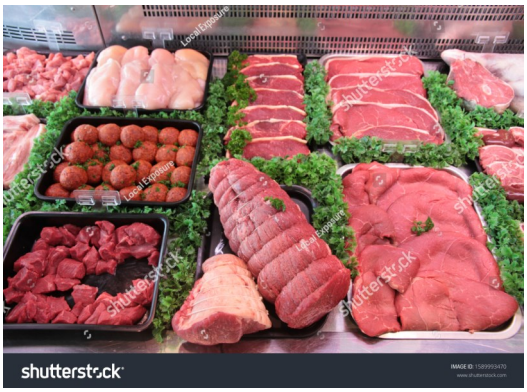
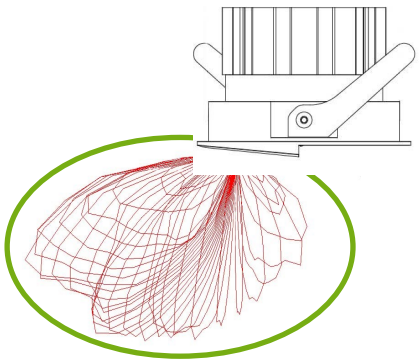
BIANCHI LIGHTING LIMITED

GUIDE

FOR SPECIAL RETAIL LIGHTING APPLICATIONS

Domestic Lighting Principals and Home Automation



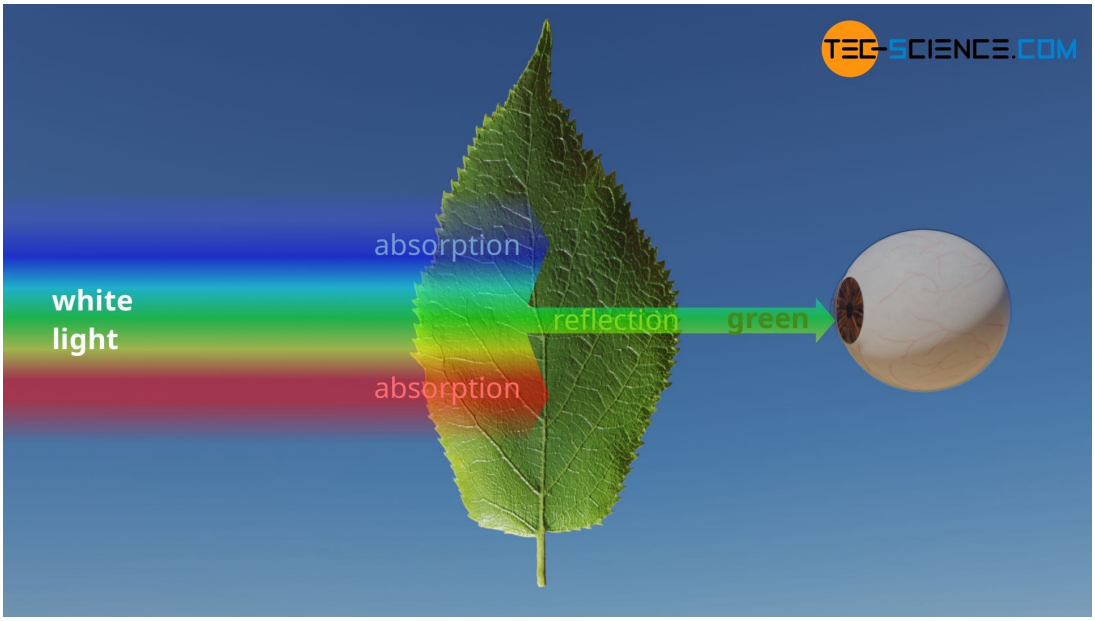


1. Colour Perception

Artificial Light represents a tiny proportion of the overall spectrum of light we receive from our sun.
What we are able to see as objects and those colours from packaging or natural colours from food sources are indeed from light reflected from these objects, where parts of the colour spectrum have been absorbed by these objects.

For all products to be vibrant in their display and appealing to customers, there must be sufficient content of that colour reflected from the object, present in the source of light in the first place.

Diffuse solar radiation contains a good abundance of all the colours. While we strive to make improvements in artificial light, factors such as cost, complexity and technical limitations means that either specialist colours are favoured for specific applications, or, additives are incorporated into the making of a light source that enhance the range of colours present.



Colours can appear dull, where the light beam is deficient in the reflected colour.

