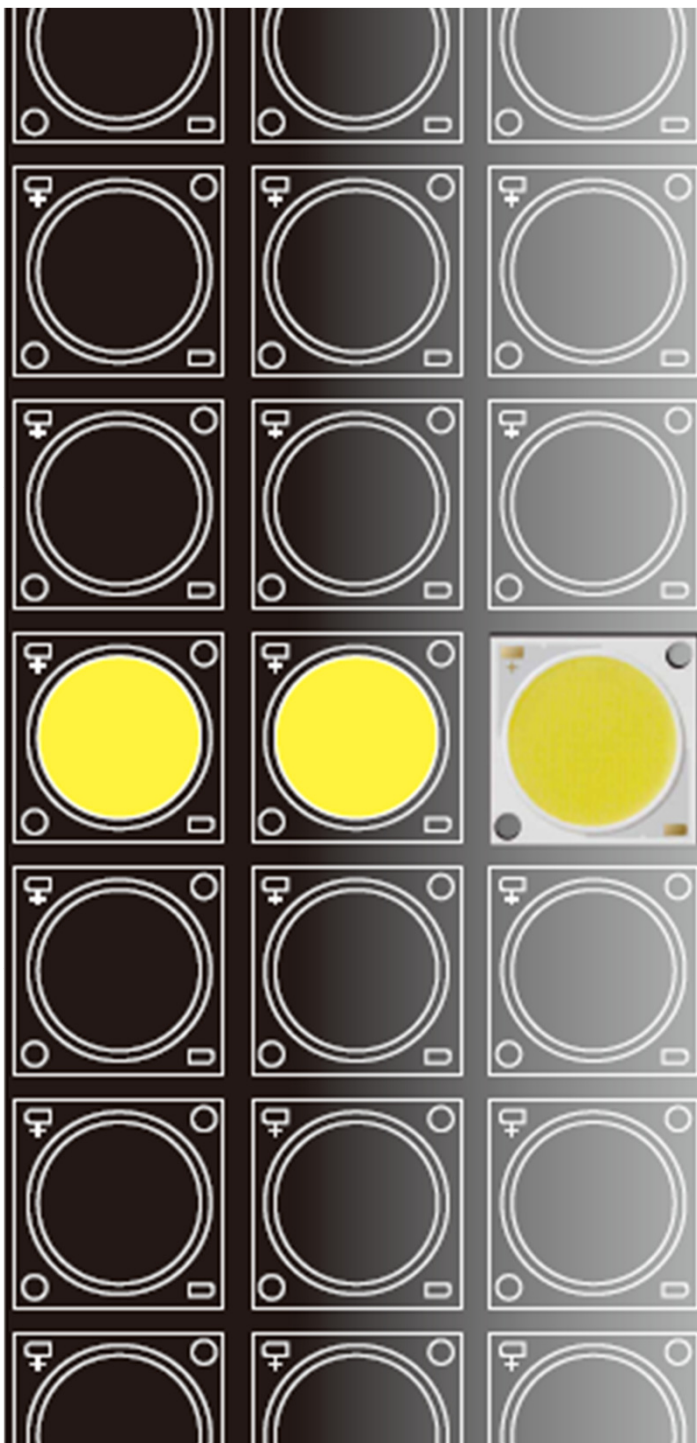


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VIVID COB

Hi color quality concept



CONFIDENTIAL CITIZEN internal only

All information and value might be changed or updated later.

This is an uncontrolled drawing provided for reference purposes only. Citizen Electronics Co.,LTD. reserves the right to implement engineering changes and to modify dimensions, design details, and materials as necessary.

