
LEDs/each optic Light colour	White	



		90* 90*
LED	XP-E2	750 800 752
FWHM / FWTM	153.0 + 70.0°	
Efficiency	93 %	.50 ⁴ 50 ⁴
Peak intensity	2.9 cd/lm	200
LEDs/each optic	1	3390
Light colour	White	45° 45°
Required compone	nts:	4000
		4850
		30* <u>10</u> ² 0 ² 10* 30*
		90* 90*
LED	XP-G	734 400 734
FWHM / FWTM	153.0 + 92.0°	80
Efficiency	88 %	.60 ⁺ 1200 60 ⁺
Peak intensity	1.9 cd/lm	1630
LEDs/each optic	1	200
Light colour	White	45* 200 45*
Required compone	nts:	2000
		300
		300
		30* 13 ⁵ 600 15* 30 ⁴
CREE 🚖		
		8°.
LED	XP-G2	
LED FWHM / FWTM	151.0 + 75.0°	90 ⁴ 73 ⁵ 809 737
LED LED FWHM / FWTM Efficiency	151.0 + 75.0° 91 %	90° 191° 190° 190° 190° 190° 190°
LEDs LED FWHM / FWTM Efficiency Peak intensity	151.0 + 75.0° 91 % 2 cd/lm	90° 70° 60° 60°
LEDs FWHM / FWTM Efficiency Peak intensity LEDs/each optic	151.0 + 75.0° 91 % 2 cd/lm 1	50° 50° 50° 50° 50° 50° 50° 50° 50° 50°
LEDs FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour	151.0 + 75.0° 91 % 2 cd/lm 1 White	50 50 50 50 50 50 50 50 50 60 60 60 60 60 60 60 60 60 60 60 60 60
LEDs FWHM / FWTM Efficiency Peak intensity LEDs/each optic	151.0 + 75.0° 91 % 2 cd/lm 1 White	
LEDs EWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour	151.0 + 75.0° 91 % 2 cd/lm 1 White	
LEDs EWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour	151.0 + 75.0° 91 % 2 cd/lm 1 White	
LEDs EWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour	151.0 + 75.0° 91 % 2 cd/lm 1 White	47 200 47 309 47 309 20 31 20 20 20 20 20 20 20 20 20 20 20 20 20
LEDs LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour Required compone	151.0 + 75.0° 91 % 2 cd/lm 1 White	
LEDS LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour Required compone	151.0 + 75.0° 91 % 2 cd/lm 1 White nts:	47 200 47 309 47 309 20 31 20 20 20 20 20 20 20 20 20 20 20 20 20
LEDS LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour Required compone	151.0 + 75.0° 91 % 2 cd/lm 1 White nts: XT-E	47 200 47 309 47 309 20 31 20 20 20 20 20 20 20 20 20 20 20 20 20
LEDs LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour Required compone CREE	151.0 + 75.0° 91 % 2 cd/lm 1 White nts: XT-E 150.0 + 64.0°	47 200 47 309 47 309 20 31 20 20 20 20 20 20 20 20 20 20 20 20 20
LEDs LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour Required compone CREE LED FWHM / FWTM Efficiency	151.0 + 75.0° 91 % 2 cd/lm 1 White nts: XT-E 150.0 + 64.0° 88 %	47 200 47 309 47 309 20 31 20 20 20 20 20 20 20 20 20 20 20 20 20
LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour Required compone CREE LED FWHM / FWTM Efficiency Peak intensity	151.0 + 75.0° 91 % 2 cd/lm 1 White nts: XT-E 150.0 + 64.0° 88 % 2 cd/lm	47 200 47 309 47 309 20 31 20 20 20 20 20 20 20 20 20 20 20 20 20
LEDs LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour Required compone CREE LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic	151.0 + 75.0° 91 % 2 cd/lm 1 White nts: XT-E 150.0 + 64.0° 88 % 2 cd/lm 1	4° 209 6° 100 100 100 100 100 100 100 100 100 10
LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour Required compone CREE LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour	151.0 + 75.0° 91 % 2 cd/lm 1 White nts: XT-E 150.0 + 64.0° 88 % 2 cd/lm 1 White	4° 209 6° 100 100 100 100 100 100 100 100 100 10
LEDs LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour Required compone CREE LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic	151.0 + 75.0° 91 % 2 cd/lm 1 White nts: XT-E 150.0 + 64.0° 88 % 2 cd/lm 1 White	200 5° 5° 5° 5° 5° 5° 5° 5° 5° 5°
LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour Required compone CREE LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour	151.0 + 75.0° 91 % 2 cd/lm 1 White nts: XT-E 150.0 + 64.0° 88 % 2 cd/lm 1 White	200 5° 5° 5° 5° 5° 5° 5° 5° 5° 5°
LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour Required compone CREE LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour	151.0 + 75.0° 91 % 2 cd/lm 1 White nts: XT-E 150.0 + 64.0° 88 % 2 cd/lm 1 White	4° 200 6° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10°
LEDS LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour Required compone CREE LEDS LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour	151.0 + 75.0° 91 % 2 cd/lm 1 White nts: XT-E 150.0 + 64.0° 88 % 2 cd/lm 1 White	4° 200 6° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10°



🥙 LUMIL	EDS	
LED	LUXEON A	90° 90°
FWHM / FWTM	151.0 + 73.0°	73.6 400 73.4
Efficiency	89 %	
Peak intensity	69 % 1.8 cd/lm	60° 1220 60°
		160
LEDs/each optic	1	$X \times I \times X$
Light colour	White	45° 2000 45°
Required compone	its:	2130
		2800
		320
		90* 13 ⁵ 36 ²⁰ 10* 30 ⁵
	EDS	35
		90* 90*
LED	LUXEON R	400
FWHM / FWTM	147.0 + 71.0°	73* 800 75*
Efficiency	88 %	1200
Peak intensity	1.9 cd/lm	
LEDs/each optic	1	200
Light colour	White	45'
Required compone	nts:	20100
		2000
		220
		3000
		30* 15 ³ 4000 15* 30*
LUMIL	EDS	90* 90*
		87
LED	LUXEON Rebel	94 90 95 75 1
LED FWHM / FWTM		9/*
LED FWHM / FWTM Efficiency	LUXEON Rebel 146.0 + 64.0° 88 %	μ ²⁹ μ ²⁰
LED FWHM / FWTM Efficiency Peak intensity	LUXEON Rebel 146.0 + 64.0° 88 % 2.9 cd/m	
LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic	LUXEON Rebel 146.0 + 64.0° 88 % 2.9 cd/m 1	59 F2
LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour	LUXEON Rebel 146.0 + 64.0° 88 % 2.9 cd/lm 1 White	107 100 001 007 100 001 007 007 007
LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic	LUXEON Rebel 146.0 + 64.0° 88 % 2.9 cd/lm 1 White	59 Fr. 599 Fr. 695
LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour	LUXEON Rebel 146.0 + 64.0° 88 % 2.9 cd/lm 1 White	107 100 001 007 100 001 007 007 007
LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour	LUXEON Rebel 146.0 + 64.0° 88 % 2.9 cd/lm 1 White	107 100 001 007 100 001 007 007 007
LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour	LUXEON Rebel 146.0 + 64.0° 88 % 2.9 cd/lm 1 White	162 (67. 162) (67. 163) (67. 163) (67.
LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour Required component	LUXEON Rebel 146.0 + 64.0° 88 % 2.9 cd/lm 1 White nts:	162 (67. 162) (67. 163) (67. 163) (67.
LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour Required component	LUXEON Rebel 146.0 + 64.0° 88 % 2.9 cd/lm 1 White hts:	197 197 199 199 197 199 197 199 197 199 197 199 197 197
LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour Required component	LUXEON Rebel 146.0 + 64.0° 88 % 2.9 cd/lm 1 White hts: EDS LUXEON Rebel ES	197 197 199 199 197 199 197 199 197 199 197 199 197 197
LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour Required componer	LUXEON Rebel 146.0 + 64.0° 88 % 2.9 cd/lm 1 White hts: EDS LUXEON Rebel ES 147.0 + 73.0°	197 197 199 199 197 199 197 199 197 199 197 199 197 197
LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour Required componer	LUXEON Rebel 146.0 + 64.0° 88 % 2.9 cd/m 1 White hts: EDS LUXEON Rebel ES 147.0 + 73.0° 88 %	50 50 50 50 50 50 50 50 50 50 50 50 50 5
LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour Required component Required component Composition Required component Efficiency Peak intensity	LUXEON Rebel 146.0 + 64.0° 88 % 2.9 cd/lm 1 White hts: EDS LUXEON Rebel ES 147.0 + 73.0° 88 % 1.9 cd/lm	
LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour Required component Required component Efficiency Peak intensity LEDs/each optic	LUXEON Rebel 146.0 + 64.0° 88 % 2.9 cd/lm 1 White hts: EDS LUXEON Rebel ES 147.0 + 73.0° 88 % 1.9 cd/lm 1	
LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour Required component Composition Required component Composition Required component Efficiency Peak intensity LEDs/each optic Light colour	LUXEON Rebel 146.0 + 64.0° 88 % 2.9 cd/lm 1 White hts: EDS LUXEON Rebel ES 147.0 + 73.0° 88 % 1.9 cd/lm 1 White	
LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour Required component Required component Efficiency Peak intensity LEDs/each optic	LUXEON Rebel 146.0 + 64.0° 88 % 2.9 cd/lm 1 White hts: EDS LUXEON Rebel ES 147.0 + 73.0° 88 % 1.9 cd/lm 1 White	
LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour Required component Composition Required component Composition Required component Efficiency Peak intensity LEDs/each optic Light colour	LUXEON Rebel 146.0 + 64.0° 88 % 2.9 cd/lm 1 White hts: EDS LUXEON Rebel ES 147.0 + 73.0° 88 % 1.9 cd/lm 1 White	159 169 05 169 05 109 05 109 05 109 05 109 05 109 05 109 05 109 06 109 07 109 08 109 09 109 100 109 00 109 00 109 00 109 00 109 00 109 00 109 00 109 00 109 00 109 00 109 00 109 100 109 100 109 100 109 100 109 100 109
LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour Required component Composition Required component Composition Required component Efficiency Peak intensity LEDs/each optic Light colour	LUXEON Rebel 146.0 + 64.0° 88 % 2.9 cd/lm 1 White hts: EDS LUXEON Rebel ES 147.0 + 73.0° 88 % 1.9 cd/lm 1 White	
LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour Required component With colour LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour	LUXEON Rebel 146.0 + 64.0° 88 % 2.9 cd/lm 1 White hts: EDS LUXEON Rebel ES 147.0 + 73.0° 88 % 1.9 cd/lm 1 White	



🙆 LUMIL	EDS	
LED	LUXEON T	
FWHM / FWTM	151.0 + 75.0°	73° 400 75°
Efficiency	93 %	
Peak intensity		50* 1220 50*
	1.8 cd/lm	
LEDs/each optic	1	2000
Light colour	White	45°
Required compone	nts:	2420
		2800
		220
		30° 3500 90° 30°
	EDS	
		90* 90*
LED	LUXEON TX	400
FWHM / FWTM	151.0 + 71.0°	800
Efficiency	92 %	80* 1200 60*
Peak intensity	1.9 cd/lm	1000
LEDs/each optic	1	2000
Light colour	White	451 200
Required compone	nts:	
		2000
		320
		30* 300
		IB 0 B
MAUCHIA		TXX YAT
ØNICHI		
LED	NCSxx19A	
	NCSxx19A 145.0 + 64.0°	94* 73* 00 73*
LED	NCSxx19A	
LED FWHM / FWTM Efficiency Peak intensity	NCSxx19A 145.0 + 64.0°	
LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic	NCSxx19A 145.0 + 64.0° 88 % 2.2 cd/lm 1	
LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour	NCSxx19A 145.0 + 64.0° 88 % 2.2 cd/lm 1 White	173° 000 775° 60° 00°
LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic	NCSxx19A 145.0 + 64.0° 88 % 2.2 cd/lm 1 White	50° 50° 7°.
LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour	NCSxx19A 145.0 + 64.0° 88 % 2.2 cd/lm 1 White	50° 50° 7°.
LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour	NCSxx19A 145.0 + 64.0° 88 % 2.2 cd/lm 1 White	50° 50° 7°.
LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour	NCSxx19A 145.0 + 64.0° 88 % 2.2 cd/lm 1 White	73* 00 72* 64* 303 60* 75* 303 6* 303 60* 70* 309 600 70*
LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour Required compone	NCSxx19A 145.0 + 64.0° 88 % 2.2 cd/lm 1 White nts:	123 000 724 604 1255 604 1255 604 1259 604 1259 604 1259 604
LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour Required compone	NCSxx19A 145.0 + 64.0° 88 % 2.2 cd/lm 1 White nts:	23 00 75 10 10 10 10 10 10 10 10 10 10 10 10 10
LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour Required compone	NCSxx19A 145.0 + 64.0° 88 % 2.2 cd/lm 1 White nts:	23 00 75 10 10 10 10 10 10 10 10 10 10 10 10 10
LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour Required compone	NCSxx19A 145.0 + 64.0° 88 % 2.2 cd/lm 1 White nts: NS9x383 150.0 + 82.0°	73* 00 72* 64* 303 60* 75* 303 6* 303 60* 70* 309 600 70*
LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour Required compone	NCSxx19A 145.0 + 64.0° 88 % 2.2 cd/lm 1 White nts: NS9x383 150.0 + 82.0° 89 %	73* 00 72* 64* 303 60* 75* 303 6* 303 60* 70* 309 600 70*
LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour Required compone	NCSxx19A 145.0 + 64.0° 88 % 2.2 cd/lm 1 White nts: NS9x383 150.0 + 82.0° 89 % 1 cd/lm	73* 00 72* 64* 303 60* 75* 303 6* 303 60* 70* 309 600 70*
LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour Required compone	NCSxx19A 145.0 + 64.0° 88 % 2.2 cd/lm 1 White nts: NS9x383 150.0 + 82.0° 89 % 1 cd/lm 1	23 00 75 10 10 10 10 10 10 10 10 10 10 10 10 10
LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour Required compone	NCSxx19A 145.0 + 64.0° 88 % 2.2 cd/lm 1 White nts: NS9x383 150.0 + 82.0° 89 % 1 cd/lm 1 White	
LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour Required compone	NCSxx19A 145.0 + 64.0° 88 % 2.2 cd/lm 1 White nts: NS9x383 150.0 + 82.0° 89 % 1 cd/lm 1 White	
LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour Required compone	NCSxx19A 145.0 + 64.0° 88 % 2.2 cd/lm 1 White nts: NS9x383 150.0 + 82.0° 89 % 1 cd/lm 1 White	
LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour Required compone	NCSxx19A 145.0 + 64.0° 88 % 2.2 cd/lm 1 White nts: NS9x383 150.0 + 82.0° 89 % 1 cd/lm 1 White	
LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour Required compone	NCSxx19A 145.0 + 64.0° 88 % 2.2 cd/lm 1 White nts: NS9x383 150.0 + 82.0° 89 % 1 cd/lm 1 White	



ØNICHI		90* A A A A A A A A A A A A A A A A A A A
LED	NVSxx19A	400
FWHM / FWTM	147.0 + 70.0°	75°
Efficiency	87 %	80
Peak intensity	1.9 cd/lm	604 1200 60
LEDs/each optic	1	1000
Light colour	White	451 2000
Required component		40, 2100
		200
		300
		30* 15° 30 30° 15° 30
ØNICHI		50*
LED	NVSxx19B/NVSxx19C	
FWHM / FWTM	151.0 + 77.0° / 163.0 + 152.0°	75* 400 73
Efficiency	87 %	 510
Peak intensity	1.6 cd/lm	a)*
LEDs/each optic	1	1000
Light colour	White	45*
Required compone		200
		2000
		200
		10° 15° 3200 15° 30
OSDAM		I IX NYYA FI
OSRAM Opto Semiconductors		82*
Opto Semiconductors	OSLON Square CSSRM2/CSSRM3	91 92 100
opto Semiconductors LED FWHM / FWTM	152.0 + 76.0° / 163.0 + 158.0°	
opto Semiconductors LED FWHM / FWTM Efficiency	152.0 + 76.0° / 163.0 + 158.0° 90 %	72
opto Semiconductors LED FWHM / FWTM Efficiency Peak intensity	152.0 + 76.0° / 163.0 + 158.0° 90 % 1.8 cd/lm	20 00 50 ⁴ 1220 60
^{opto Semiconductors} LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic	152.0 + 76.0° / 163.0 + 158.0° 90 % 1.8 cd/lm 1	20 00 01 120 1500 00 00 00 00 00 00 00 00 00
