

New products of LEDs for lighting, 'COB Series'

Development of three types of high color rendering series pursuing 'quality of light'

- for illumination for museums focusing on 'quality of light' -

Citizen Electronics Co., Ltd. (Head Office: Fujiyoshida City, Yamanashi Prefecture. President: Yoshihiro Gohta) has developed three types of high color rendering LEDs pursuing 'quality of light' and being superior in color reproducibility, as new products of LEDs for lighting, 'COB *1 Series.'

These products will be exhibited during the 'Hong Kong International Lighting Fair 2013' from October 27, 2013.



LEDs for lighting, 'COB Series'

Three types of high color rendering series


■ Developed products:

1. Ultra-high color rendering type (9 models)
2. Type achieving both high color rendering and high efficacy (36 models)
3. Preferable color type (9 models)

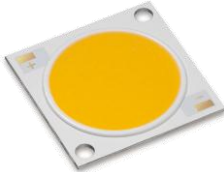
■ Mass production is scheduled to start in February 2014

CLL022 Series



CLL032 Series



CLL042 Series

■ Background of development

As LED lighting has been spreading, there is a demand for products that meet a variety of needs for not only brightness and efficacy, but 'quality of light,' in order to enable an illuminated object to look more beautiful.

We have developed the following three types in response to such market demand and lined up high color rendering LEDs that meet customers' preferences.

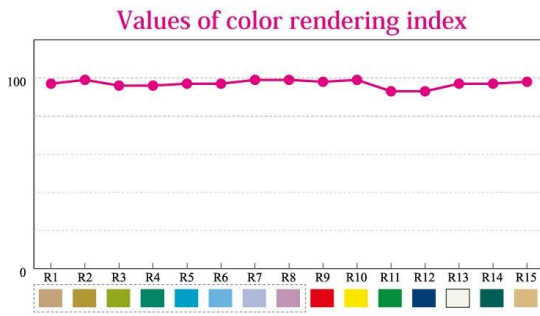
1. Ultra-high color rendering type (Ra 97 typ.)
2. Type achieving both high color rendering and high efficacy (Ra 90 min. on B.B.L. *2)
3. Preferable color type (Ra 90 min. below B.B.L.)

1. Ultra-high color rendering type (Ra 97 typ.)

If quality of a light source changes, an object may look different colors. Thus, 'color rendering' is effect of quality of a light source on the color appearance of objects. Color rendering is generally indicated in a general color rendering index (Ra) and it is said that the nearer to 100 Ra is, the closer to natural light the color of light looks and the better it is.

This product has achieved ultra-high color rendering by adjusting the compounding ratio of phosphors: color rendering is increased from Ra 90 of the current model to Ra 97, and for products of 2700K, special color rendering indexes R9 to R15 are 90 or more. High color rendering brings superior color

reproducibility and enables LEDs to be used for applications such as illumination at museums requiring faithful color reproduction.



General color rendering index (Ra): average of R1 to R8
 Special color rendering index: R9 to R15
 *The graph on the left is for reference only.

2. Type achieving both high color rendering and high efficacy (Ra 90 min. on B.B.L. *2)

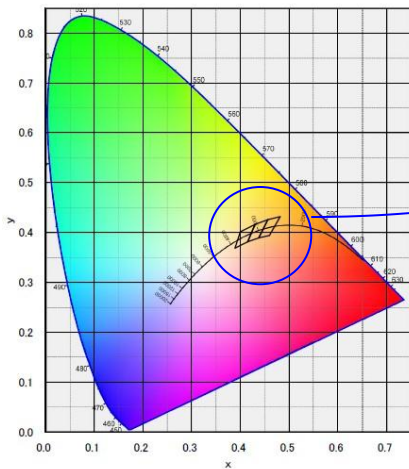
Generally, increase in color rendering will result in a trade-off as luminous efficacy will decrease. However, as the new product has both high color rendering and high efficacy by reselection and optimization of materials, both luminous flux and efficacy have been increased 9 to 11 % with color rendering remaining high.

