

RUALIGHT

INNOVATIVE AND FAST GROWING COMMERCIAL INDOOR
LIGHTING MANUFACTURER



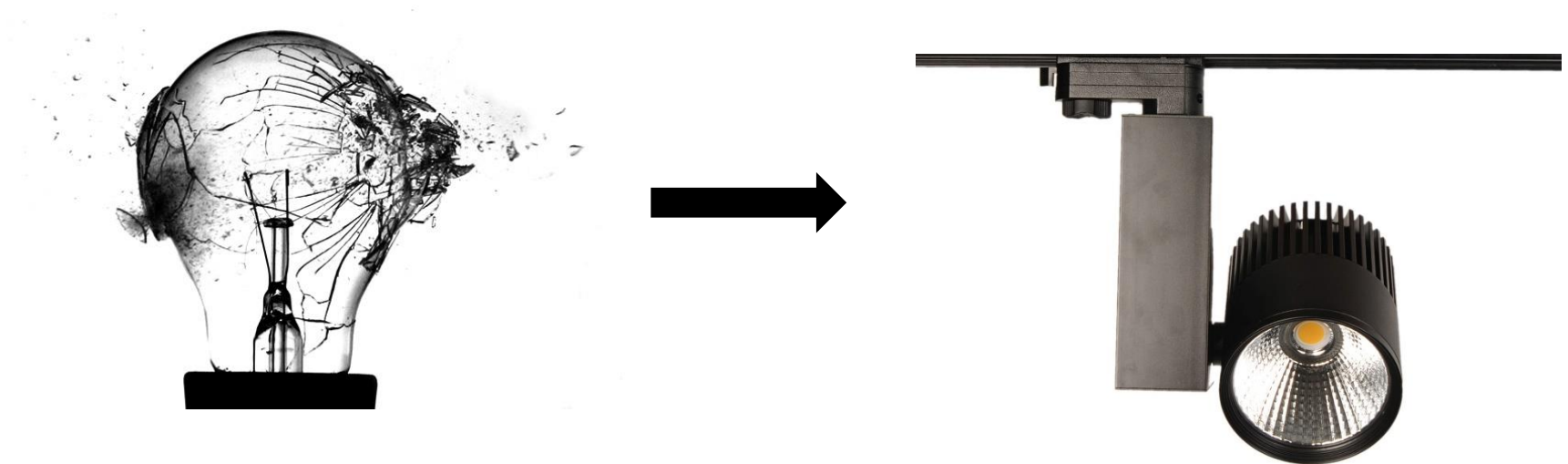
RUALIGHT

KEY TO SUCCESS

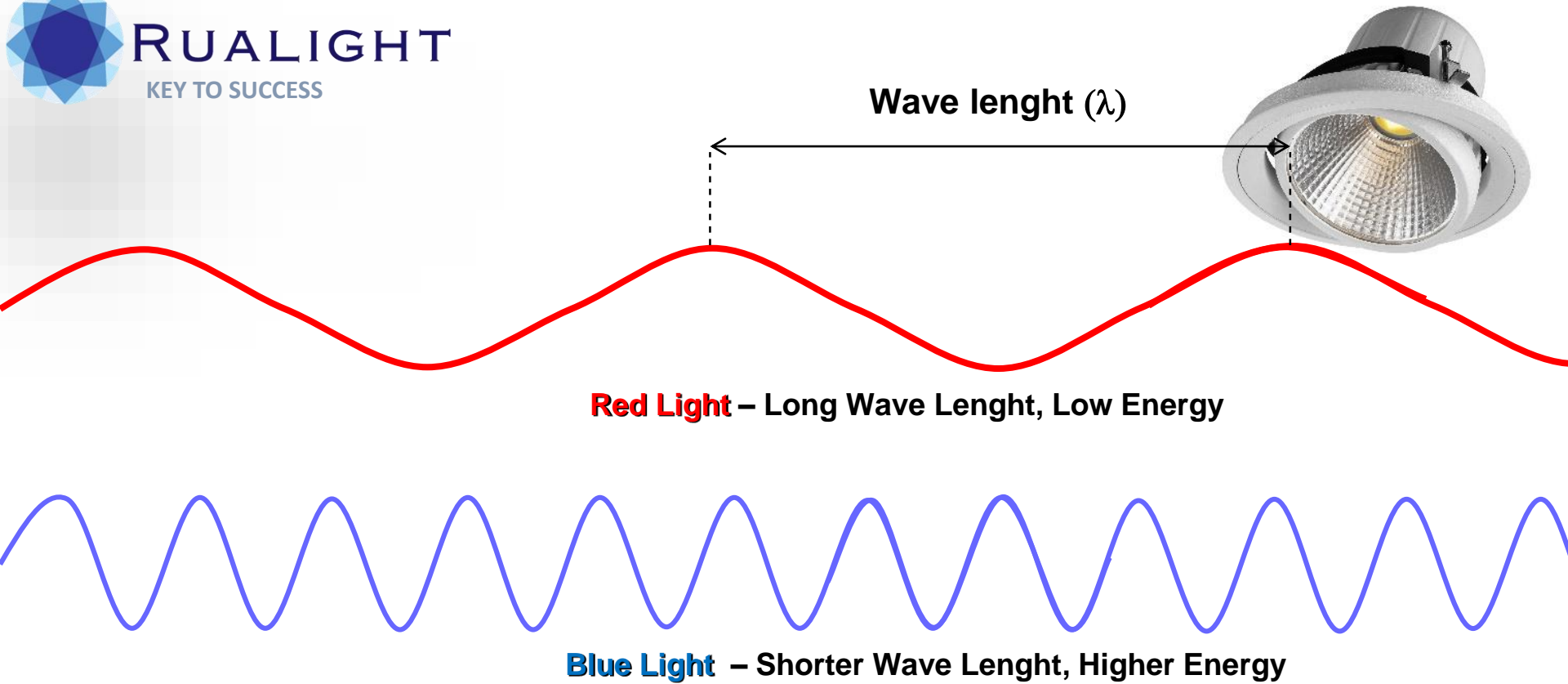
QUALITY OF LIGHT