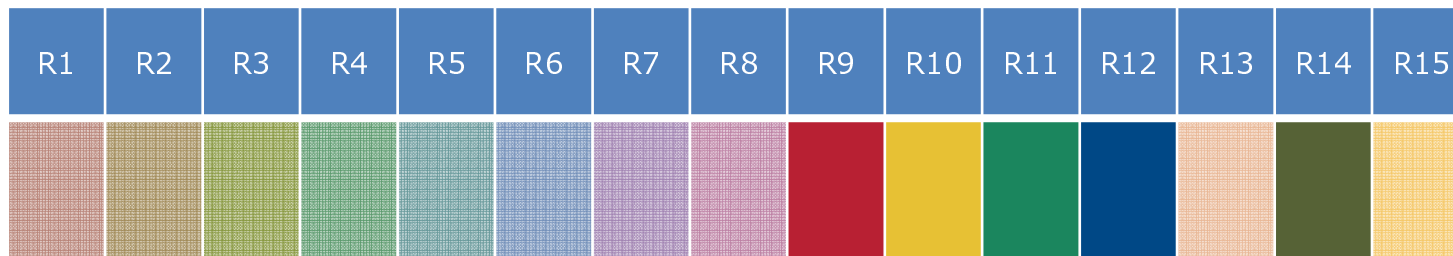
What is the concept of VIVID LED

What is CRI (Color Rendering Index) ?

A **color rendering index (CRI)** is a quantitative measure of the ability of a [light source](#) to reveal the [colors](#) of various objects faithfully in comparison with an ideal or natural light source.

- CRI (Color Rendering Index) ... CIE (Commission Internationale de l'Eclairage)

CIE1964 $U^*V^*W^*$ Ra : average R1-R8



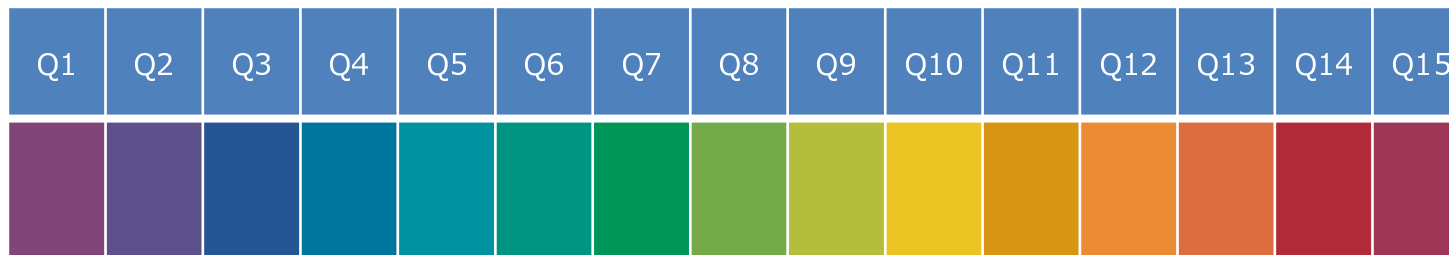
CRI is, when seen in the spectrum of the reference light source is a numerical evaluation to 100, even higher than this, it is penalized also below

⇒ Place the basis of the appearance when viewed by the reference light source, numerical value indicating the fidelity to this

What we have done is to improve the color saturation, which pursued a brilliant appearance.

