

## CST-90 LEDs



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### Introduction:

This document describes the binning and labeling nomenclature for CST-90 Big Chip 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.

**Table of Products**

Products	Ordering Part Number	Description
CST-90-W65S	CST-90-W65S-C12-xx123	White Big Chip LED™ CST-90 consisting of a 9 mm <sup>2</sup> LED, connector, mounted on a copper-core PCB
CST-90-W57S	CST-90-W57S-C12-xx123	
CST-90-WDLS	CST-90-WDLS-C12-xx123	
CST-90-W45S	CST-90-W45S-C12-xx123	
CST-90-WCLS	CST-90-WCLS-C12-xx123	
CST-90-W40S	CST-90-W40S-C12-xx123	
CST-90-W30M	CST-90-W30M-C12-xx123	
CST-90-WWRM	CST-90-WWRM-C12-xx123	

CST-90-W65S	CST-90-W65S-C13-xx123	White Big Chip LED™ CST-90 consisting of a 9 mm <sup>2</sup> LED, connector, mounted on a copper-core PCB with an on board thermistor
CST-90-W57S	CST-90-W57S-C13-xx123	
CST-90-WDLS	CST-90-WDLS-C13-xx123	
CST-90-W45S	CST-90-W45S-C13-xx123	
CST-90-WCLS	CST-90-WCLS-C13-xx123	
CST-90-W40S	CST-90-W40S-C13-xx123	
CST-90-W30M	CST-90-W30M-C13-xx123	
CST-90-WWRM	CST-90-WWRM-C13-xx123	

### CST-90 Shipping and Labeling Nomenclature

All CST-90 products are packaged and labeled with their respective bin as outlined in the following pages. Each package or reel 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
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<b>Product Family</b>	<p>A - Package type: "C" denotes chip-on board            B - Lens type: "S" denotes dome            C - Chip quantity: "T" denotes single chip</p>				
<b>Chip Area</b>	<p>1 2 3 - Total LED chip area (mm<sup>2</sup>) x 10: "90" denotes 9mm<sup>2</sup></p>				
<b>Color</b>	<p>D - Color: "W" denotes white            4 5 - Color temperature: "65" denotes 6500K, "DL" denotes daylight white (6500K through 5700K) etc.            E - Color rendering: "S" (standard) denotes a typical CRI of 70, "M" (moderate) denotes a typical CRI of 83</p>				
<b>Package Config.</b>	<p>F 6 7 - Package configuration (for internal use)</p>				
<b>Flux Bin</b>	<p>G H - Flux bin</p>				
<b>Chromaticity Bin</b>	<p>I 8 - Chromaticity bin</p>				

**Example:**

The part number CST-90-W65S-C12-WN-G4 refers to a 6500K standard CRI white, CST-90 emitter, with a flux range from 850 to 1,000 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).

### CST-90 Bin Kit Ordering Nomenclature

All CST-90 White 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
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Product Family	A - Package type: "C" denotes chip-on board B - Lens type: "S" denotes dome C - Chip quantity: "T" denotes single chip			
Chip Area	1 2 3 - Total LED chip area (mm <sup>2</sup> ) x 10: "90" denotes 9mm <sup>2</sup>			
Color	D - Color: "W" denotes white 4 5 - Color temperature: "65" denotes 6500K, "DL" denotes daylight white (6500K through 5700K) etc. E - Color rendering: "S" (standard) denotes a typical CRI of 70, "M" (moderate) denotes a typical CRI of 83			
Package Config.	F 6 7 - Package configuration (for internal use)			
Bin Kit Code	G H - Flux bin 8 9 0 - Chromaticity bin kit code			

**Example:**

The ordering part number CST-90-W65S-C12-GN101 refers to a 6500K standard CRI white, CST-90 emitter, with a minimum flux value of 850 lumens and falling in the F4, F3, G4, G3, EF, and DG chromaticity bins.