LED Lighting Revolution has already started; leave energy-inefficient light bulbs and join us!



NEW ERA!

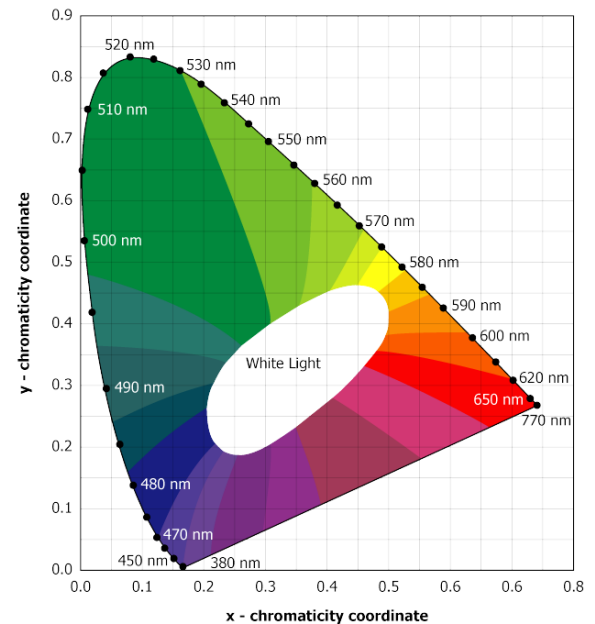
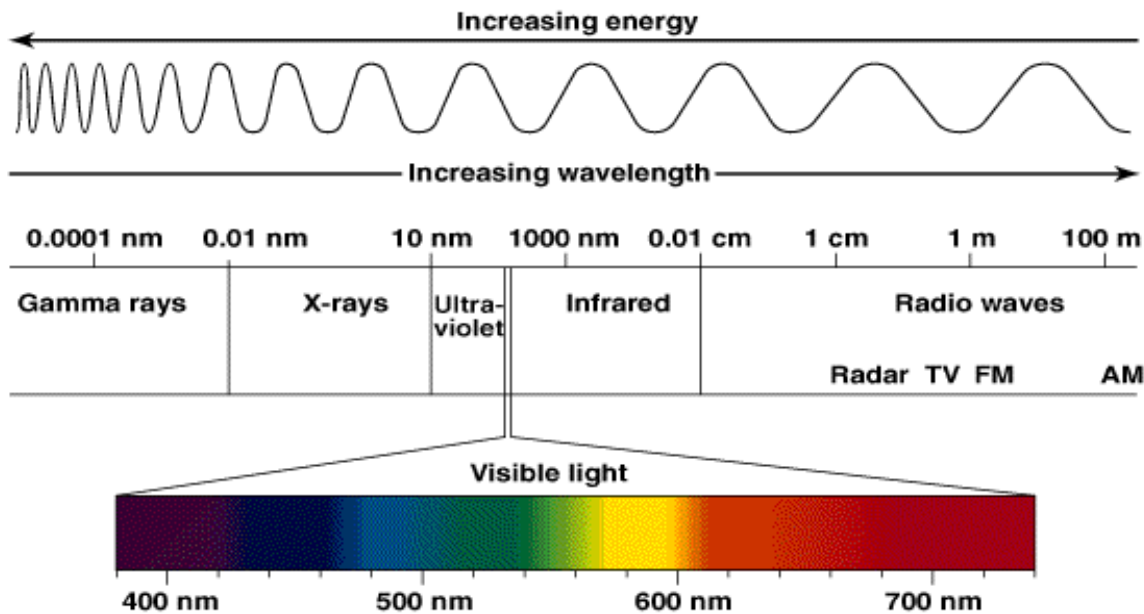


