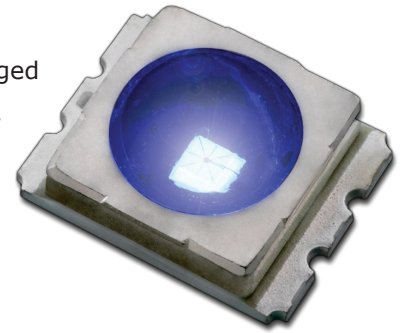


Cree® XLamp® 7090 LED

Binning and Labeling

Cree XLamp 7090 LEDs combine the brightness of power LED chips with a rugged package capable of operating in excess of one watt. XLamp LEDs lead the solid-state lighting industry in brightness while providing a reflow-solderable design that is optimized for ease-of-use and thermal management. Lighting applications featuring XLamp LEDs maximize light output and increase design flexibility, while minimizing environmental impact.



This application note describes Cree’s procedures for sorting XLamp 7090 LEDs by color (dominant wavelength or chromaticity) and brightness (flux) and then lists the order codes encompassing these color and brightness groups for easy reference.

Nomenclature

XLamp LEDs are tested and sorted into performance bins. A bin is specified by ranges of dominant wavelength and brightness. Sorted XLamp LEDs are packaged on reels. A reel contains lamps from one bin and is labeled with its bin code. For more information on packaging see the XLamp 7090 Data Sheet.

XLamp LEDs are sold by order codes in combinations of bins called kits. Kits include a minimum of two dominant wavelength groups and two brightness groups. Order codes are configured in the following manner:

Family	Color	Spatial Pattern	Viewing Angle (degrees)	Kit # Combination of bins
XL7090	ROY	L – Lambertian	100	0001-9999
	BLU	G - Global*		
	CYN			
	GRN			
	AMB			
	RDO			
	RED			
	WHT			

* Global - is an alternative white product that has higher efficacy with slightly lower color uniformity.

XLamp LED order codes specify package family, color, optical configuration (spatial pattern and viewing angle) and kit number (combination of bins).

Kit number 0001 is always the order code encompassing the broadest range of color and brightness groups.

Performance Groups – Brightness

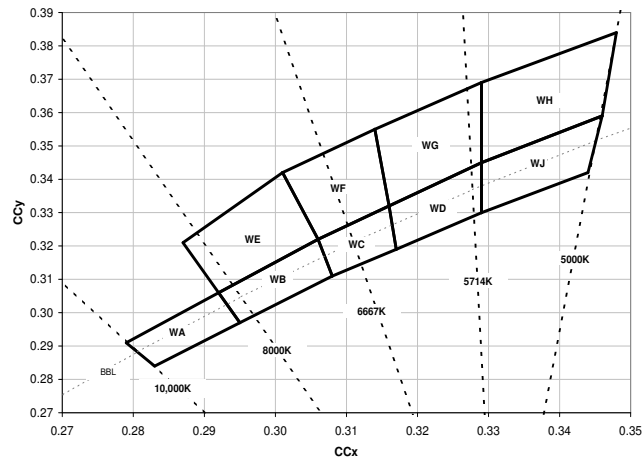
XLamp LEDs that are tested for luminous flux are placed into one of the following groups:

Group	Minimum Luminous Flux (lm) @ 350mA	Maximum Luminous Flux (lm) @ 350mA
C	4.8	6.3
D	6.3	8.2
E	8.2	10.7
F	10.7	13.9
G	13.9	18.1
H	18.1	23.5
J	23.5	30.6
K	30.6	39.8
M	39.8	51.7
N	51.7	67.2
P	67.2	87.4
Q	87.4	113.6
R	113.6	147.7

Royal Blue XLamp LEDs are tested for radiant flux and are placed into one of the following groups:

Group	Minimum Radiant Flux (mW) @ 350mA	Maximum Radiant Flux (mW) @ 350mA
07	100	122
08	122	147
09	147	175
10	175	210
11	210	250
12	250	300
13	300	350

Cree’s standard chromaticity regions plotted on the 1931 CIE Curve.



Performance Groups – Dominant Wavelength (DWL)

Monochromatic XLamp LEDs are tested for dominant wavelength and placed into one of the following groups.

