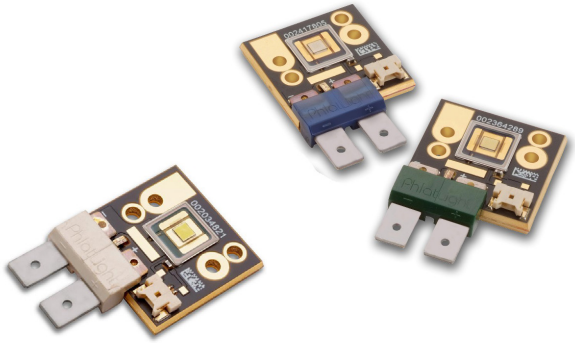
CBT-90 LEDs



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Introduction:

This document describes the binning and labeling nomenclature for CBT-90 LED product as well as the orderable bin kits for each part.

With each build of parts, there is a distribution of performance in both flux and wave length or chromaticity. In order to guarantee specific performance for customers, each device is measured and subsequently grouped into flux and wavelength or chromaticity bins. Each individual package or reel of parts contains only one combination of flux and wavelength or chromaticity bin. Furthermore, bins are combined into orderable bin kits comprising of a selection of flux and wavelength or chromaticity bins to ease the ordering process.

PDS-001694 Rev 11

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Table of Products

Products	Ordering Part Number	Description
CBT-90-W57S	CBT-90-W57S-C11-xx123	Luminus LED™ CBT-90 consisting of a 9 mm^2 LED, connector, on a copper-core PCB *Note: The CBT-90-G and CBT-90-B devices have been discontinued and replaced by the CBT-90 TE version. Please refer to PDS-002547 for more information*
CBT-90-W65S	CBT-90-W65S-C11-xx123	
CBT-90-WDLS	CBT-90-WDLS-C11-xx123	
CBT-90-W57H	CBT-90-W57H-xx123	
CBT-90-G	CBT-90-G-C11-xx123	
CBT-90-B	CBT-90-B-C11-xx123	

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CBT-90 Shipping and Labeling Nomenclature

All CBT-90 products are packaged and labeled with their respective bin as outlined in the following pages. Each package will only contain one bin. The part number designation is as follows:

A B C — 1 2 3 — D 4 5 E — F 6 7 — G H — I 8

Product Family	Chip Area	Color	Package Configuration	Flux Bin	Chromaticity Bin/ Wavelength

Product Family	A - Package type: "C" denotes chip-on board B - Lens type: "B" denotes window (no lens) C - Chip quantity: "T" denotes single chip
Chip Area	1 2 3 - Total LED chip area (mm^2) x 10: "90" denotes $9mm^2$
Color	D - Color: "W" denotes white , "G" denotes Green, "B" denotes blue 4 5 - Color temperature: "57" denotes 5700K. 65" denotes 6500K . "DL" denotes daylight white (6500K through 5700K) etc., not applicable for monochrome parts E - Color rendering: "S" (standard) and "H" (high) denote typical CRI of 70 and 92 respectively, not applicable for monochrome parts
Package Config.	F 6 7 - Package configuration (for internal use)
Flux Bin	G H - Flux bin
Chromaticity Bin/ Wavelength	I 8 - Wavelength / Chromaticity bin

Example:
The part number CBT-90-W65S-C11-NB-G4 refers to a 6500K standard CRI white, CBT-90 emitter, with a flux range from1,710 to 1,830 lumens and a chromaticity value within the box defined by the four points (0.313, 0.338), (0.321, 0.348), (0.322, 0.336), (0.312, 0.328).

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CBT-90 Bin Kit Ordering Nomenclature

All CBT-90 products are sold in sets of flux and chromaticity bins called bin kits. Each bin kit specifies a minimum flux bin and a specific selection of chromaticity bins. The ordering part number designation is as follows:

A B C — 1 2 3 — D 4 5 E — F 6 7 — G H 8 9 0

Product Family	Chip Area	Color	Package Configuration	Bin Kit Code

Product Family	A - Package type: "C" denotes chip-on board B - Lens type: "B" denotes window (no lens) C - Chip quantity: "T" denotes single chip
Chip Area	1 2 3 - Total LED chip area (mm^2) x 10: "90" denotes $9mm^2$
Color	D - Color: "W" denotes white , "G" denotes Green, "B" denotes blue 4 5 - Color temperature: "57" denotes 5700K, "65" denotes 6500K , "DL" denotes daylight white (6500K through 5700K) etc., not applicable for monochrome parts E - Color rendering: "S" (standard) and "H" (high) denote typical CRI of 70 and 92 respectively, not applicable for monochrome parts
Package Config.	F 6 7 - Package configuration (for internal use)
Bin Kit Code	G H - Flux bin 8 9 0 - Wavelength/ Chromaticity bin kit code

Example:

The ordering part number CBT-90-W65S-C11-NB101 refers to a 6500K standard CRI white, CBT-90 emitter, with a minimum flux value of 1,710 lumens and falling in the F4, F3, G4, G3, EF, and DG chromaticity bins.