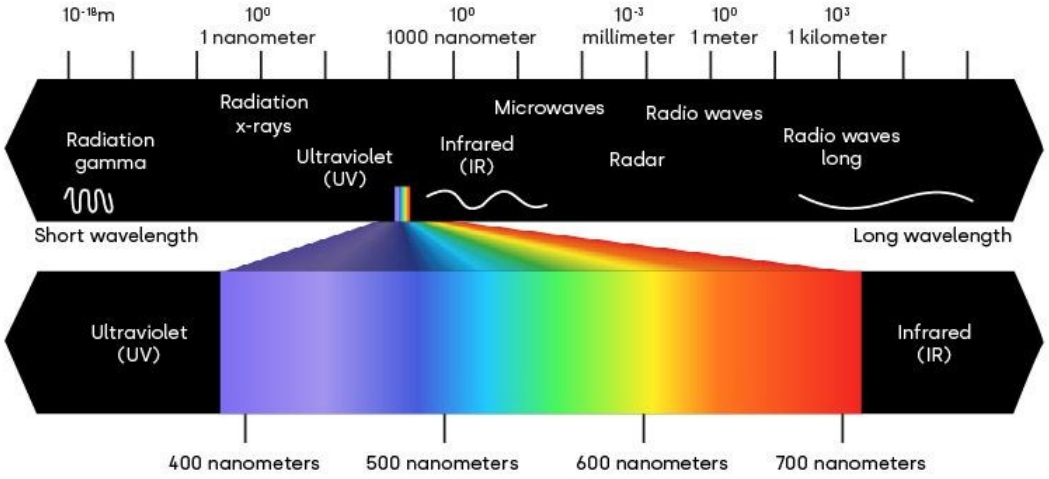
Filters can reduce the presence of other colours

2. Natural Light Vs Artificial Light

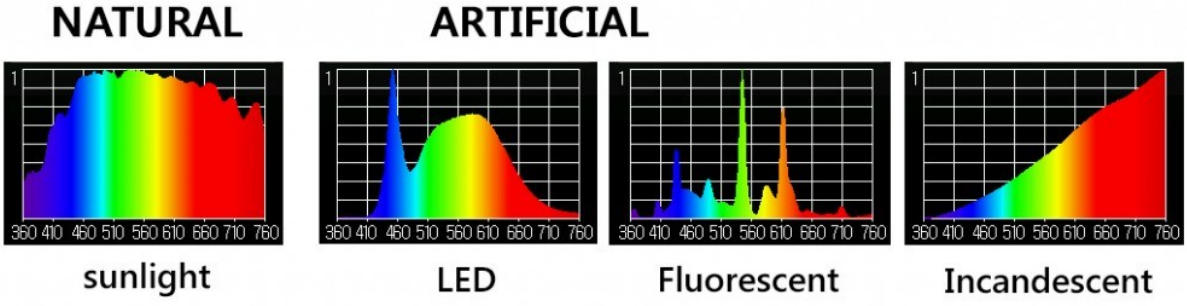
Natural Light is perceived on earth through Diffuse Solar Radiation who's source is our sun.

This natural light is modified and undergoes changes in trajectory while going through our atmosphere. Our visual perception of this solar radiation represents our full spectrum of light.

We strive to replicate natural light through artificial light, but equally, the full spectrum of light also includes many other wavelengths that are very harmful. Our visible spectrum of light, represents only a tiny portion of the radiation emitted. This range is stated as between 380nm and 700nm (measured in nano meters). It has proven very difficult to replicate such a visible spectrum of light, when it is derived using other materials and means such as chemical reactions to achieve similar results from non-nuclear reactions.



So; How well are we doing so far?



OK, So not that good then!. There is a separation between the light colour we see, and the colours present in the beam. Generally, if warmer colours are required, the Red content is more prevalent in the warmer colours which can be harnessed.

3. Retail Requirements

It takes years for an apprentice to learn enough to design lighting properly.
Retail requires sensitivity to target the right quality of light, in the right quantity at a specific target with the aim to accent the merchandise above a background circulation level.
Where goods may transition in a space, it is common for an entire floor area to be lit to a standard background performance, However, this approach will reduce the impact on merchandise placed to attract sales. This guide, cannot cover everything, but hopes to provide some minimum guidance.
This guide relates to specific perishable merchandise with special colour requirements, designed so as to limit premature aging of products, and enhance the visual appeal and vibrance of such products.

Such perishable products are:

- MEAT. High Red and White Content
- FISH. High White and Blue Content.
- BAKERY . High Red and Amber Content good white and colours.

LED's now represent the most efficient, versatile and long lasting with reduced maintenance offer for commercial spaces. At time of writing, LED's with enhanced colour properties are available, but in the public's perspective these more specialist than mainstream, with very little to none available in the general public sector. LED's modified for the above applications are even rarer. With rarity, purchase costs and maintenance should be expected to rise exponentially.