* Comparison of the two models below made when they light up with the same conditions (3000K, Ra 90 min., Tc=25°C)

	Luminous flux	Luminous efficacy	(Product code)
New product:	3,780 lm	97 lm/W	(CLL042-1218A5-303H3D2)
Current model:	3,435 lm [10 % up]	88 lm/W [10 % up]	(CLL040-1218A5-303H1A7)

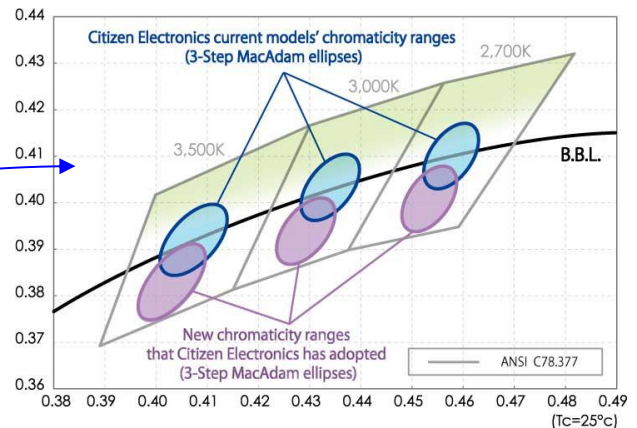
3. Preferable color type (Ra 90 min. below B.B.L.)

Generally LEDs for lighting have the white chromaticity range centering on the curve (B.B.L.) located in the center of the chromaticity diagram below. However, as there are different color shades above B.B.L. and below B.B.L., some customers prefer other chromaticity ranges. In order to respond to such needs, we have set chromaticity ranges only below B.B.L. and unified color shades.



CIE 1931 xy chromaticity diagram

Magnified figure



Common features among three types

- We have adopted Chip on Aluminum technique (patented by our company), which is a high heat dissipation technique where LED dice are directly mounted on an aluminum board.

- As the new products are compliant with the chromaticity control standard ‘3-Step MacAdam ellipses’ which is about one-ninth of the chromaticity range of ANSI C78.377 ^{*3}, chromaticity variations of LEDs are rarely noticed.

■ Specifications

1. Ultra-high color rendering type (Ra 97 typ.)

(T_c=25°C)

Product code	CLL022-1204A5-XX3H7E1	CLL032-1212A5-XX3H7E1	CLL042-1818A5-XX3H7E1
Size (mm)	13.5×13.5×1.4	19.0×19.0×1.4	28.0×28.0×1.4
Power (W)	8.7	26.1	58.8
Color temperature (K)	2700, 3000, 4000		
General color rendering index, Ra	97 typ.		
Product type	9 models including variations of color temperature		
Shipment of samples will start in	January 2014		
Mass production will start in	February 2014		

2. Type achieving both high color rendering and high efficacy (Ra 90 min. on B.B.L.)

(T_c=25°C)

Product code	CLL022-1202A5-XX3H3D2 CLL022-1203A5-XX3H3D2 CLL022-1204A5-XX3H3D2	CL032-1205A5-XX3H3D2 CL032-1206A5-XX3H3D2 CL032-1208A5-XX3H3D2 CL032-1212A5-XX3H3D2	CL042-1218A5-XX3H3D2 CL042-1818A5-XX3H3D2
Size (mm)	13.5×13.5×1.4	19.0×19.0×1.4	28.0×28.0×1.4
General color rendering index, Ra	90 min.		
Color temperature (K)	2700, 3000, 3500, 4000		
Product type	36 models including variations of color temperature		
Shipment of samples will start in	January 2014		
Mass production will start in	February 2014		

3. Preferable color type (Ra 90 min. below B.B.L.)

(T_c=25°C)

Product code	CLL032-1206A5-XX3H6D2	CLL032-1212A5-XX3H6D2	CLL042-1218A5-XX3H6D2
Size (mm)	19.0×19.0×1.4	19.0×19.0×1.4	28.0×28.0×1.4
Power (W)	13.0	26.1	39.1
Color temperature (K)	2700, 3000, 3500		
General color rendering index, Ra	90 min.		
Product type	9 models including variations of color temperature		
Shipment of samples will start in	January 2014		
Mass production will start in	February 2014		

*1 COB: stands for Chip on Board and is a structure where LED dice are directly mounted on a board.

*2 B.B.L.: stands for Black Body Locus.

*3 ANSI C78.377: a chromaticity control standard provided by the American National Standards Institute (ANSI).



“CITILED The Light Engine” is a brand name of LEDs for lighting manufactured by CITIZEN ELECTRONICS CO., Japan.

CITILED is a registered trademark of CITIZEN ELECTRONICS CO., Japan.

Information provided on this press release is accurate at the time of announcement.

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