What is light?

Light is a special form of energy that dissipates in form of wave or foton. You can also describe the light as a magnetic wave and human eye can only see an interval of 380nm & 780 nm. Cosmic lights, gamma light, x-ray and uv are with lower wave length but are with high energy. Infrared, radar, radio waves are with higher wave length but are with lower energy.

VISIBLE LIGHT

Electromagnetic Spectrum



CRI OVERVIEW

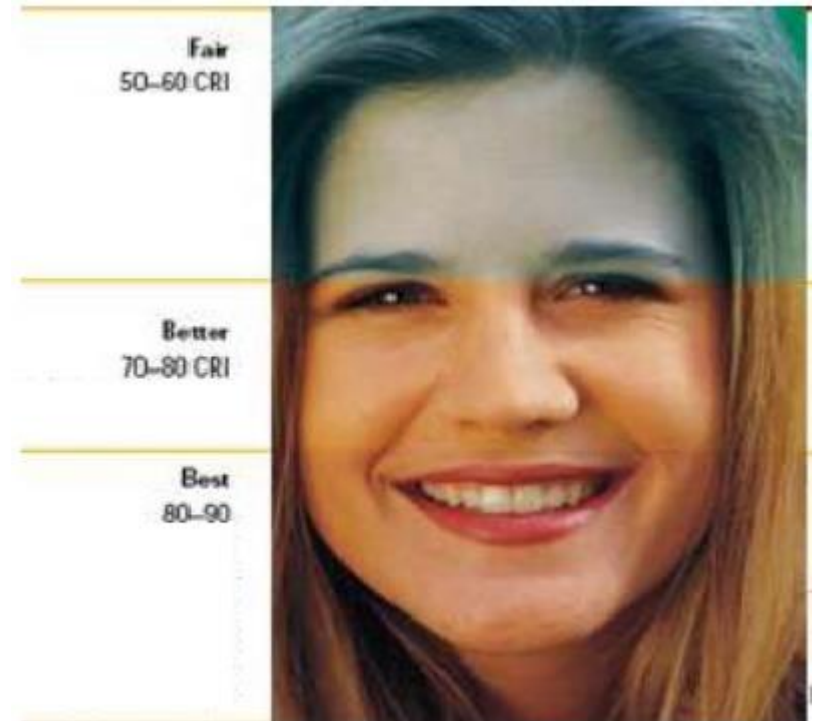
- The Color Rendering Index (CRI) was created to help indicate how colors appear under different light sources.
- Its mathematical result allows two different light sources to be compared.



QUALITY OF LIGHT: COLOR RENDERING

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Rualight uses minimum 80CRI leds.
Also 90 CRI and 97 CRI is available on demand.