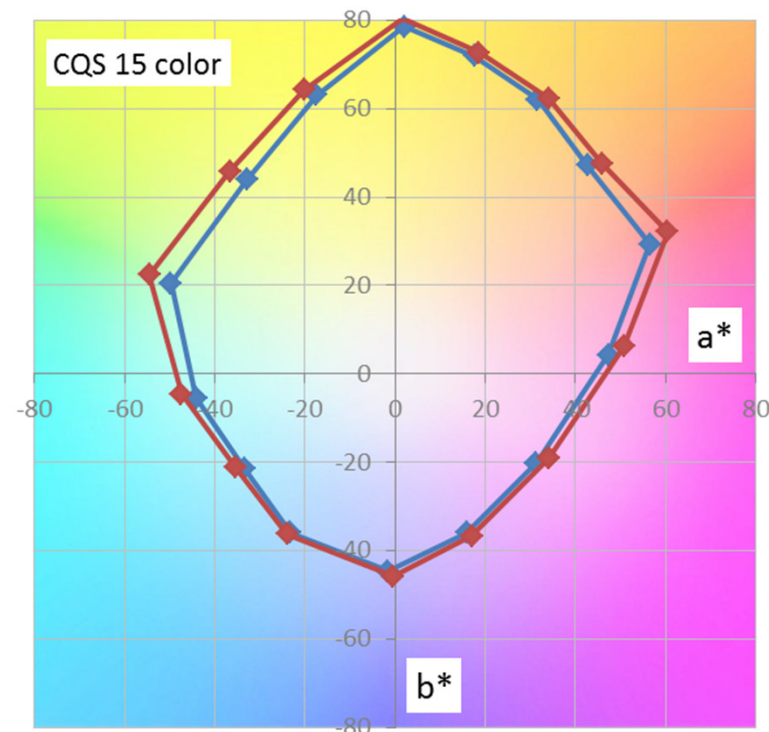
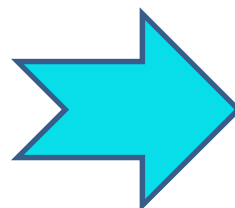
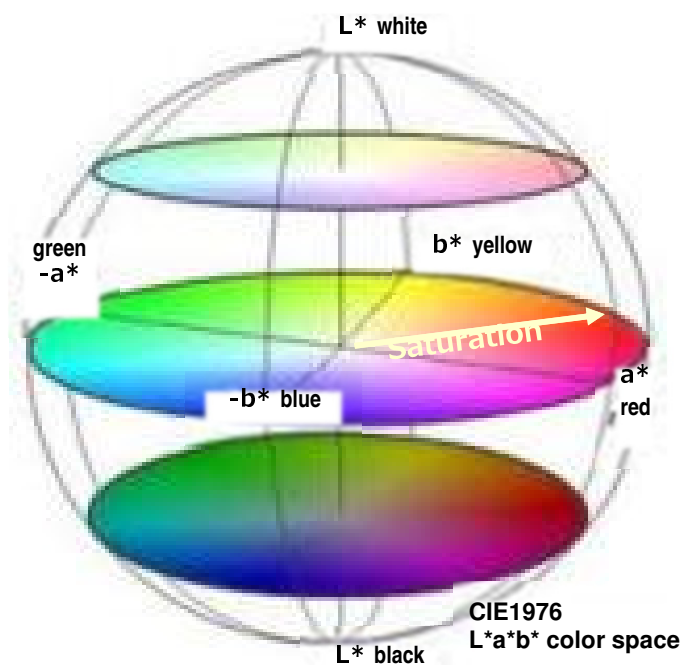
- CQS (Color Quality Scale) ... NIST (National Institute of Standards and Technology)

In order to check the **COLOR SATURATION**, these below 15s color is better.
CIE1976 L*a*b* Qa : average Q1-Q15



What is CITIZEN VIVID LED

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CIELAB:

Color space determined by CIE1976 $L^*a^*b^*$

This is considered to be the equal color space close to human sensitivity and widely applied to the color systems that express the color of objects.