opto Semiconductors LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour	152.0 + 76.0° / 163.0 + 158.0° 90 % 1.8 cd/lm 1 White	20 00 50 ⁴ 1220 60
opto Semiconductors LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic	152.0 + 76.0° / 163.0 + 158.0° 90 % 1.8 cd/lm 1 White	
opto Semiconductors LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour	152.0 + 76.0° / 163.0 + 158.0° 90 % 1.8 cd/lm 1 White	50 50 50 50 50 50 50 50 50 50 50 50 50 5
Opto Semiconductors LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour	152.0 + 76.0° / 163.0 + 158.0° 90 % 1.8 cd/lm 1 White	50 50 50 50 50 50 50 50 50 50 50 50 50 5
Opto Semiconductors LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour	152.0 + 76.0° / 163.0 + 158.0° 90 % 1.8 cd/lm 1 White	20 00 01 120 150 150 200 0 0 0 0 0 0 0 0 0 0 0 0
Opto Semiconductors LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour	152.0 + 76.0° / 163.0 + 158.0° 90 % 1.8 cd/lm 1 White	
Opto Semiconductors LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour Required component OSERAM Opto Semiconductors	152.0 + 76.0° / 163.0 + 158.0° 90 % 1.8 cd/lm 1 White nts:	
opto Semiconductors LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour Required component OSCRAM Opto Semiconductors LED	152.0 + 76.0° / 163.0 + 158.0° 90 % 1.8 cd/lm 1 White nts:	
opto Semiconductors LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour Required component OSRAM Opto Semiconductors LED FWHM / FWTM	152.0 + 76.0° / 163.0 + 158.0° 90 % 1.8 cd/lm 1 White nts: OSLON Square EC 150.0 + 76.0°	
opto Semiconductors LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour Required component OSERAM Opto Semiconductors LED FWHM / FWTM Efficiency	152.0 + 76.0° / 163.0 + 158.0° 90 % 1.8 cd/lm 1 White nts: OSLON Square EC 150.0 + 76.0° 89 %	
opto Semiconductors LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour Required component Opto Semiconductors LED FWHM / FWTM Efficiency Peak intensity	152.0 + 76.0° / 163.0 + 158.0° 90 % 1.8 cd/lm 1 White nts: OSLON Square EC 150.0 + 76.0° 89 % 1.9 cd/lm	
opto Semiconductors LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour Required component Opto Semiconductors LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic	152.0 + 76.0° / 163.0 + 158.0° 90 % 1.8 cd/lm 1 White nts: OSLON Square EC 150.0 + 76.0° 89 % 1.9 cd/lm 1	
opto Semiconductors LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour Required componen Opto Semiconductors LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour	152.0 + 76.0° / 163.0 + 158.0° 90 % 1.8 cd/lm 1 White nts: OSLON Square EC 150.0 + 76.0° 89 % 1.9 cd/lm 1 White	
opto Semiconductors LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour Required component Opto Semiconductors LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic	152.0 + 76.0° / 163.0 + 158.0° 90 % 1.8 cd/lm 1 White nts: OSLON Square EC 150.0 + 76.0° 89 % 1.9 cd/lm 1 White	
opto Semiconductors LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour Required componen Opto Semiconductors LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour	152.0 + 76.0° / 163.0 + 158.0° 90 % 1.8 cd/lm 1 White nts: OSLON Square EC 150.0 + 76.0° 89 % 1.9 cd/lm 1 White	
opto Semiconductors LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour Required componen Opto Semiconductors LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour	152.0 + 76.0° / 163.0 + 158.0° 90 % 1.8 cd/lm 1 White nts: OSLON Square EC 150.0 + 76.0° 89 % 1.9 cd/lm 1 White	



OSRAM Opto Semiconductors		90° 90°
LED	OSLON Square PC	400
FWHM / FWTM	150.0 + 86.0°	273°
Efficiency	89 %	1290
Peak intensity	2 cd/lm	. 60 ⁴ 60 ⁴ .