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CBT-90 White Binning Structure

CBT-90 white LEDs are tested for luminous flux and chromaticity at a drive current of 9.0 A (1.0 A/mm^2) and placed into one of the following luminous flux (FF) and chromaticity (WW) bins:

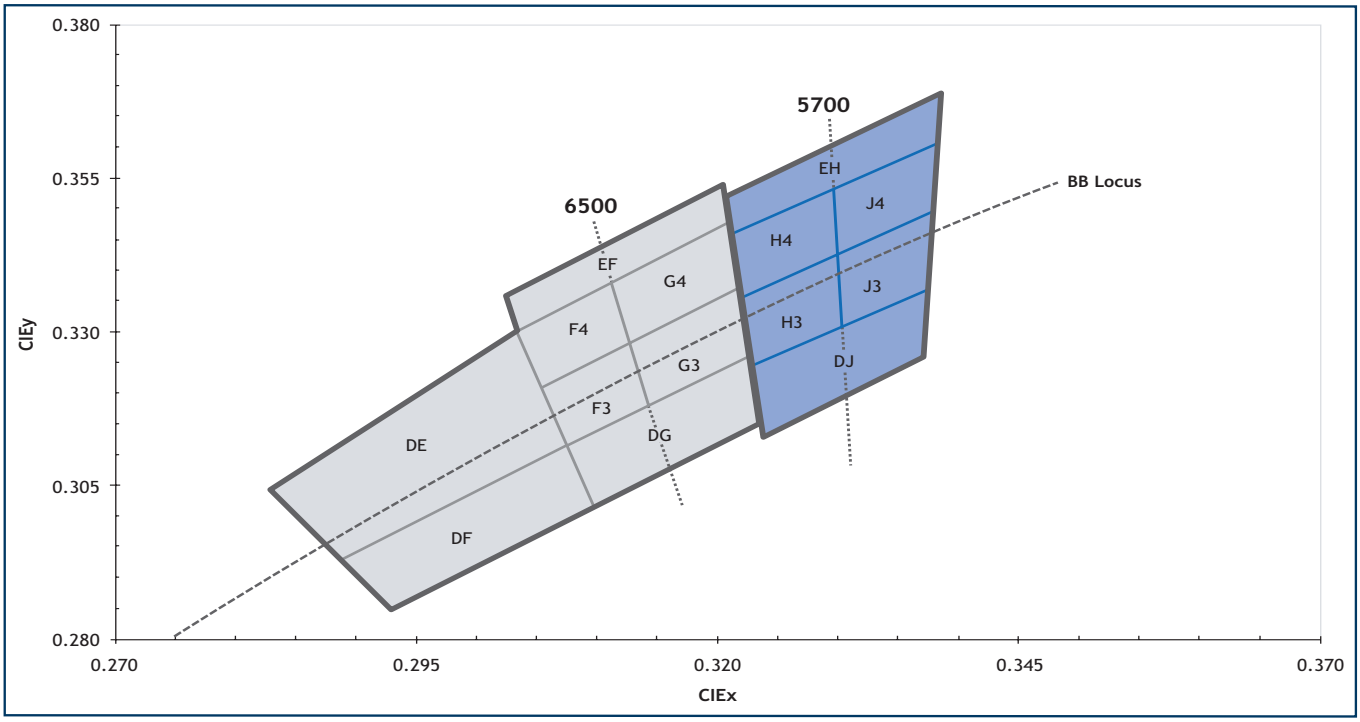
Flux Bins (At Test Condition[1])

Color	Flux Bin (FF)	Minimum Flux (lm) at 9.0A	Maximum Flux (lm) at 9.0A
W65S (6500K, 70CRI) W57S (5700K, 70CRI) W57H (5700K, 92CRI)	SB	2,990	3,200
	SA	2,780	2,990
	RB	2,600	2,780
	RA	2,420	2,600
	QB	2,260	2,420
	QA	2,100	2,260
	PB	1,966	2,100
	PA	1,830	1,966
	NB	1,710	1,830
	NA	1,590	1,710
	MB	1,485	1,590
	MA	1,380	1,485
	LB	1,290	1,380
	LA	1,200	1,290

Note 1: Luminus maintains a +/- 6% tolerance on flux measurements and a +/- 2% tolerance on CRI measurements.

Chromaticity Bins[2]

Luminus' Standard Chromaticity Bins: 1931 CIE Curve



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The following tables describe the four chromaticity points that bound each chromaticity bin. Chromaticity bins are grouped together based on the color temperature.