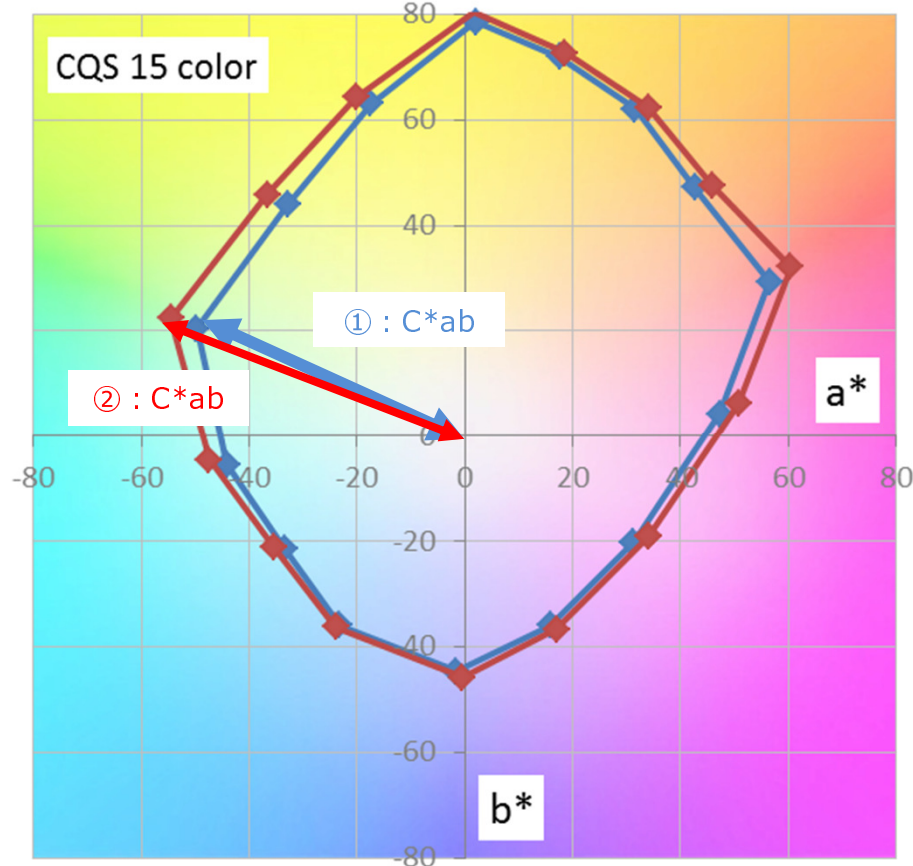
Calculation

$$\Delta C^*ab = \textcircled{2}C^*ab - \textcircled{1}C^*ab$$

= Gap of color saturation

CIE1976 L*a*b*

Qa : average Q1-Q15



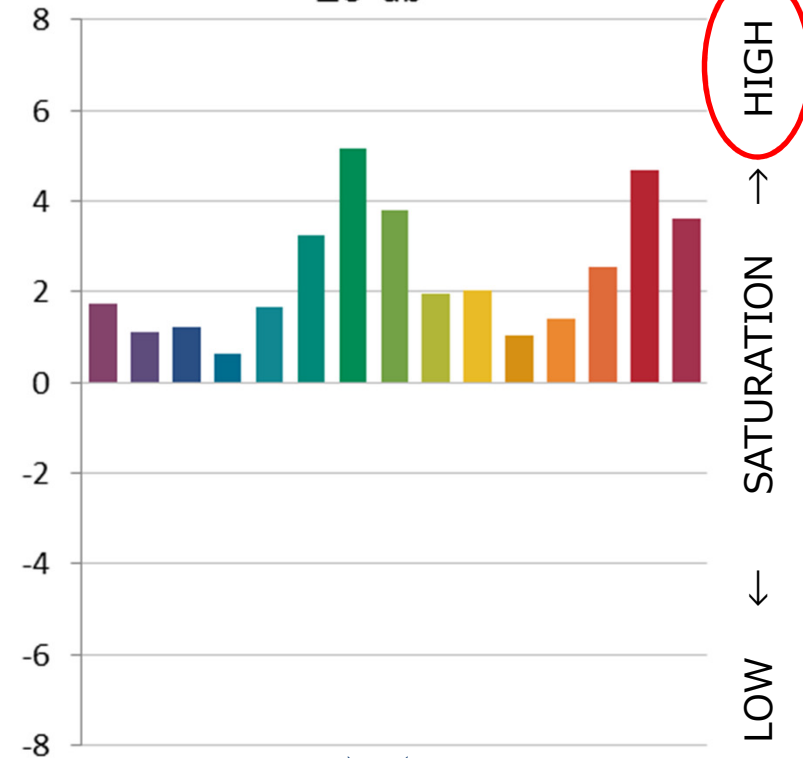
$$\Delta C^*ab = \textcircled{2}C^*ab_{LED} - \textcircled{1}C^*ab_{\text{standard light source}}$$

is calculated each value at 15 points.

