# Cree® XLamp® 7090 XR-E Series LED
Binning and Labeling

Cree XLamp 7090 XR-E Series 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.
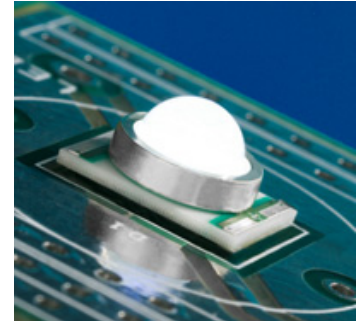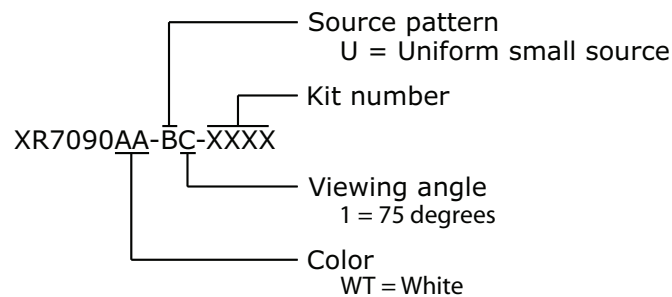
This application note describes Cree's procedures for sorting XLamp 7090 LEDs by color (chromaticity) and brightness (luminous flux) and then lists the order codes encompassing these color and brightness groups for easy reference.
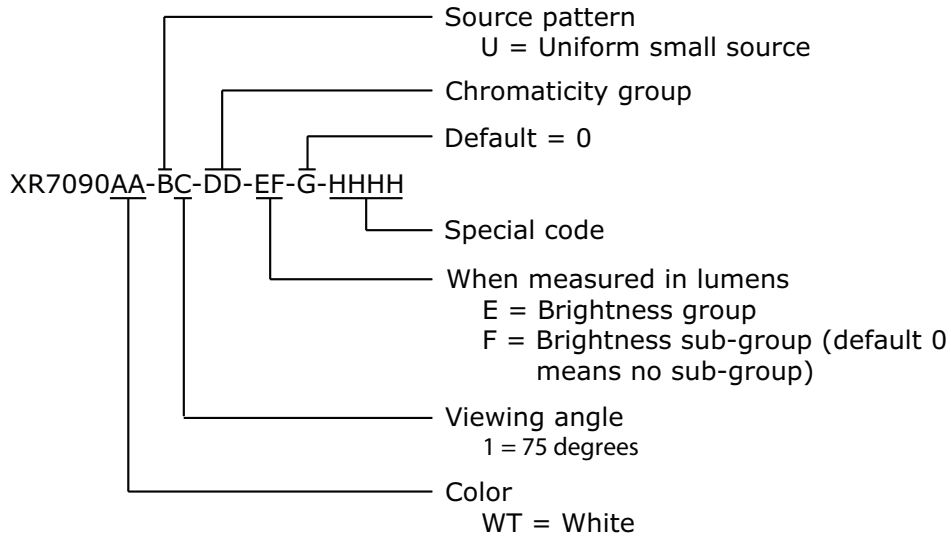
Nomenclature

XLamp LEDs are tested and sorted into performance bins. A bin is specified by ranges of color 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 XR-E Series LEDs data sheet.

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

Source pattern
U = Uniform small source

Kit number

XR7090AA-BC-XXXX

Viewing angle
1 = 75 degrees

Color
WT = White

Bin Codes Nomenclature

XR7090AA-BC-DD-EF-G-HHHH

- Source pattern
    - U = Uniform small source
- Chromaticity group
- Default = 0
- Special code
- When measured in lumens
    - E = Brightness group
    - F = Brightness sub-group (default 0 means no sub-group)
- Viewing angle
    - 1 = 75 degrees
- Color
    - WT = White