### CST-90 White Binning Structure

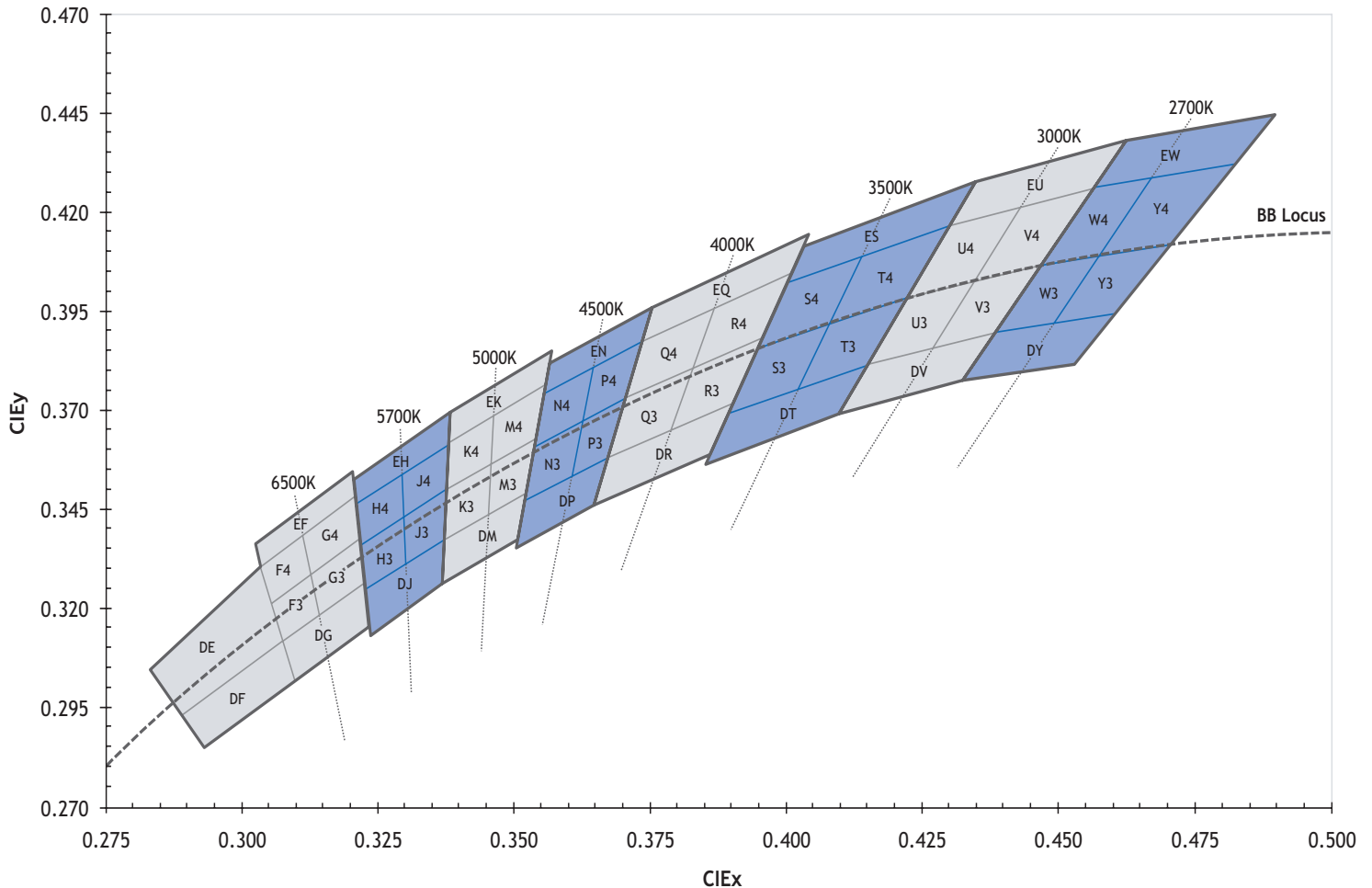
CST-90 LEDs are tested for luminous flux and chromaticity at a drive current of 3.15 A (350 mA/mm<sup>2</sup>) and placed into one of the following luminous flux (FF) and chromaticity (WW) bins:

Flux Bin (FF)	Minumum Flux (lm) @ 3.15A	Maximum Flux (lm) @ 3.15A
K	500	600
L	600	700
M	700	850
N	850	1,000

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

### Chromaticity Bins

Luminus' Standard Chromaticity Bins: 1931 CIE Curve



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

5000K Chromaticity Bins		
Bin Code (WW)	CIE <sub>x</sub>	CIE <sub>y</sub>
EK	0.338	0.368
	0.356	0.384
	0.355	0.376
	0.338	0.362
K3*	0.337	0.349
	0.345	0.355
	0.345	0.343
	0.337	0.337
K4*	0.338	0.362
	0.347	0.369
	0.345	0.355
	0.337	0.349
M3*	0.345	0.355
	0.353	0.349
	0.352	0.372
	0.344	0.343
M4*	0.346	0.369
	0.355	0.376
	0.353	0.362
	0.345	0.355
DM	0.337	0.337
	0.352	0.349
	0.350	0.337
	0.336	0.326

4500K Chromaticity Bins		
Bin Code (WW)	CIE <sub>x</sub>	CIE <sub>y</sub>
EN	0.356	0.384
	0.376	0.396
	0.374	0.387
	0.355	0.374
N3*	0.353	0.360
	0.361	0.366
	0.359	0.352
	0.351	0.347
N4*	0.355	0.374
	0.364	0.381
	0.361	0.366
	0.353	0.360
P3*	0.361	0.366
	0.370	0.373
	0.367	0.358
	0.359	0.352
P4*	0.364	0.381
	0.374	0.387
	0.370	0.373
	0.361	0.366
DP	0.351	0.347
	0.367	0.358
	0.364	0.346
	0.350	0.335