$\Delta C^*ab > 0$: High color saturation

$\Delta C^*ab < 0$: Low color saturation

ΔC^*ab

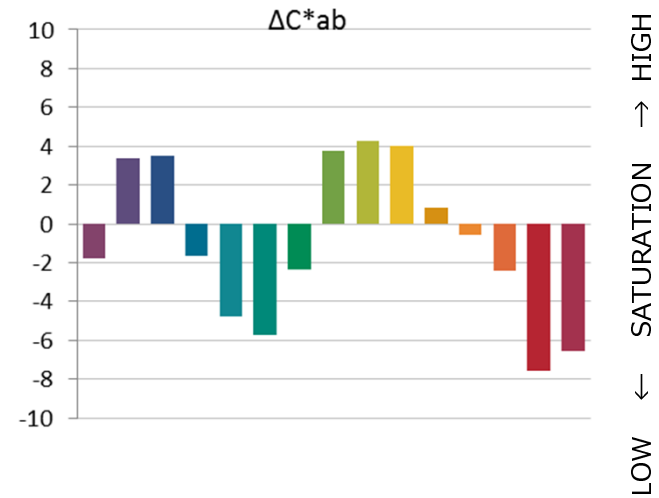
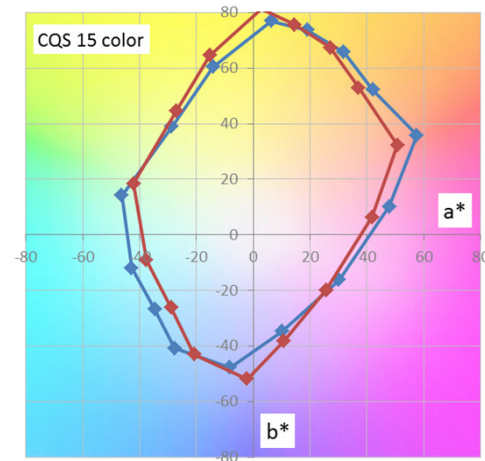


VIVIDNESS

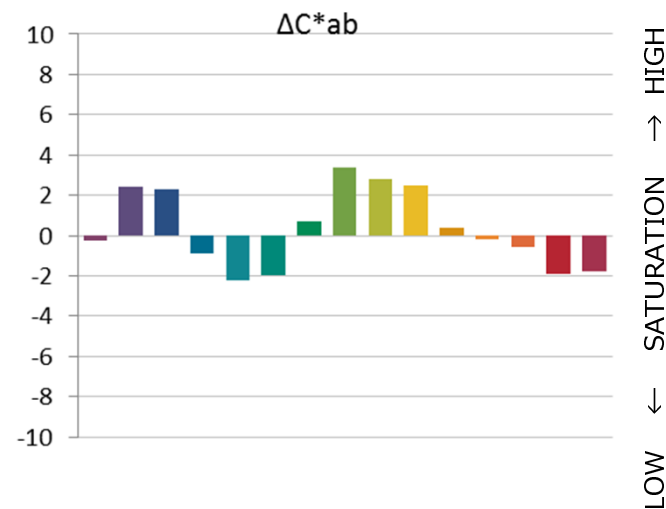
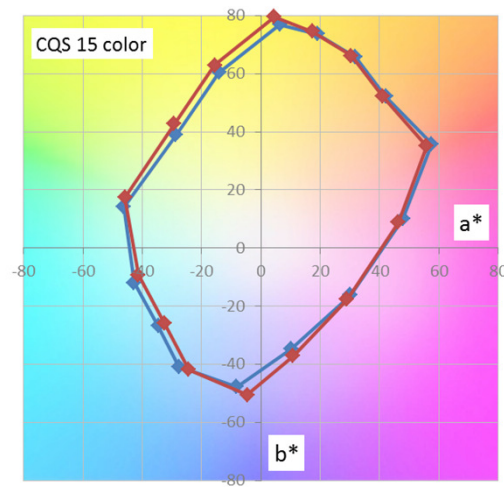
CITIZEN VIVID LED

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LED 3000K Ra:80



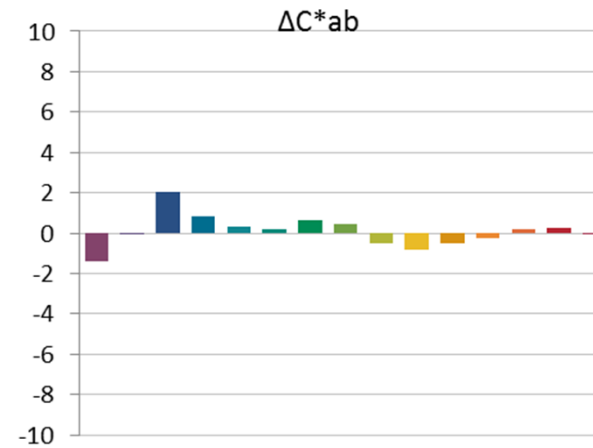
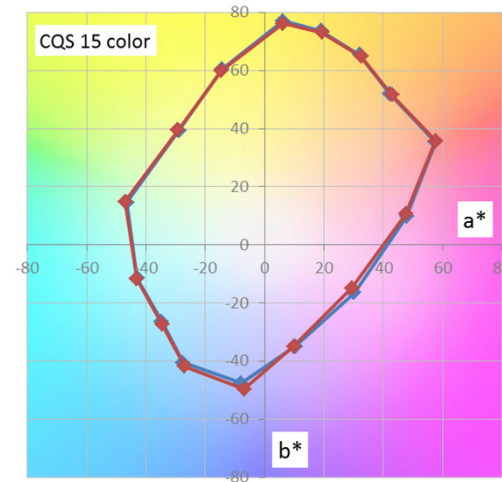
LED3000K Ra:90 Hi-CRI