Performance Groups – Brightness

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

| Group Code	Minimum Luminous Flux @350 mA (lm)	Maximum Luminous Flux (lm) @ 350 mA
N4	62.0	67.2
P2	67.2	73.9
P3	73.9	80.6
P4	80.6	87.4
Q2	87.4	93.9
Q3	93.9	100.4

Performance Groups – Chromaticity

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

White Color Region Coordinates - 5000K–10000K

Region	x	y	Region	x	y
WA	.292	.306	WH	.348	.384
	.295	.297		.346	.359
	.283	.284		.329	.345
	.279	.291		.329	.369
WB	.306	.322	WJ	.329	.330
	.308	.311		.329	.345
	.295	.297		.346	.359
	.292	.306		.344	.342
WC	.316	.332	WK	.283	.284
	.317	.319		.295	.297
	.308	.311		.298	.288
	.306	.322		.287	.276
WD	.329	.345	WM	.295	.297
	.329	.330		.308	.311
	.317	.319		.310	.300
	.316	.332		.298	.288
WE	.301	.342	WN	.308	.311
	.306	.322		.317	.319
	.292	.306		.318	.308
	.287	.321		.310	.300
WF	.314	.355	WP	.317	.319
	.316	.332		.329	.330
	.306	.322		.329	.318
	.301	.342		.318	.308
WG	.329	.369	WQ	.329	.330
	.329	.345		.344	.342
	.316	.332		.343	.328
	.314	.355		.329	.318
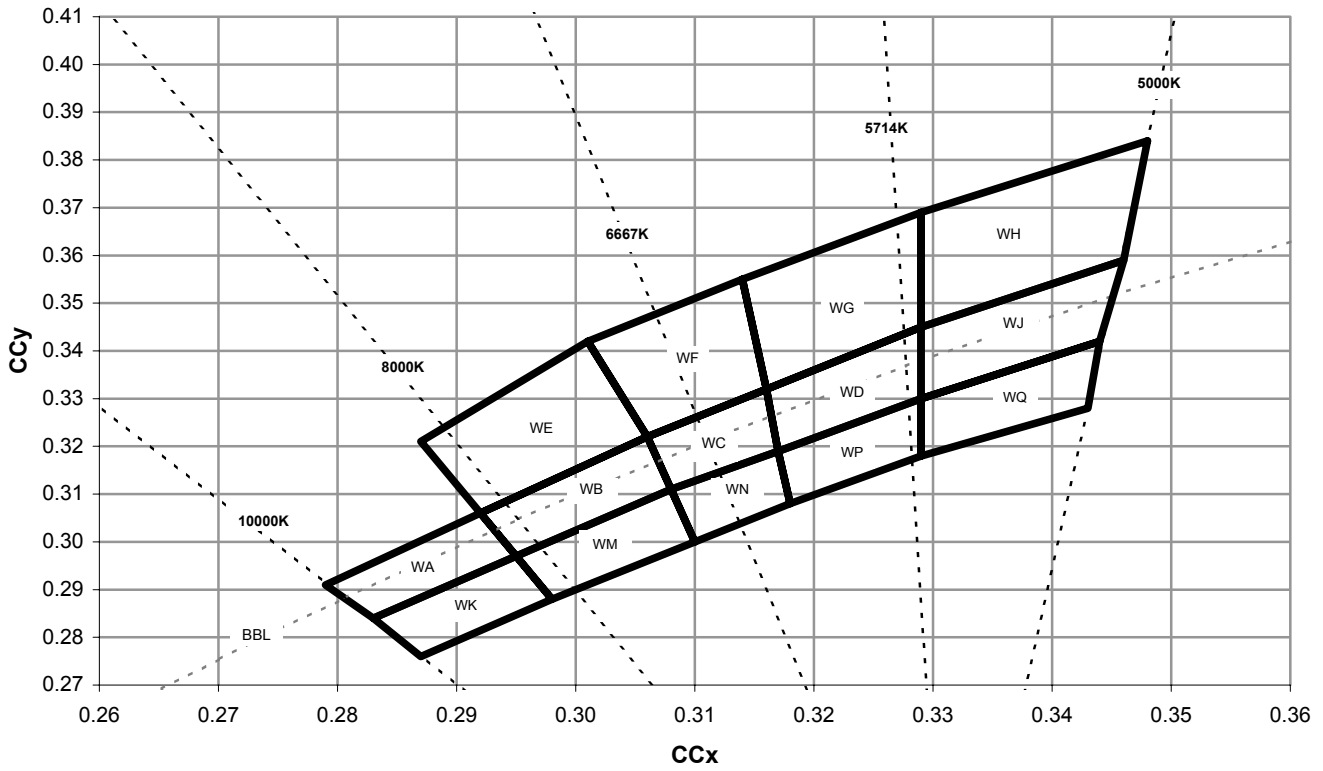
Standard Order Codes and Bins