COLOR RENDERING INDEX



- Color Rendering Index (CRI) is a measure of the ability of a light source to accurately reproduce the color of an object in comparison to how that same object would be seen under an ideal light source
- For light sources with a CCT of $<5000\text{K}$, the ideal reference source is on the BBL (Black Body Locus)
- Daylight in Western Europe (identified by the CIE as D65) is the ideal reference source for a CCT $>5000\text{K}$
- Eight pastel colors are illuminated with the ideal source and the source under test



COMPUTING CRI



- The distance between the chromaticity point of each of the reference colors as compared to the ideal chromaticity of the same color when illuminated with the ideal source is determined.* This distance is defined as E_i
- The CRI for each reference color (R_i) is then calculated using the formula $R_i = 100 - 4.6(E_i)$
- The CRI for the light source (R_a) is then calculated by simply averaging each of the individual R_i values





Color Rendering/Color Quality In Real Life



CRI = 62



CRI = 93



CRI = 80



CRI = 92

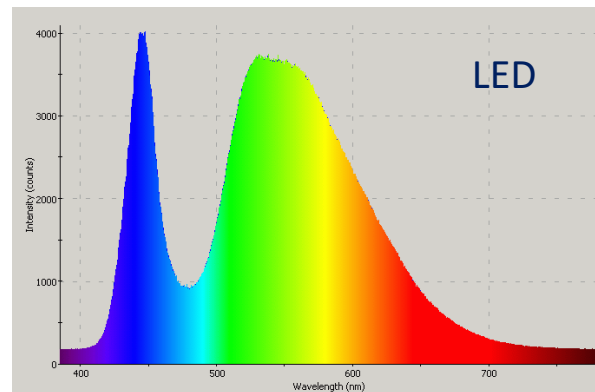
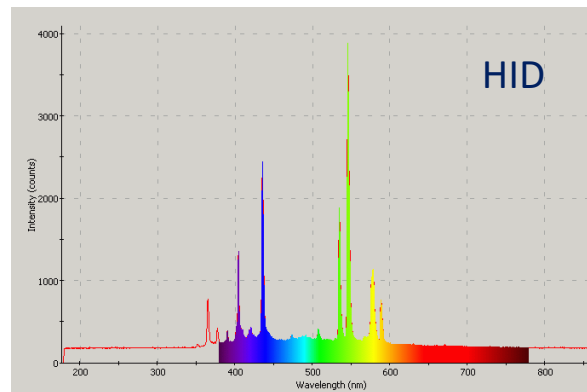
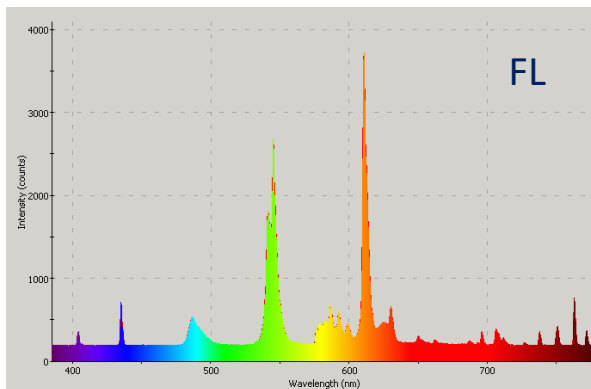
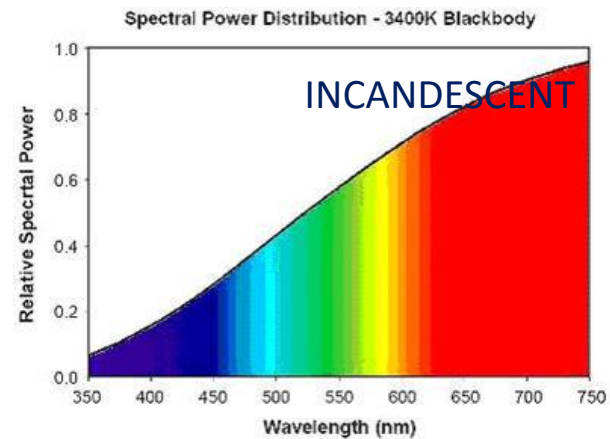
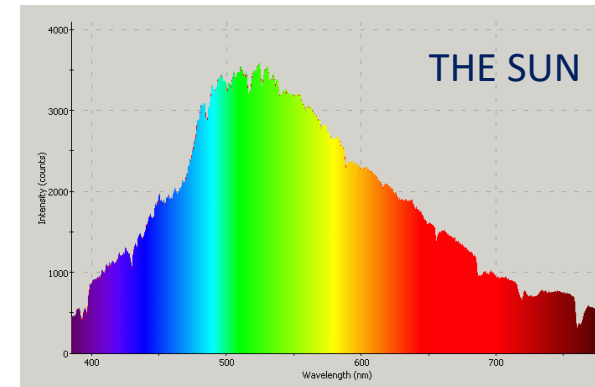
CRI OF SOME COMMON SOURCES