CITIZEN VIVID LED

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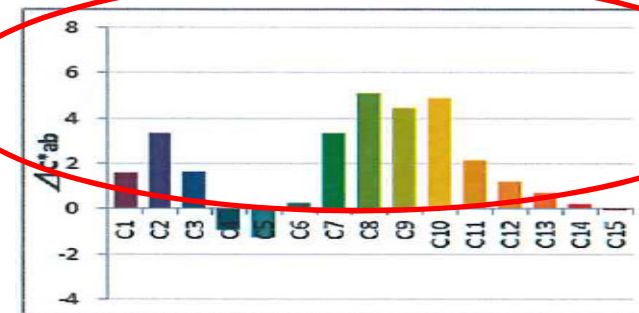
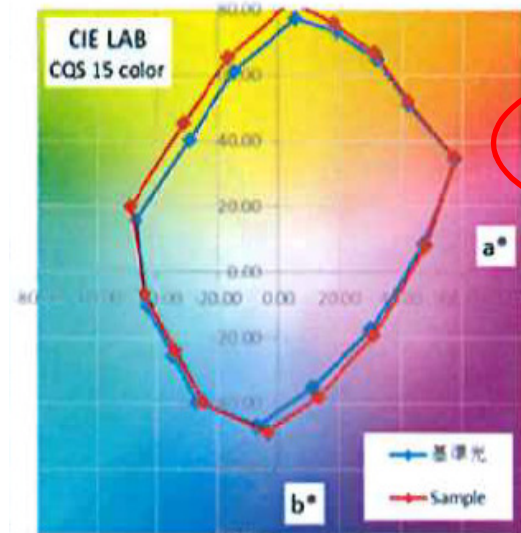
LED 3000K Ra:97 Super Hi-CRI