Having said this, the opportunity to showcase merchandise and perishable food is equally greatly increased and could make a difference in close competition for customers.

Ultimately, the displays are more likely to require a good distribution of colours, displays may sometimes include fruit and green leaves to enhance the sense of freshness. So there's a decision to be made to balance

- Form and Function,
- Natural Enhancement or Specialist Source.
- Costs and Maintenance.

A link between light and heat meaning increases in energy that also affects luminaire design and special processed to enhance colour reflectivity.

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4. LED Diversity

Early on in LED history, Lumen output was an issue. Over time LED's have increased in output to reach a point where we are able to modify colour properties, which is at the expense of performance, but still be suitable for many applications.

This diversity has been driven by market applications. Each LED chip manufacturer has sought to identify and name each derivative as unique to them. In addition, some luminaire manufacturers have also agreed levels of cooperation to introduce their own specific derivatives aimed at their market share. The result is somewhat confusing to retailers and shop fitters.

To demystify the ranges available, the diversity of LED's will fall into one of these groups below. We've used some names from a specific manufacturer a this was generally quite descriptive just for clarity.

APPLICATION AREA

Street Lighting

bridgelux
Bridging Light and Life™

HOME / PRODUCTS / V SERIES™

V SERIES™
Street Lighting

General Circulation Areas

Commonly available through lighting retail and trade

- CRI 80
- Mains and Retro Fit

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4. LED Diversity

APPLICATION AREA

Well being

Specialist Sources & Retailers

- CRI 93
- SELV with Driver

Domestic Applications

High Output, High Spaces

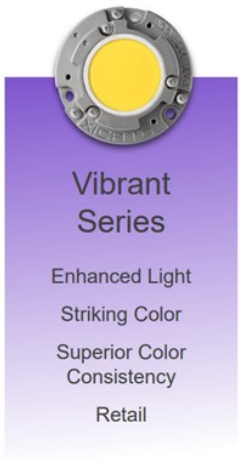
Specialist Sources & Retailers

- CRI 93
- SELV with Driver

As above for commercial applications

Enhanced Colour Range

Vibrant Colours



Commonly available through lighting retail and trade

- CRI 80
- Mains and Retro Fit

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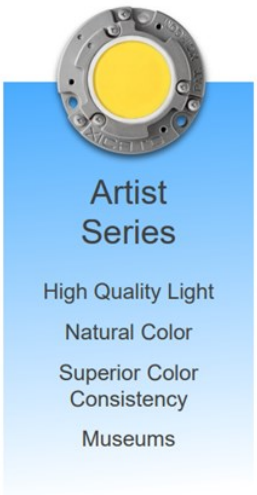
4. LED Diversity

APPLICATION AREA

Artistic and realistic



Specialist Sources

- CRI 98
- SELV with Driver

Art Installations

SPECIAL APPLICATION AREAS

Enhanced Colour Range Specific Colours

Beauty

Specialist Sources

- Custom CRI Pink & Amber
- SELV with Driver
- Specialist with Skin Tones

Meat

Specialist Sources

- Custom CRI Pink
- SELV with Driver
- Specialist Red Content with Pink Hue.

Meat & Fish

Specialist Sources

- Custom CRI Pink & White
- SELV with Driver
- Specialist Blue & Red Content For Fish & Cut Meats.