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

	Standard Order Codes – White		
Order Code	**Chromaticity Bounding Regions**	**Luminous Flux (lm) @ 350 mA**	
		Min.	**Max.**
XR7090WT-U1-0001	All	62	87.4
XR7090WT-U1-0002	WC,WD, WF, WG	62	87.4
XR7090WT-U1-0005	WA, WB, WC, WD, WE, WF, WG, WH, WJ	62	87.4
XR7090WT-U1-0006	WC, WD, WJ, WN, WP, WQ	62	87.4
XR7090WT-U1-0011	All	67.2	93.9
XR7090WT-U1-0012	WC, WD, WF, WG	67.2	93.9
XR7090WT-U1-0015	WA, WB, WC, WD, WE, WF, WG, WH, WJ	67.2	93.9
XR7090WT-U1-0016	WC, WD, WJ, WN, WP, WQ	67.2	93.9
XR7090WT-U1-0021	All	73.9	100.4
XR7090WT-U1-0022	WC, WD, WF, WG	73.9	100.4
XR7090WT-U1-0025	WA, WB, WC, WD, WE, WF, WG, WH, WJ	73.9	100.4
XR7090WT-U1-0026	WC, WD, WJ, WN, WP, WQ	73.9	100.4

Standard Bins – White

Luminous Flux (lm)	WA	WB
100.4 – 93.9	XR7090WT-XX-WA-Q3-0-0001	XR7090WT-XX-WB-Q3-0-0001
93.9 – 87.4	XR7090WT-XX-WA-Q2-0-0001	XR7090WT-XX-WB-Q2-0-0001
87.4 – 80.6	XR7090WT-XX-WA-P4-0-0001	XR7090WT-XX-WB-P4-0-0001
80.6 – 73.9	XR7090WT-XX-WA-P3-0-0001	XR7090WT-XX-WB-P3-0-0001
73.9 – 67.2	XR7090WT-XX-WA-P2-0-0001	XR7090WT-XX-WB-P2-0-0001
67.2 – 62.0	XR7090WT-XX-WA-N4-0-0001	XR7090WT-XX-WB-N4-0-0001

Chromaticity Regions

Standard Bins – White	

Luminous Flux (lm)

100.4	
	XR7090WT-XX-WC-Q3-0-0001	XR7090WT-XX-WD-Q3-0-0001
93.9	
	XR7090WT-XX-WC-Q2-0-0001	XR7090WT-XX-WD-Q2-0-0001
87.4	
	XR7090WT-XX-WC-P4-0-0001	XR7090WT-XX-WD-P4-0-0001
80.6	
	XR7090WT-XX-WC-P3-0-0001	XR7090WT-XX-WD-P3-0-0001
73.9	
	XR7090WT-XX-WC-P2-0-0001	XR7090WT-XX-WD-P2-0-0001
67.2	
	XR7090WT-XX-WC-N4-0-0001	XR7090WT-XX-WD-N4-0-0001
62.0	
	WC	WD

Chromaticity Regions

Standard Bins – White	

Luminous Flux (lm)