Color	DWL Group	Min. DWL (nm) @ 350mA	Max. DWL (nm) @ 350mA
Royal Blue	RB4	455	460
	RB5	460	465
Blue	B3	465	470
	B4	470	475
Cyan	C2	500	505
	C3	505	510
Green	G2	520	525
	G3	525	530
	G4	530	535
Amber	A2	585	590
	A3	590	595
Red-Orange	RO3	610	615
	RO4	615	620
Red	R2	620	625
	R3	625	630
	R4	630	635

Performance Groups – Chromaticity

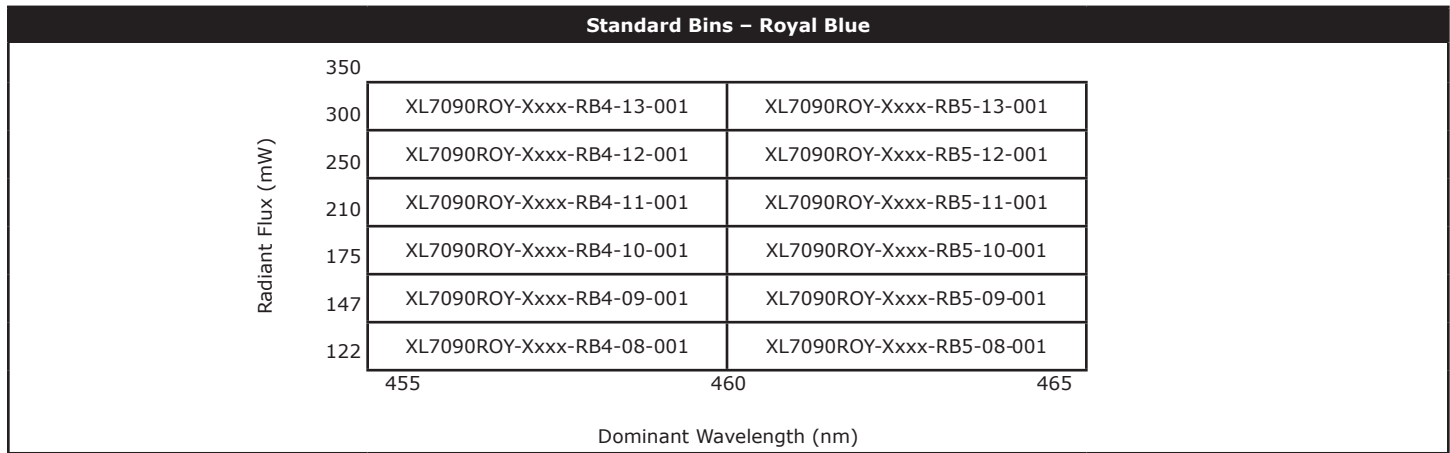
White XLamp LEDs are tested for chromaticity and placed into one of the regions defined by the bounding coordinates below.

Region	x	y	Region	x	y	Region	x	y
WA	.292	.306	WD	.329	.345	WG	.329	.369
	.295	.297		.329	.330		.329	.345
	.283	.284		.317	.319		.316	.332
	.279	.291		.316	.332		.314	.355
WB	.306	.322	WE	.301	.342	WH	.348	.384
	.308	.311		.306	.322		.346	.359
	.295	.297		.292	.306		.329	.345
	.292	.306		.287	.321		.329	.369
WC	.316	.332	WF	.314	.355	WJ	.329	.330
	.317	.319		.316	.331		.329	.345
	.308	.311		.306	.322		.346	.359
	.306	.322		.301	.342		.344	.342

Standard Order Codes and Bins

The following tables list standard order code configurations and performance bins. Contact Cree Lighting at +1 919.313.5300 if custom order codes are required.

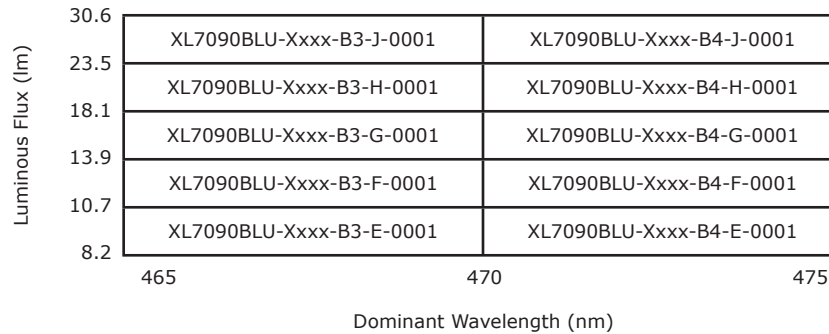
Standard Order Codes – Royal Blue					
Order Code	Bins	DWL (nm)		Radiant Flux (mW)	
		Min.	Max.	Min.	Max.
XL7090ROY-L100-0001	ALL	455	465	ALL	
XL7090ROY-L100-0002	6	455	465	122	210
XL7090ROY-L100-0003	6	455	465	175	300
XL7090ROY-L100-0005	8	455	465	175	350