→ HIGH
SATURATION
← LOW

VERY CLOSE to CRI100

LED 3200K Warm Plus

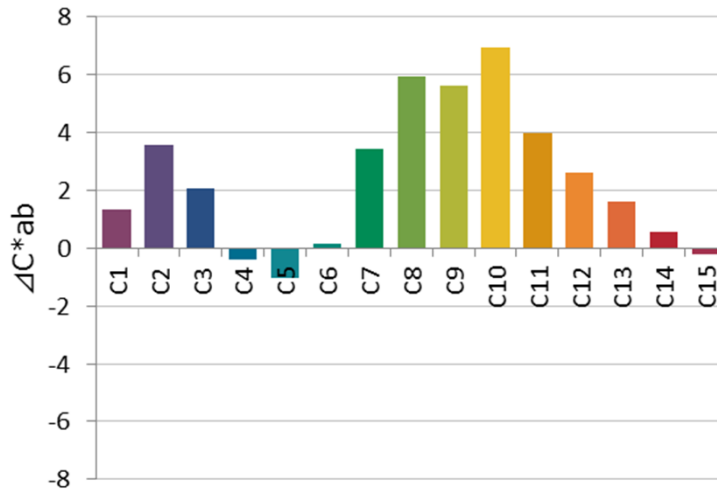


→ HIGH
SATURATION
← LOW

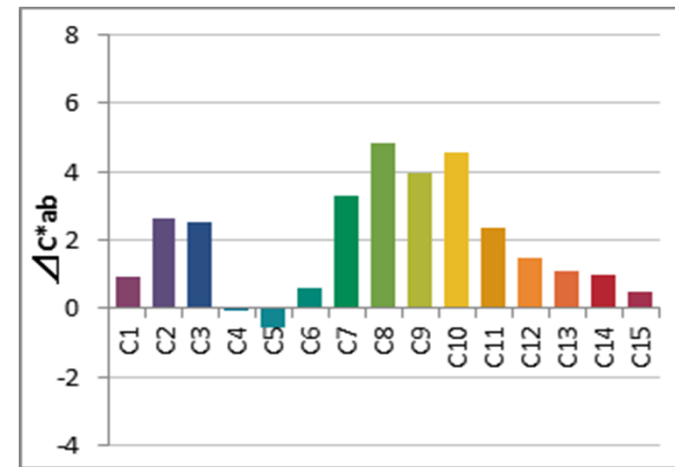
CITIZEN VIVID LED

CITIZEN

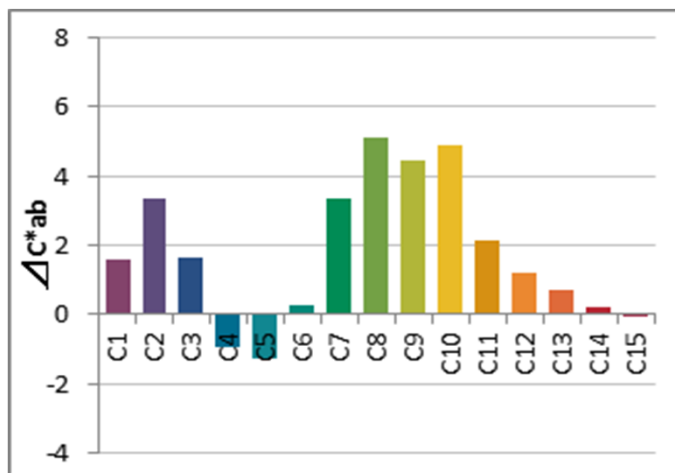
Vivid 2700K



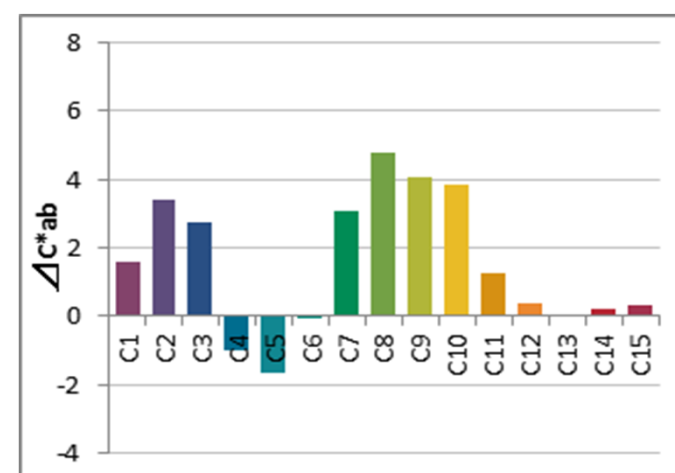
Vivid 3400K



Vivid 3200K



Vivid 4200K



Most of color are positive area!

Vivid Color application range



Jewelry, Watch, Cosmetics



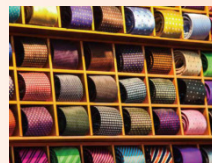
Shop Lighting
(Casual, Shoes, etc)



Shop Lighting
(Luxury, Formal)



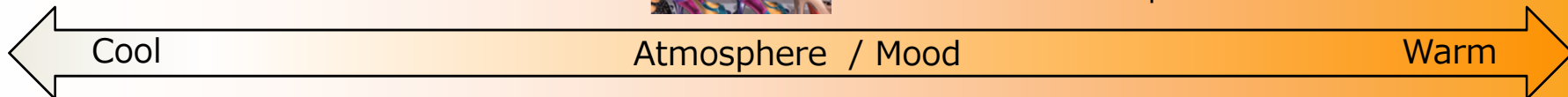
Super Market / Fresh Light
(Exempt Fresh Meat)



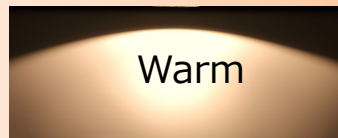
Restaurant /
Coffee Shop



Shop Lighting
(Leather, Shoes)



White

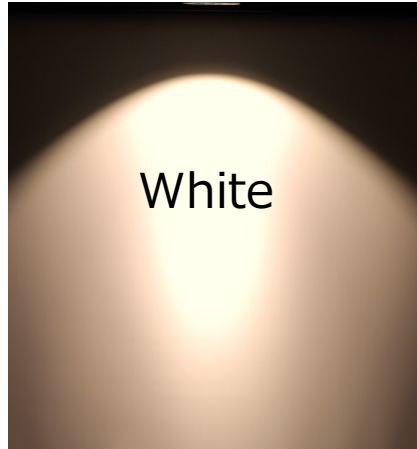


Warm



Warm Plus+

White Good For ...