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



4000K Chromaticity Bins		
Bin Code (WW)	CIE <sub>x</sub>	CIE <sub>y</sub>
EQ	0.376	0.396
	0.404	0.414
	0.401	0.404
	0.374	0.387
Q3*	0.370	0.373
	0.382	0.380
	0.378	0.365
	0.367	0.358
Q4*	0.374	0.387
	0.387	0.396
	0.382	0.380
	0.370	0.373
R3*	0.382	0.380
	0.395	0.388
	0.390	0.372
	0.378	0.365
R4*	0.387	0.396
	0.401	0.404
	0.395	0.388
	0.382	0.380
DR	0.367	0.358
	0.390	0.372
	0.386	0.359
	0.364	0.346

3500K Chromaticity Bins		
Bin Code (WW)	CIE <sub>x</sub>	CIE <sub>y</sub>
ES	0.403	0.411
	0.435	0.427
	0.430	0.417
	0.400	0.402
S3*	0.394	0.385
	0.407	0.392
	0.402	0.375
	0.389	0.369
S4*	0.400	0.402
	0.415	0.409
	0.407	0.392
	0.394	0.385
T3*	0.407	0.392
	0.422	0.399
	0.415	0.381
	0.402	0.375
T4*	0.415	0.409
	0.430	0.417
	0.422	0.399
	0.407	0.392
DT	0.389	0.369
	0.415	0.381
	0.409	0.369
	0.385	0.357

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



3000K Chromaticity Bins		
Bin Code (WW)	CIE <sub>x</sub>	CIE <sub>y</sub>
EU	0.435	0.427
	0.462	0.437
	0.456	0.426
	0.430	0.417
U3*	0.422	0.399
	0.434	0.403
	0.426	0.385
	0.415	0.381
U4*	0.430	0.417
	0.443	0.421
	0.434	0.403
	0.422	0.399
V3*	0.434	0.403
	0.447	0.408
	0.437	0.389
	0.426	0.385
V4*	0.443	0.421
	0.456	0.426
	0.447	0.408
	0.434	0.403
DV	0.415	0.381
	0.437	0.389
	0.431	0.377
	0.409	0.369

2700K Chromaticity Bins		
Bin Code (WW)	CIE <sub>x</sub>	CIE <sub>y</sub>
EW	0.462	0.437
	0.488	0.444
	0.481	0.432
	0.456	0.426
W3*	0.447	0.408
	0.458	0.410
	0.448	0.392
	0.437	0.389
W4*	0.456	0.426
	0.469	0.429
	0.458	0.410
	0.447	0.408
Y3*	0.458	0.410
	0.70	0.413
	0.459	0.394
	0.448	0.392
Y4*	0.469	0.429
	0.481	0.432
	0.470	0.413
	0.458	0.410
DY	0.437	0.389
	0.459	0.394
	0.452	0.382
	0.431	0.377

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

**CST-90 Bin Kit Order Codes**

The following tables describe the bin kit ordering codes for the CST-90 and the flux and chromaticity bins included in the bin kit. Each kit specifies a minimum flux and the listed 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 chromaticity bins. For information on ordering bin kits not listed below, please contact Luminus or an official distributor.

**CST-90-C12 and CST-90-C13 Bin Kit Order Codes**

Color	Luminous Flux		Chromaticity Bins	Kit Number
	Bin Kit Flux Code	Min. Flux		
White W65S 6500K, Standard CRI (typ. 70)	N	850	F4, F3, G4, G3, EF, DG, DE, DF	GN100
			F4, F3, G4, G3, EF, DG	GN101
			F4, F3, G4, G3	GN102
White WDLS 6500K & 5700K Standard CRI (typ. 70)	N	850	F4, F3, G4, G3, EF, DG, DE, DF H4, H3, J4, J3, EH, DJ	GN150
White W57S 5700K, Standard CRI (typ. 70)	N	850	H4, H3, J4, J3, EH, DJ	GN200
			H4, H3, J4, J3	GN201
White W45S 4500K, Standard CRI (typ. 70)	M	700	N4, N3, P4, P3, EN, DP	GM400
			N4, N3, P4, P3	GM401
White WCLS 4500K & 4000K Standard CRI (typ. 70)	M	700	N3, N4, P3, P4, DP, EN Q3, Q4, R3, R4, DR, EQ	GM450
White W40S 4000K, Standard CRI (typ. 70)	M	700	Q4, Q3, R4, R3, EQ, DR	GM500
			Q4, Q3, R4, R3	GM501

White W30M 3000K, Moderate CRI (typ. 83)	K	500	U4, U3, V4, V3, EU, DV	GK700
			U4, U3, V4, V3	GK701
	L	600	U4, U3, V4, V3, EU, DV	GL700
			U4, U3, V4, V3	GL701
White WWRM 3000K & 2700K Moderate CRI (typ. 83)	K	500	U3, U4, V3, V4, DV, EU W3, W4, Y3, Y4, DY, EW	GK750
	L	600	U3, U4, V3, V4, DV, EU W3, W4, Y3, Y4, DY, EW	GL750

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