6500K Chromaticity Bins		
Bin Code (WW)	CIEx	CIEy
DG	0.307	0.311
	0.322	0.326
	0.323	0.316
	0.309	0.302
F3*	0.305	0.321
	0.313	0.329
	0.315	0.319
	0.307	0.311
F4*	0.303	0.330
	0.312	0.339
	0.313	0.329
	0.305	0.321
G3*	0.313	0.329
	0.321	0.337
	0.322	0.326
	0.315	0.319
G4*	0.312	0.339
	0.321	0.348
	0.321	0.337
	0.313	0.329
EF	0.302	0.335
	0.320	0.354
	0.321	0.348
	0.303	0.330
DE	0.283	0.304
	0.303	0.330
	0.307	0.311
	0.289	0.293
DF	0.289	0.293
	0.307	0.311
	0.309	0.302
	0.293	0.285

5700K Chromaticity Bins		
Bin Code (WW)	CIEx	CIEy
DJ	0.322	0.324
	0.337	0.337
	0.336	0.326
	0.323	0.314
H3*	0.321	0.335
	0.329	0.342
	0.329	0.331
	0.322	0.324
H4*	0.321	0.346
	0.329	0.354
	0.329	0.342
	0.321	0.335
J3*	0.329	0.342
	0.337	0.349
	0.337	0.337
	0.330	0.331
J4*	0.329	0.354
	0.338	0.362
	0.337	0.349
	0.329	0.342
EH	0.320	0.352
	0.338	0.368
	0.338	0.362
	0.321	0.346

*Sub-bins within ANSI defined quadrangles per ANSI C78.377-2008

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CBT-90 Monochromatic Binning Structure

All CBT-90 monochromatic LEDs are tested for luminous flux/ dominant wavelength and placed into one of the following flux/ wave length bins. The binning structure is universally applied across each monochromatic color of the CBT-90 product line. Consult the local sales person for the available flux/ wavelength bins for the product:

Flux Bins

Color	Luminous Flux Bin (FF)	Minumum Flux (lm) @ 13.5A	Maximum Flux (lm) @ 13.5A
Green	CK	1,500	2,000
	CM	2,000	2,300
Blue	DJ	250	350
	DK	350	450
	DM	450	575

Wavelength Bins

Color	Wavelength Bin (FF)	Minumum Wavelength @ 13.5A	Maximum Wavelength @ 13.5A
Green	G4	520	525
	G5	525	530
	G6	530	535
	G7	535	540
Blue	B4	450	455
	B5	455	460
	B6	460	465
	B7	465	470

*Note: Luminus maintains a +/- 6% tolerance on flux measurements.

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CBT-90 Bin Kit Order Codes

The following tables describe the bin kit ordering codes for the CBT-90. The flux and wave length or chromaticity bins included in the bin kit. Each kit specifies a minimum flux and the listed wave length or chromaticity bins. A maximum flux is not specified. Within each kit, Luminus may ship any part meeting or exceeding the minimum flux specification. Shipments will always meet the listed wave length or chromaticity bins. For information on ordering bin kits not listed below, please contact Luminus or an official distributor.

CBT-90 Bin Kit Order Codes

Color	Luminous Flux		Chromaticity Bins	Kit Number
	Bin Kit Flux Code	Min. Flux		
W57S 5700K, Standard CRI (typ. 70)	NA	1,590	H3, H4, J3, J4, EH, DJ	NA200
			H3, H4, J3, J4	NA201
	NB	1,710	H3, H4, J3, J4, EH, DJ	NB200
			H3, H4, J3, J4	NB201
	PA	1,830	H3, H4, J3, J4, EH, DJ	PA200
W65S 6500K, Standard CRI (typ. 70)	NA	1,590	F4, F3, G4, G3, EF, DG, DE, DF	NA100
			F4, F3, G4, G3, EF, DG	NA101
			F4, F3, G4, G3	NA102
	NB	1,710	F4, F3, G4, G3, EF, DG, DE, DF	NB100
			F4, F3, G4, G3, EF, DG	NB101
			F4, F3, G4, G3	NB102
White WDLS 6500K & 5700K Standard CRI (typ. 70)	MA	1,380	F4, F3, G4, G3, EF, DG, DE, DF H4, H3, J4, J3, EH, DJ	MA150
	MB	1,485	F4, F3, G4, G3, EF, DG, DE, DF H4, H3, J4, J3, EH, DJ	MB150
	NA	1,590	F4, F3, G4, G3, EF, DG, DE, DF H4, H3, J4, J3, EH, DJ	NA150
	NB	1,710	F4, F3, G4, G3, EF, DG, DE, DF H4, H3, J4, J3, EH, DJ	NB150
W57H 5700K, High CRI (typ. 92)	KA	1,080	H4, H3, J4, J3, EH, DJ	KA200
			H4, H3, J4, J3	KA201
	KB	1,120	H4, H3, J4, J3, EH, DJ	KB200
			H4, H3, J4, J3	KB201

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Color	Luminous Flux		Wavelength Bins	Kit Number
	Bin Kit Flux Code	Min. Flux		
Green	JK	1,500	G2, G3, G4, G5, G6, G7, G8	JK200
			G4, G5, G6, G7	JK201
	JM	2,000	G2, G3, G4, G5, G6, G7, G8	JM200
			G4, G5, G6, G7	JM201
Blue	KJ	250	B4, B5, B6, B7, B8	KJ300
			B5, B6, B7	KJ301
	KK	350	B4, B5, B6, B7, B8	KK300
			B5, B6, B7	KK301
	KM	450	B4, B5, B6, B7, B8	KM300
			B5, B6, B7	KM301

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