Light source	CRI
low pressure sodium	0-18
high pressure sodium	25
clear mercury	17
white deluxe mercury	45
warm white fluorescent tube	55
cool white fluorescent tube	65
deluxe warm white fluorescent	73
daylight fluorescent	79
metal halide 4200K	85
deluxe cool white fluorescent	86
metal halide 5400K	93
100-watt incandescent	100



SPECTRAL POWER DISTRIBUTIONS OF VARIOUS SOURCES

- Various “white” sources have different spectral power distributions
- The wavelengths of light available from a given source affects the apparent color rendering of an object illuminated by that source
- Which one is closer to the sun?
- A new standart – (CQS) Colour Quality Standart is currently being set for ALL light sources.



IS CRI A GOOD PARAMETER?

Best Fluorescent Tube (3600K)

Rx		Rx	
1	99.4	9	1.6
2	98.0	10	61.5
3	61.3	11	79.9
4	93.9	12	64.3
5	90.5	13	94.8
6	88.5	14	72.8
7	91.3		
8	67.6		
Ra	86.3		

Warm White (3350K)

Rx		Rx	
1	86.5	9.0	57.7
2	87.8	10.0	67.3
3	85.5	11.0	81.8
4	85.0	12.0	61.8
5	84.1	13.0	86.0
6	80.8	14.0	91.0
7	90.1		
8	83.4		
Ra	85.4		

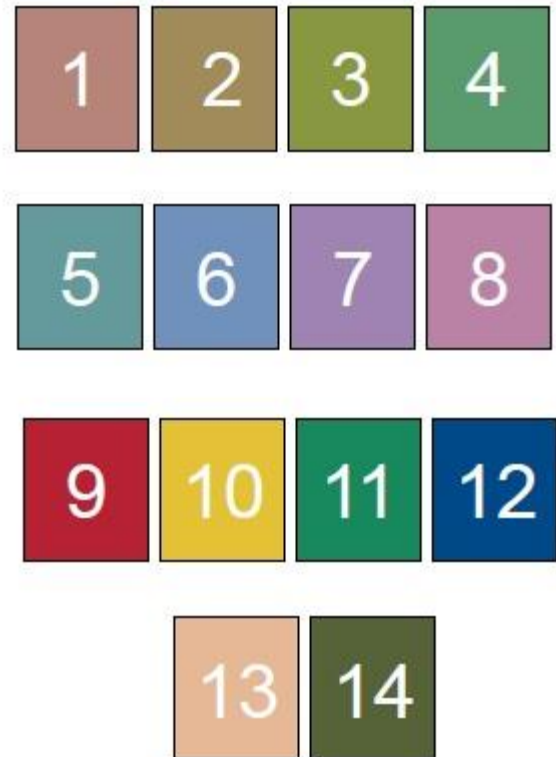
- Incandescent bulbs have high CRI with all 14 colors.
- Fluorescent tubes have lower CRI, especially for R9-14
- CIE decided to not include the color rendering indices R9...14 into the General Color Rendering Index “Ra”.
- Warm white LED demonstrates excellent color rendering with all 14 colors (R1-14>80).

- Although it is the recognized standard used in the world today, CRI is known to have significant limitations in accurately defining true color quality
- The color space used to determine the individual CRI values for the test colors is non-uniform. A deviation in red calculates out to a much greater Eithan a similar deviation in blue or green
- None of the test colors used is saturated. So, CRI is a poor measure for indicating how well a light source illuminates saturated colors (RGB LED systems); even with a high Ra, color rendering of saturated colors can be poor
- The U.S. National Institute of Standards and Technology (NIST) is currently developing a new standard -Color Quality Scale (CQS) –in conjunction with CIE.