LEDs/each optic	1	2000
Light colour	White	45' 2990 45'
Required compone	nts:	200
		2200
		15 ⁵ 6000 15 ⁴ 30 ⁴
OSRAM Opto Semiconductors		90°
LED	OSLON SSL 150	800
FWHM / FWTM	152.0 + 99.0°	1650
Efficiency	92 %	50 ⁴
Peak intensity	2.9 cd/lm	.50°
LEDs/each optic	1	2200
Light colour	White	45* 4000 45*
Required compone	nts:	4500
		550
		30* 6430 30*
		112 ⁰ 0° 10 ¹
OSRAM Opto Semiconductors		90* 90*
LED	OSLON SSL 80	
FWHM / FWTM	148.0 + 53.0°	73°
Efficiency	89 %	1270
Peak intensity	2.3 cd/lm	. 60°
LEDs/each optic	1	200
Light colour	White	45' 2450 53'
Required compone	nts:	200
		330
		3600
		15 ⁵ 4800 15 ⁶ 30 ⁷



OPTICAL RESULTS (SIMULATED):

		90* 92*
LED	XP-G3	
FWHM / FWTM	157.0 + 79.0° / 171.0 + 182.0°	736 400 75°
Efficiency	88 %	
Peak intensity	1.1 cd/lm	50 ⁴ 900 60 ⁴
LEDs/each optic	1	
Light colour	White	120
Required components:	Wille	45* 45*
Required components.		1600
		\times
		2000
		30° 15° 0° 15° 30°
		80 ⁴
LED LEDS	XP-L HI	
FWHM / FWTM	156.0 + 64.0° / 168.0 + 166.0°	75° 400 78°
Efficiency	90 %	
Peak intensity	1.3 cd/lm	80° 800 80°.
LEDs/each optic	1	1220
Light colour	White	$X \times / T \setminus X >$
Required components:	Wille	45* 45* 47*
Required components.		
		2000
		2430
		30° 15° 0° 15° 30°
	XD-D	90° 90°
LED	XP-P 153.0 + 39.0° / 165.0 + 148.0°	94 95 95 95 95 95 95 95 95 95 95 95 95 95
LED FWHM / FWTM	153.0 + 39.0° / 165.0 + 148.0°	90° 90° 90°
LED FWHM / FWTM Efficiency	153.0 + 39.0° / 165.0 + 148.0° 91 %	30 ⁻ 30 ⁻ 30 ⁻ 400 50 ⁻ 50 ⁻
LED FWHM / FWTM Efficiency Peak intensity	153.0 + 39.0° / 165.0 + 148.0° 91 % 1.6 cd/lm	A0 ⁵ 1122 60 ⁴
LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic	153.0 + 39.0° / 165.0 + 148.0° 91 % 1.6 cd/lm 1	50° 120 64 169
LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour	153.0 + 39.0° / 165.0 + 148.0° 91 % 1.6 cd/lm	A07 1120 601
LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic	153.0 + 39.0° / 165.0 + 148.0° 91 % 1.6 cd/lm 1	50° 120 64 169
LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour	153.0 + 39.0° / 165.0 + 148.0° 91 % 1.6 cd/lm 1	61 ⁴ 122 61 123 16 ⁴ 200 67
LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour	153.0 + 39.0° / 165.0 + 148.0° 91 % 1.6 cd/lm 1	63* 125 63 155 0* 205 05 205 07 205 07 205 07 205 07 205 07 205 07 205 07 205 07 205 07 07 07 07 07 07 07 07 07 07
LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour	153.0 + 39.0° / 165.0 + 148.0° 91 % 1.6 cd/lm 1	61 ⁴ 122 61 ⁴
LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour Required components:	153.0 + 39.0° / 165.0 + 148.0° 91 % 1.6 cd/lm 1 White	63° 120 69 120 63° 200 67 200 200
LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour Required components:	153.0 + 39.0° / 165.0 + 148.0° 91 % 1.6 cd/lm 1 White	63* 120 69 120 63* 200 2350 2350 200
LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour Required components:	153.0 + 39.0° / 165.0 + 148.0° 91 % 1.6 cd/lm 1 White S LUXEON 5050 Round LES	63* 125 63 155 0* 205 05 205 07 205 07 205 07 205 07 205 07 205 07 205 07 205 07 205 07 07 07 07 07 07 07 07 07 07
LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour Required components:	153.0 + 39.0° / 165.0 + 148.0° 91 % 1.6 cd/lm 1 White S LUXEON 5050 Round LES Asymmetric	
LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour Required components:	153.0 + 39.0° / 165.0 + 148.0° 91 % 1.6 cd/lm 1 White S LUXEON 5050 Round LES Asymmetric 87 %	
LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour Required components:	153.0 + 39.0° / 165.0 + 148.0° 91 % 1.6 cd/lm 1 White S LUXEON 5050 Round LES Asymmetric 87 % 0.8 cd/lm	21 21 22 23 23 23 23 23 23 23 23 23
LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour Required components:	153.0 + 39.0° / 165.0 + 148.0° 91 % 1.6 cd/lm 1 White S LUXEON 5050 Round LES Asymmetric 87 % 0.8 cd/lm 1	
LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour Required components:	153.0 + 39.0° / 165.0 + 148.0° 91 % 1.6 cd/lm 1 White S LUXEON 5050 Round LES Asymmetric 87 % 0.8 cd/lm	
LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour Required components:	153.0 + 39.0° / 165.0 + 148.0° 91 % 1.6 cd/lm 1 White S LUXEON 5050 Round LES Asymmetric 87 % 0.8 cd/lm 1	
LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour Required components:	153.0 + 39.0° / 165.0 + 148.0° 91 % 1.6 cd/lm 1 White S LUXEON 5050 Round LES Asymmetric 87 % 0.8 cd/lm 1	
LED FWHM / FWTM Efficiency Peak intensity LEDs/each optic Light colour Required components:	153.0 + 39.0° / 165.0 + 148.0° 91 % 1.6 cd/lm 1 White S LUXEON 5050 Round LES Asymmetric 87 % 0.8 cd/lm 1	



OPTICAL RESULTS (SIMULATED):

🥙 LUMILEC)S	80
LED	LUXEON V	
FWHM / FWTM	64.0 + 156.0° / 176.0 + 175.0°	330 400 9
Efficiency	90 %	
Peak intensity	0.9 cd/lm	
LEDs/each optic	1	XXXX
Light colour	White	45*
Required components:		1200
		1430
		1600
		30* 1800
OSRAM		
Opto Semiconductors	OSCONIQ S 5050	90*
LED FWHM / FWTM	154.0 + 72.0° / 168.0 + 154.0°	776 70
Efficiency	87 %	
Peak intensity	0.7 cd/lm	
LEDs/each optic	1	
Light colour	White	
Required components:		
		1000
		30* <u>15</u> ⁵ <u>18</u> 30 <u>15</u> * 3
SECUL		90*
LED	Z5M4	l
FWHM / FWTM	149.0 + 67.0° / 164.0 + 140.0°	75% 400 7
Efficiency	89 %	
Peak intensity	1.2 cd/lm	
LEDs/each optic	1	1220
Light colour	White	45'
Required components:		1500
		30+ 2400 3
SECUL		112 ¹ 0 ⁴ 12 ⁵
SEOUL SEMICONDUCTOR		90*
LED	Z8Y22P	
FWHM / FWTM	154.6 + 110.7° / 172.0 + 180.0°	250 400
Efficiency	93 %	
Peak intensity	1.1 cd/lm	
	1	$\vee \times / \wedge \times \wedge$
LEDs/each optic		
Light colour	White	45+
	White	.67
Light colour	White	57 1200
Light colour	White	4° 120