100.4	
	XR7090WT-XX-WE-Q3-0-0001	XR7090WT-XX-WF-Q3-0-0001
93.9	
	XR7090WT-XX-WE-Q2-0-0001	XR7090WT-XX-WF-Q2-0-0001
87.4	
	XR7090WT-XX-WE-P4-0-0001	XR7090WT-XX-WF-P4-0-0001
80.6	
	XR7090WT-XX-WE-P3-0-0001	XR7090WT-XX-WF-P3-0-0001
73.9	
	XR7090WT-XX-WE-P2-0-0001	XR7090WT-XX-WF-P2-0-0001
67.2	
	XR7090WT-XX-WE-N4-0-0001	XR7090WT-XX-WF-N4-0-0001
62.0	
	WE	WF

Chromaticity Regions

Standard Bins – White	

Luminous Flux (lm)

100.4	
	XR7090WT-XX-WG-Q3-0-0001	XR7090WT-XX-WH-Q3-0-0001
93.9	
	XR7090WT-XX-WG-Q2-0-0001	XR7090WT-XX-WH-Q2-0-0001
87.4	
	XR7090WT-XX-WG-P4-0-0001	XR7090WT-XX-WH-P4-0-0001
80.6	
	XR7090WT-XX-WG-P3-0-0001	XR7090WT-XX-WH-P3-0-0001
73.9	
	XR7090WT-XX-WG-P2-0-0001	XR7090WT-XX-WH-P2-0-0001
67.2	
	XR7090WT-XX-WG-N4-0-0001	XR7090WT-XX-WH-N4-0-0001
62.0	
	WG	WH

Chromaticity Regions

Standard Bins – White

Luminous Flux (lm)		
100.4	XR7090WT-XX-WJ-Q3-0-0001	XR7090WT-XX-WK-Q3-0-0001
93.9	XR7090WT-XX-WJ-Q2-0-0001	XR7090WT-XX-WK-Q2-0-0001
87.4	XR7090WT-XX-WJ-P4-0-0001	XR7090WT-XX-WK-P4-0-0001
80.6	XR7090WT-XX-WJ-P3-0-0001	XR7090WT-XX-WK-P3-0-0001
73.9	XR7090WT-XX-WJ-P2-0-0001	XR7090WT-XX-WK-P2-0-0001
67.2	XR7090WT-XX-WJ-N4-0-0001	XR7090WT-XX-WK-N4-0-0001
62.0	WJ	WK

Chromaticity Regions

Standard Bins – White

Luminous Flux (lm)		
100.4	XR7090WT-XX-WM-Q3-0-0001	XR7090WT-XX-WN-Q3-0-0001
93.9	XR7090WT-XX-WM-Q2-0-0001	XR7090WT-XX-WN-Q2-0-0001
87.4	XR7090WT-XX-WM-P4-0-0001	XR7090WT-XX-WN-P4-0-0001
80.6	XR7090WT-XX-WM-P3-0-0001	XR7090WT-XX-WN-P3-0-0001
73.9	XR7090WT-XX-WM-P2-0-0001	XR7090WT-XX-WN-P2-0-0001
67.2	XR7090WT-XX-WM-N4-0-0001	XR7090WT-XX-WN-N4-0-0001
62.0	WM	WN

Chromaticity Regions

Standard Bins – White

Luminous Flux (lm)		
100.4	XR7090WT-XX-WP-Q3-0-0001	XR7090WT-XX-WQ-Q3-0-0001
93.9	XR7090WT-XX-WP-Q2-0-0001	XR7090WT-XX-WQ-Q2-0-0001
87.4	XR7090WT-XX-WP-P4-0-0001	XR7090WT-XX-WQ-P4-0-0001
80.6	XR7090WT-XX-WP-P3-0-0001	XR7090WT-XX-WQ-P3-0-0001
73.9	XR7090WT-XX-WP-P2-0-0001	XR7090WT-XX-WQ-P2-0-0001
67.2	XR7090WT-XX-WP-N4-0-0001	XR7090WT-XX-WQ-N4-0-0001
62.0	WP	WQ

Chromaticity Regions