Standard Order Codes – Blue

Order Code	Bins	DWL (nm)		Luminous Flux (lm)	
		Min.	Max.	Min.	Max.
XL7090BLU-L100-0001	ALL	465	475	ALL	
XL7090BLU-L100-0003	6	465	475	8.2	18.1
XL7090BLU-L100-0005	4	465	475	8.2	13.9
XL7090BLU-L100-0006	4	465	475	10.7	18.1
XL7090BLU-L100-0007	6	465	475	13.9	30.6

Standard Bins – Blue

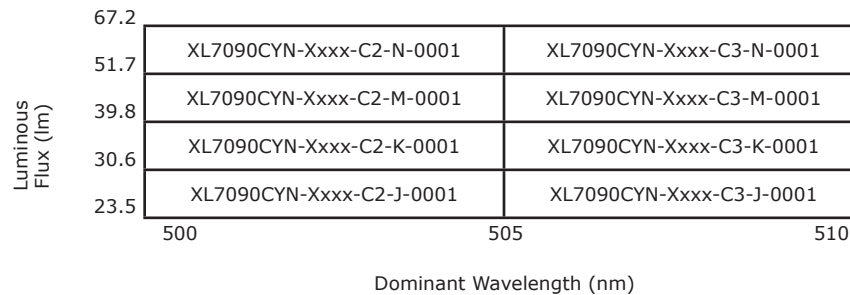


Dominant Wavelength (nm)

Standard Order Codes – Cyan

Order Code	Bins	DWL (nm)		Luminous Flux (lm)	
		Min.	Max.	Min.	Max.
XL7090CYN-L100-0001	ALL	500	510	ALL	
XL7090CYN-L100-0003	6	500	510	23.5	51.7
XL7090CYN-L100-0005	4	500	510	23.5	39.8
XL7090CYN-L100-0006	4	500	510	30.6	51.7

Standard Bins – Cyan



Dominant Wavelength (nm)

Standard Order Codes – Green					
Order Code	Bins	DWL (nm)		Luminous Flux (lm)	
		Min.	Max.	Min.	Max.
XL7090GRN-L100-0001	ALL	520	535	ALL	
XL7090GRN-L100-0010	6	520	535	30.6	51.7
XL7090GRN-L100-0011	6	520	530	30.6	67.2
XL7090GRN-L100-0012	6	525	535	30.6	67.2
XL7090GRN-L100-0013	6	520	535	39.8	67.2

Standard Bins – Green					
Luminous Flux (lm)	87.4	XL7090GRN-Xxxx-G2-P-0001	XL7090GRN-Xxxx-G3-P-0001	XL7090GRN-Xxxx-G4-P-0001	
	67.2	XL7090GRN-Xxxx-G2-N-0001	XL7090GRN-Xxxx-G3-N-0001	XL7090GRN-Xxxx-G4-N-0001	
	51.7	XL7090GRN-Xxxx-G2-M-0001	XL7090GRN-Xxxx-G3-M-0001	XL7090GRN-Xxxx-G4-M-0001	
	39.8	XL7090GRN-Xxxx-G2-K-0001	XL7090GRN-Xxxx-G3-K-0001	XL7090GRN-Xxxx-G4-K-0001	
30.6					
		520	525	530	535
		Dominant Wavelength (nm)			