Watch



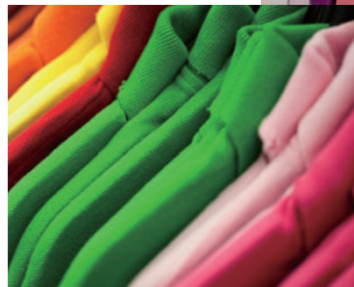
Jewelry



Cosmetics



White dishes / Glass

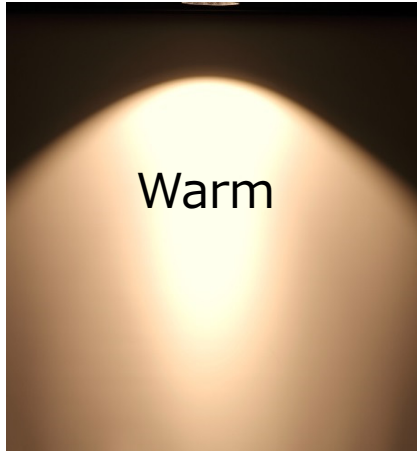


Apparel Shop
(Fast fashion, Color variation)



Super Market / Fresh Light
(Ex : Fresh Meat)

Warm Good For ...



Restaurant / Bar
Coffee Shop



Clothing Shop / Select Shop



Warm Plus Good For ...



Clothing (Luxury, Formal)



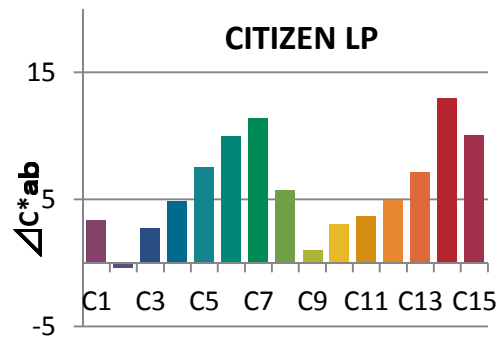
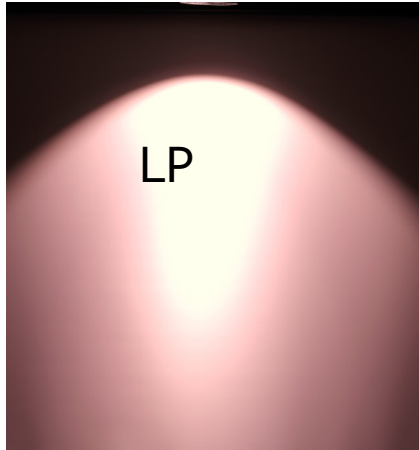
Pottery / Art



Shoes / Leather Goods



LP Good For ...



Fresh Meat
Beautiful Red and White

VIVID series Line-ups

CITIZEN

New

New Color : Warm Plus2

... More warmer, incandescent like color.



VIVID COB



HI VIVID



VIVID SMD

New

Additional Lineup : SMD VIVID Light Pink



CLL130
2.0x1.6x0.75mm



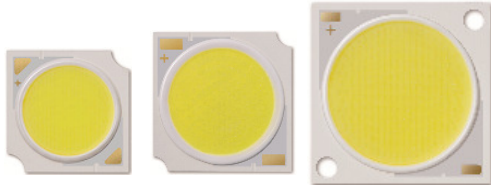
*Special light color for fresh meat.

*Suitable for meat section lighting.

Schedule Datasheet : Q3 2016
Sample : available
MP : Q3 2016

VIVID series Line-ups

CITIZEN



Original package
1204,1206,1208,1212



Small LES package
0303,0602,0603,1002,1204,1206



SMD package
0101

Thank You