High CR(R95) and Special Color Rendering Product Lineups

Both the 757 and COB series have products available in these special color rendering options and the high CRI (R95).



Fig. 4: Product list for the special color rendering options in 757 and COB series.

Available color ranks for the special color rendering products are shown in Fig. 5.



Fig 5: Color ranks 757 series (left) COB series (right)

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Product Information for High CRI and Special Color Rendering for General Lighting Applications







What is Color Rendering Index(CRI)?

CRI is a numerical representation used to evaluate the color rendering properties of a light source. It demonstrates how accurately a sample light source reproduces an object's color compared to a reference light source. A CRI value of 100 means the sample light source reproduces the same color as the reference light source. Therefore, the higher the CRI value, the more it resembles the reference light source.

CIE defines 14 colors / indexes (R1 thru R14) and JIS defines 15 colors / indexes (R1 thru R15) as the test colors to evaluate CRI. Generally CRI is represented as one number, Ra, which is an average of indexes R1 to R8.

The other indexes (R9 thru R14/R15), especially R9, are most commonly used to see color quality in general lighting applications.

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15

Fig. 1: Color Sample for CRI

CRI for LED

NICHIA's white LEDs are made up of a blue die and yellow phosphor. Ra and R9 are strictly controlled by changing phosphor combinations.

Spectrum and color rendering index for standard CRI lineups (R70, R8000, R9050, and R95) are shown below. Depending on the application, the suitable Ra rank might change. For example, R70 could be suitable for outdoor fixtures which prefer high luminous efficacy over CRI. R9050 could be suitable for a dining room and restaurant where the hues of the environment are more important than luminous efficacy.



CRI Rank R70 (Ra≥70)	Ra/73	R1/71	R2/78	R3/82	R4/74	R5/71	R6/68	R7/82	R8/59	R9/-23	R10/46	R11/71	R12/40	R13/72	R14/90	R15/65
CRI Rank R8000 (Ra≥80, R9>0)	Ra/82	R1/80	R2/86	R3/90	R4/83	R5/81	R6/80	R7/87	R8/69	R9/10	R10/67	R11/82	R12/60	R13/81	R14/95	R15/75
CRI Rank R9050 (Ra≥90, R9≥50)	Ra/93	R1/98	R2/94	R3/87	R4/93	R5/95	R6/90	R7/95	R8/95	R9/84	R10/83	R11/91	R12/66	R13/97	R14/92	R15/97
CRI Rank R95 (Ra≥95)	Ra/98	R1/98	R2/99	R3/99	R4/97	R5/97	R6/96	R7/97	R8/97	R9/95	R10/99	R11/98	R12/72	R13/98	R14/99	R15/95

Fig. 2 (top): Spectrum for R70, R8000, R9050, and R95 (All 5000K) in order from the left. Fig. 2 (bottom): Color Rendering Index

Additional Options - Special Color Rendering for LEDs

NICHIA has researched to improve Ra and R9~R15 values (especially R12) in addition to special color rendering options, which is a different approach from color rendering index. Special color rendering focuses on how objects can appear more fresh and vivid. For example: meats appear more appetizing; vegetables, fruits, and flowers appear more natural, and fashion fabrics more vibrant.

Special color rendering options are shown in Fig. 3. NICHIA offers a new way to personalize the appearance of objects with LEDs.





g the proper color coordinat ite appearance, thus making reds re true to their color.

Emphasizing the red and reducing the yellow

Meat





Fig. 3: Spectrum and appearance comparisons for meat (top), produce (middle) and white fabric (bottom).



This series provides a high qualit of light focused specifically or red colors. Emphasizing more o the red than standard types appearance, thus making the reds spectrum more than truer to their color. standard types.