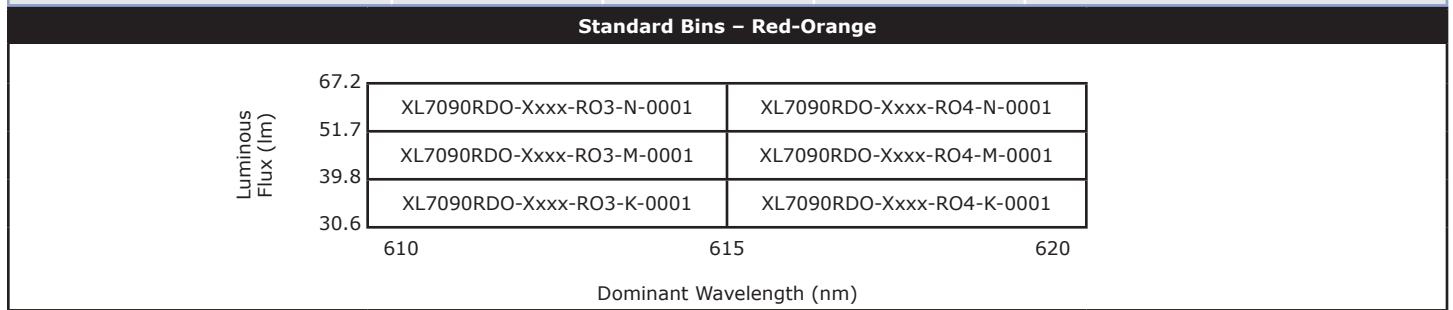
Amber and red XLamp 7090 LEDs are binned according to forward voltage at the rated current. The forward voltage group is indicated by the X in the four-character string 0X01 at the end of the performance bin. Cree's forward voltage bins are:

Forward Voltage Bins	
C	2.0 - 2.25
D	2.25 - 2.5
E	2.5 - 2.75
F	2.75 - 3.0

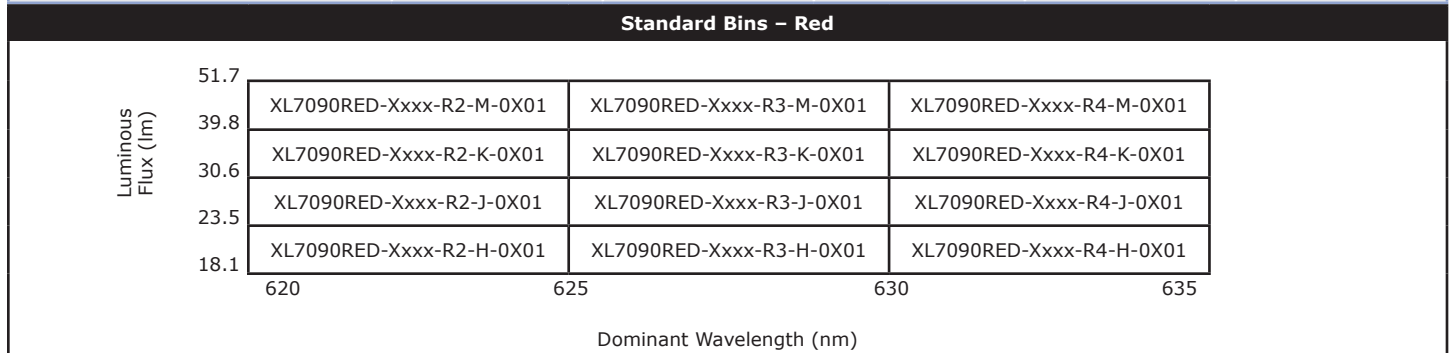
Standard Order Codes – Amber					
Order Code	Bins	DWL (nm)		Luminous Flux (lm)	
		Min.	Max.	Min.	Max.
XL7090AMB-L100-0001	ALL	585	595	ALL	

Standard Bins – Amber				
Luminous Flux (lm)	67.2	XL7090AMB-Xxxx-A2-N-0X01	XL7090AMB-Xxxx-A3-N-0X01	
	51.7	XL7090AMB-Xxxx-A2-M-0X01	XL7090AMB-Xxxx-A3-M-0X01	
	39.8	XL7090AMB-Xxxx-A2-K-0X01	XL7090AMB-Xxxx-A3-K-0X01	
	30.6	XL7090AMB-Xxxx-A2-J-0X01	XL7090AMB-Xxxx-A3-J-0X01	
23.5				
		585	590	595
		Dominant Wavelength (nm)		

Standard Order Codes – Red-Orange					
Order Code	Bins	DWL (nm)		Luminous Flux (lm)	
		Min.	Max.	Min.	Max.
XL7090RDO-L100-0001	ALL	610	620	ALL	