NEW PROPOSED STANDARD: COLOR QUALITY SCALE*

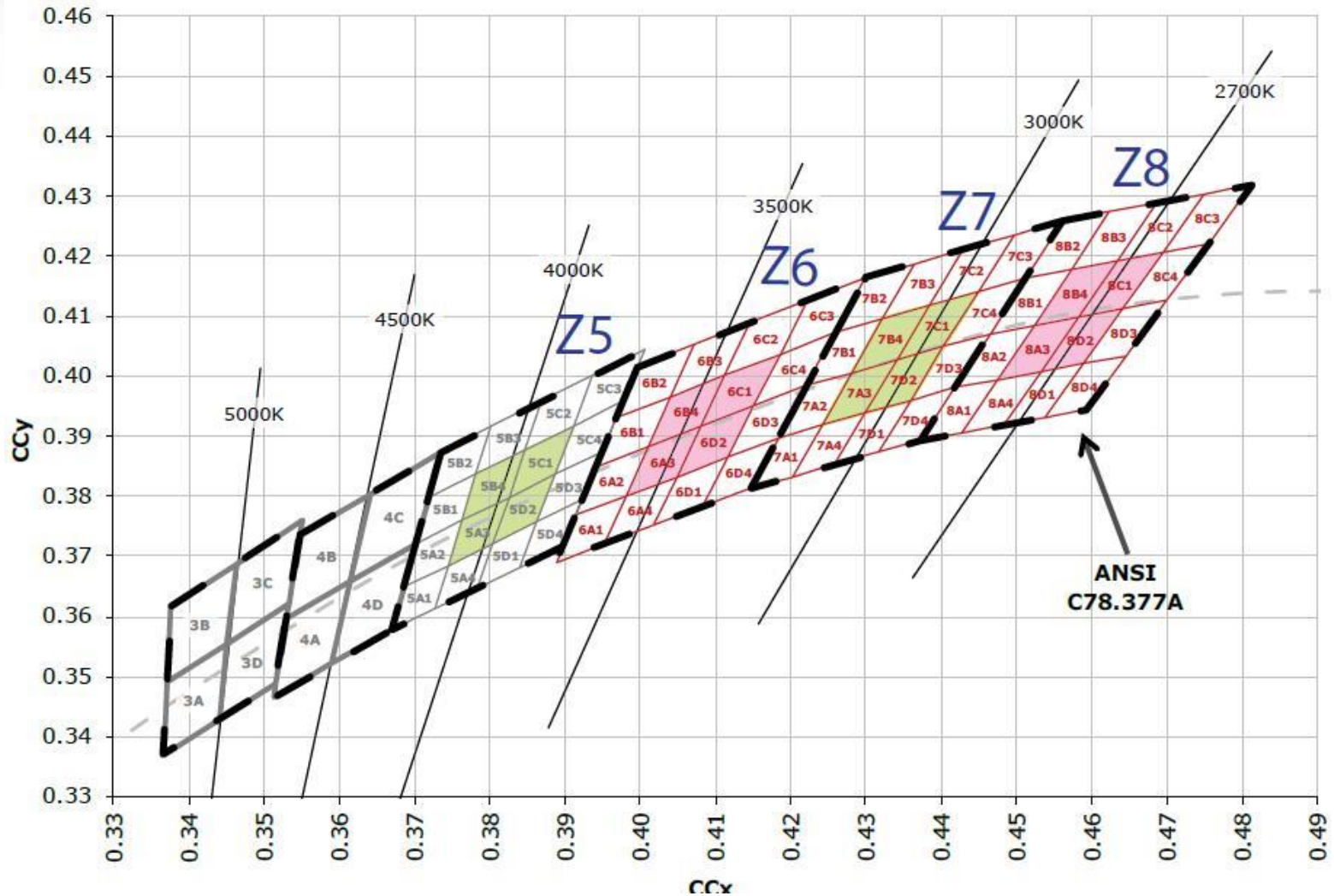
- Similarities to CRI:
 - Single number
 - 100 point scale
 - Uses color tiles (14 vs. 8)
- Status: still in committee, still reviewing/defending comments
 - Ultimate approval is not a certainty



RUALIGHT FOLLOWS ALL REQUIREMENTS AND OFFERS THE BEST TO THE CUSTOMERS.

