

CBT-90 LEDs

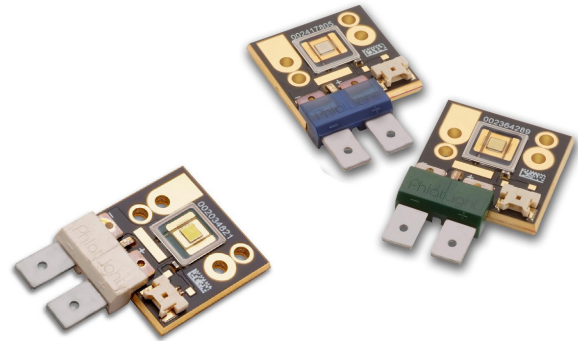


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Introduction:

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 wavelength 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 |
|-------------|-----------------------|--|
| 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 <i>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</i> |
| 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 | |

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 from 1,710 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).

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.

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/mm²) and placed into one of the following luminous flux (FF) and chromaticity (WW) bins:

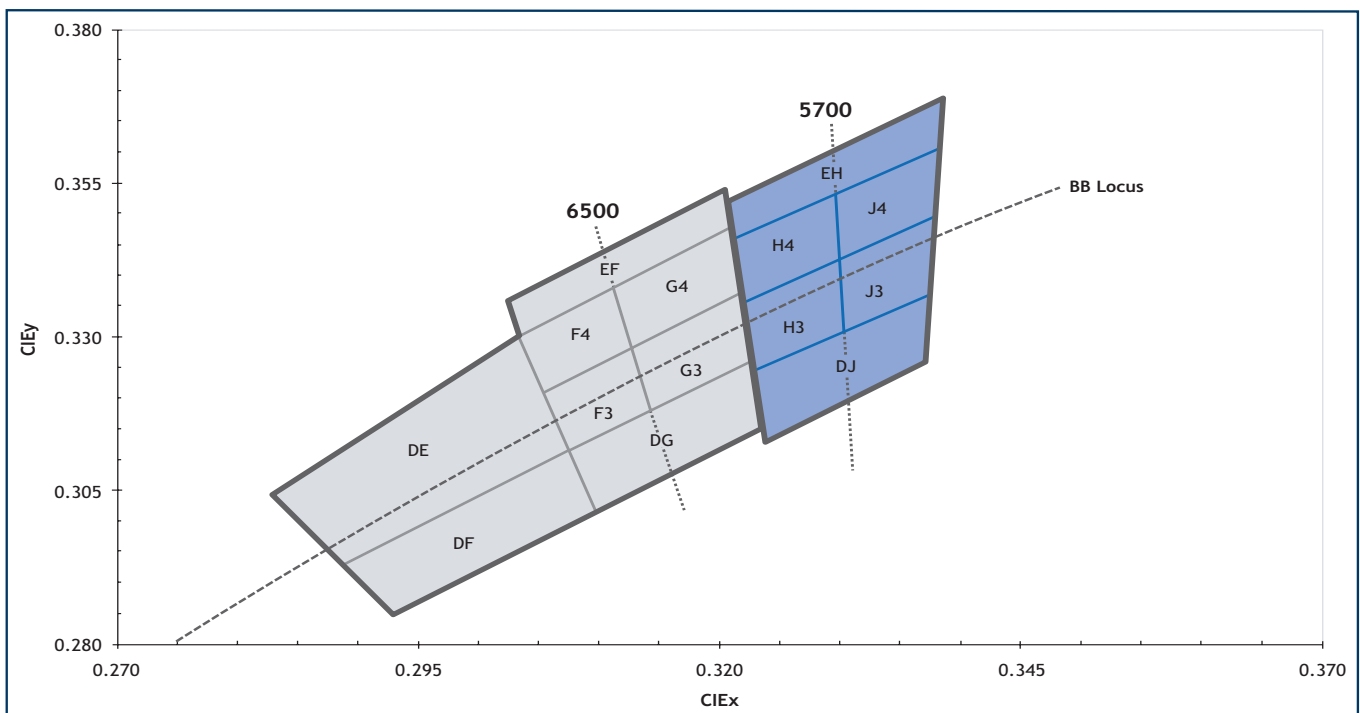
Flux Bins (At Test Condition¹)

| 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 Bins²

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

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.

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 |

| 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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