Standard Order Codes – Red					
Order Code	Bins	DWL (nm)		Luminous Flux (lm)	
		Min.	Max.	Min.	Max.
XL7090RED-L100-0001	ALL	620	635	ALL	
XL7090RED-L100-0010	6	620	630	18.1	39.8
XL7090RED-L100-0011	6	625	635	18.1	39.8
XL7090RED-L100-0012	4	625	635	23.5	39.8
XL7090RED-L100-0014	9	620	635	23.5	51.7



Standard Order Codes – White											
Order Code	WA	WB	WC	WD	WE	WF	WG	WH	WJ	Lum. Flux (lm)	
										Min.	Max.
XL7090WHT-L100-0001	X	X	X	X	X	X	X	X	X	ALL	
XL7090WHT-L100-0010			X	X		X	X			39.8	67.2
XL7090WHT-G100-0001	X	X	X	X	X	X	X	X	X	ALL	
XL7090WHT-G100-0014		X	X	X	X	X	X	X		51.7	67.2
XL7090WHT-G100-0018	X	X	X	X	X	X	X	X		56.8	67.2

Standard Bins – White

67.2	XL7090WHT-Xxxx-WA-N-0004	XL7090WHT-Xxxx-WB-N-0004
	XL7090WHT-Xxxx-WA-N-0003	XL7090WHT-Xxxx-WB-N-0003
51.7	XL7090WHT-Xxxx-WA-N-0002	XL7090WHT-Xxxx-WB-N-0002
39.8	XL7090WHT-Xxxx-WA-M-0003	XL7090WHT-Xxxx-WB-M-0003
	XL7090WHT-Xxxx-WA-M-0002	XL7090WHT-Xxxx-WB-M-0002
	WA	WB

Chromaticity Region

Standard Bins – White

67.2	XL7090WHT-Xxxx-WC-N-0004	XL7090WHT-Xxxx-WD-N-0004
	XL7090WHT-Xxxx-WC-N-0003	XL7090WHT-Xxxx-WD-N-0003
51.7	XL7090WHT-Xxxx-WC-N-0002	XL7090WHT-Xxxx-WD-N-0002
39.8	XL7090WHT-Xxxx-WC-M-0003	XL7090WHT-Xxxx-WD-M-0003
	XL7090WHT-Xxxx-WC-M-0002	XL7090WHT-Xxxx-WD-M-0002
	WC	WD

Chromaticity Region

Standard Bins – White

67.2	XL7090WHT-Xxxx-WE-N-0004	XL7090WHT-Xxxx-WF-N-0004
	XL7090WHT-Xxxx-WE-N-0003	XL7090WHT-Xxxx-WF-N-0003
51.7	XL7090WHT-Xxxx-WE-N-0002	XL7090WHT-Xxxx-WF-N-0002
39.8	XL7090WHT-Xxxx-WE-M-0003	XL7090WHT-Xxxx-WF-M-0003
	XL7090WHT-Xxxx-WE-M-0002	XL7090WHT-Xxxx-WF-M-0002
	WE	WF

Chromaticity Region

Standard Bins – White			
67.2	XL7090WHT-Xxxx-WG-N-0004 XL7090WHT-Xxxx-WG-N-0003 XL7090WHT-Xxxx-WG-N-0002	XL7090WHT-Xxxx-WH-N-0004 XL7090WHT-Xxxx-WH-N-0003 XL7090WHT-Xxxx-WH-N-0002	XL7090WHT-Xxxx-WJ-N-0004 XL7090WHT-Xxxx-WJ-N-0003 XL7090WHT-Xxxx-WJ-N-0002
51.7	XL7090WHT-Xxxx-WG-M-0003 XL7090WHT-Xxxx-WG-M-0002	XL7090WHT-Xxxx-WH-M-0003 XL7090WHT-Xxxx-WH-M-0002	XL7090WHT-Xxxx-WJ-M-0003 XL7090WHT-Xxxx-WJ-M-0002
39.8	WG	WH	WJ
Chromaticity Region			

In order to minimize the perceived luminous flux variation among white lamps from the same reel, Cree bins to tighter luminous flux sub-groups. These sub-groups are defined below. Cree does not take orders for specific sub-groups.

Group Code	Minimum Luminous Flux (lm)	Maximum Luminous Flux (lm)
M-0002	39.8	45.7
M-0003	45.7	51.7
N-0002	51.7	56.8
N-0003	56.8	62.0
N-0004	62.0	67.2
P-0002*	67.2	73.9
P-0003*	73.9	80.6
P-0004*	80.6	87.4

* not yet available