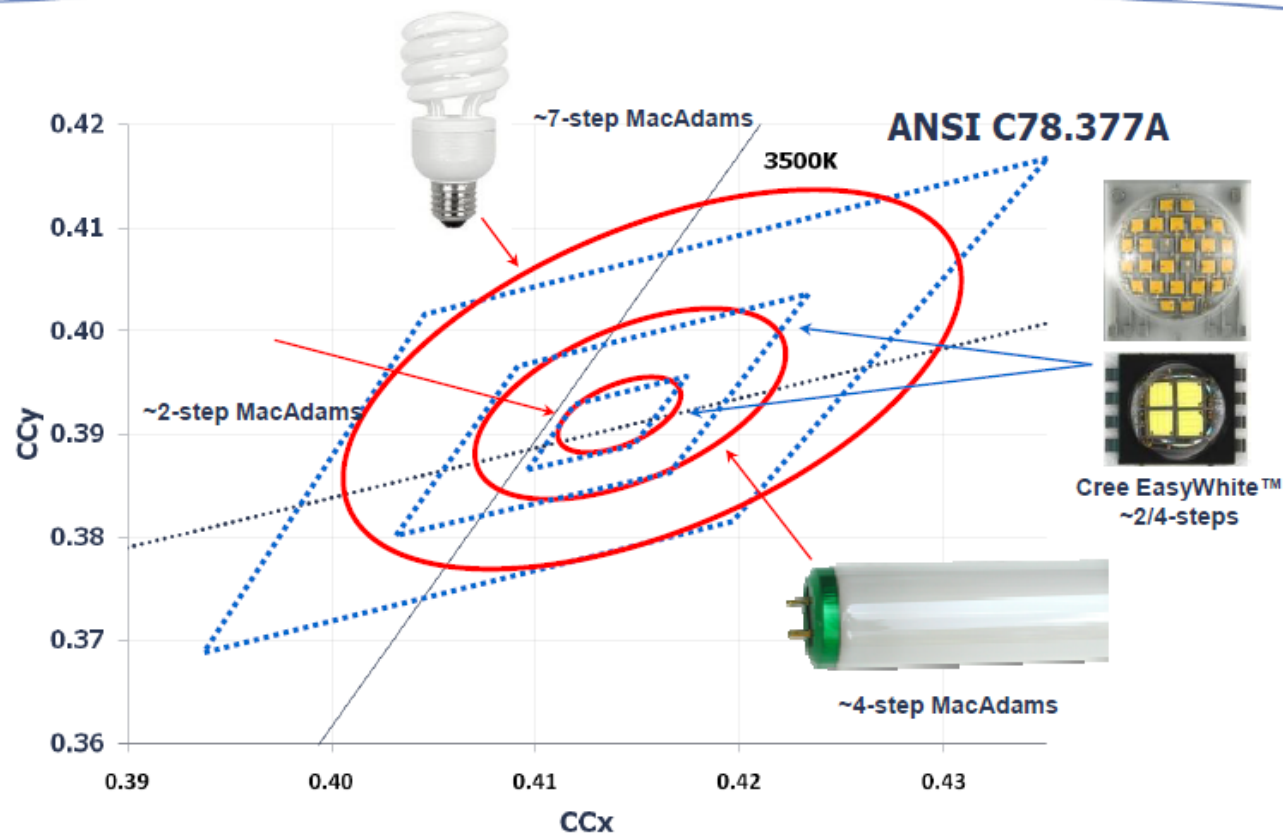
Colour Differences causes inconvenience, but you should relax because we take care of it. With special bin selections and 2-3 step MacAdams leds you are in safe and in comfort now. For led luminaires, you have options for minimum 80 CRI and minimum 90 CRI. We believe that it's time to switch from other light sources to LED. LED has lots of **benefits (LEDs are performing better in terms of efficacy; they are directional and no wasted light; have a very long lifetime; are inherently rugged because no filament to break; start instantly in nano seconds vs. > 10 min re-strike (HID); are environmentally sound and no Hg, Pb, heavy metals; are infinitely dimmable, controllable and new lighting features, power savings; love cold temperatures and no cold starting issues; at least same or better CRI values)** to switch to led today. Please ask to us for your special requirements.

COLOR BIN SELECTION



MAC ADAMS STEPS

LED Bins in Context



MAC ADAMS STEPS

2 steps



3 steps



5 steps



7 steps

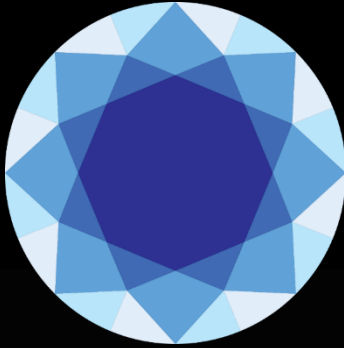


LED Lighting: Energy Efficient & Planet Friendly

Please do not hesitate to contact us for your further questions and inquiries.

Kind Regards,





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