Bakery and Pastry

Specialist Sources

- Custom CRI Amber & White
- SELV with Driver
- Specialist with Skin Tones

Fruit & Veg

Specialist Sources

- Custom CRI White and colours
- SELV with Driver
- Specialist Red Content

Cheese

Specialist Sources

- Custom CRI White and Pearl
- SELV with Driver
- Specialist Red Content

5. Colour Appearance

SPECIAL APPLICATION AREAS

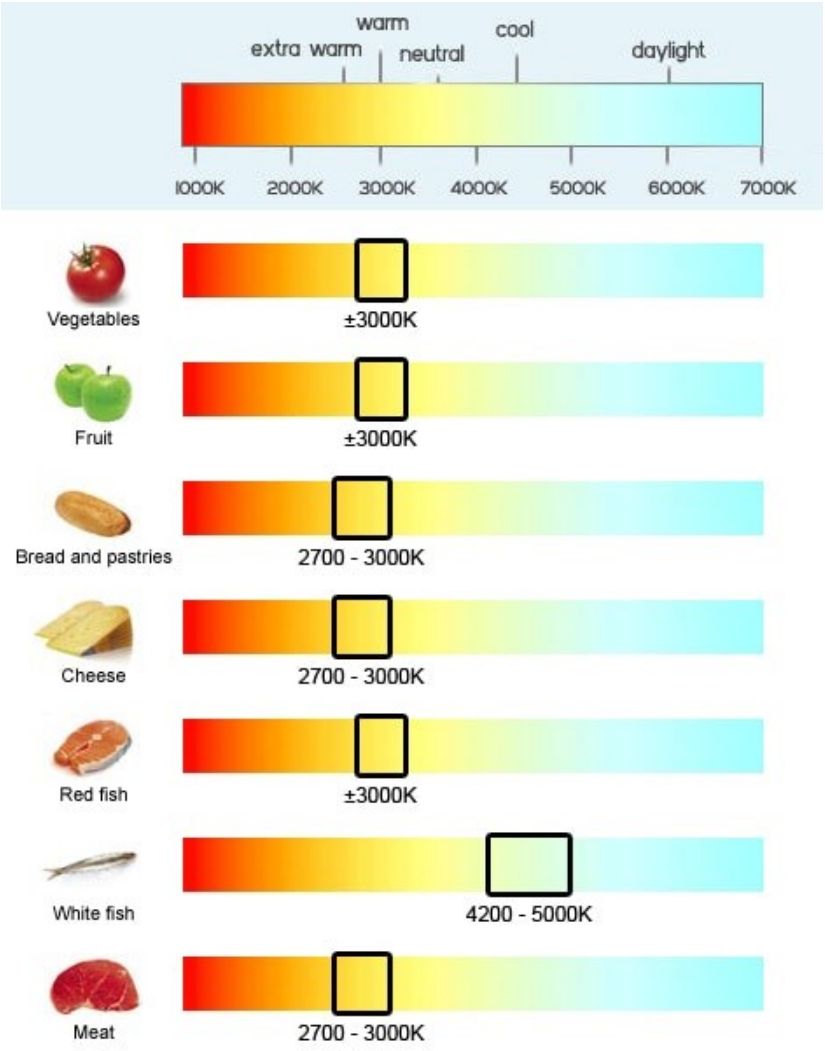
Warmer colours are more appealing to customers generally. These warmer colours in the left part of the spectrum shown below contain more red content in the beam that can be harnessed.

Cooler white colours tend to promote faster turn around of customers, but this is coupled with good glare control allowing customers to be comfortable and concentrated on the goods / services to be purchased.

The ability to select a colour appearance and even change this colour is now possible with the advent of new control technology.

Much better colour content in the beam is now also more achievable than ever before.

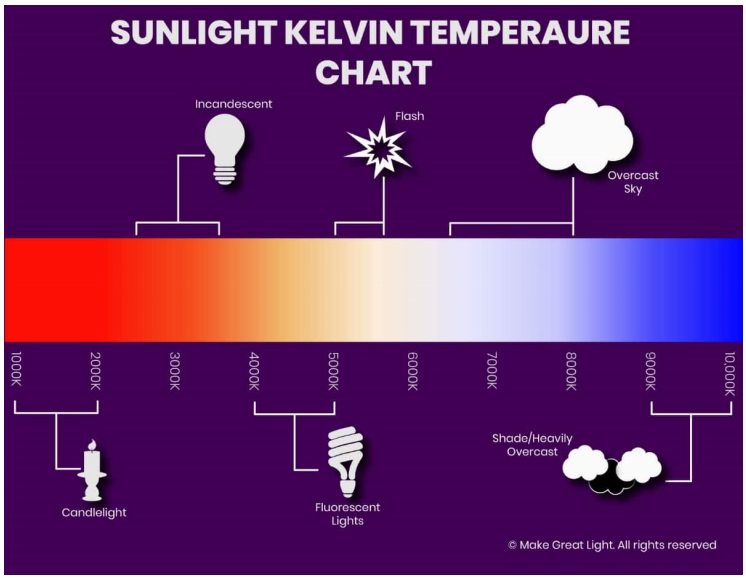
Typical colour appearance recommendations are shown below



5. Colour Appearance

SPECIAL APPLICATION AREAS

As a means of comparison between sources and their colour appearance in the image below is representative of some of the common sources we may be used to.



There are no hard and fast rules in retail lighting. The intensity light source and spectral properties in the previous pages very much depend on what is being displayed, and colour needs of that merchandise.

Power and heat needs to be managed to ensure the lighting does not introduce a perishable life to the goods.

6. DESIGNERS & SHOP FITTERS

Some shop fitters have in house design services, or such collaborative arrangements.
As is life, the design outcome is only as good as the designer, and the detail information provided to them.
Free design services linked to a product order is available. However, this can be over simplistic and lacking in detail experiences.
Generally, all such designs are offered at the clients risks. The service is there to provide detail on purchase quantity and budget analysis only. (As ever, Check the small print).

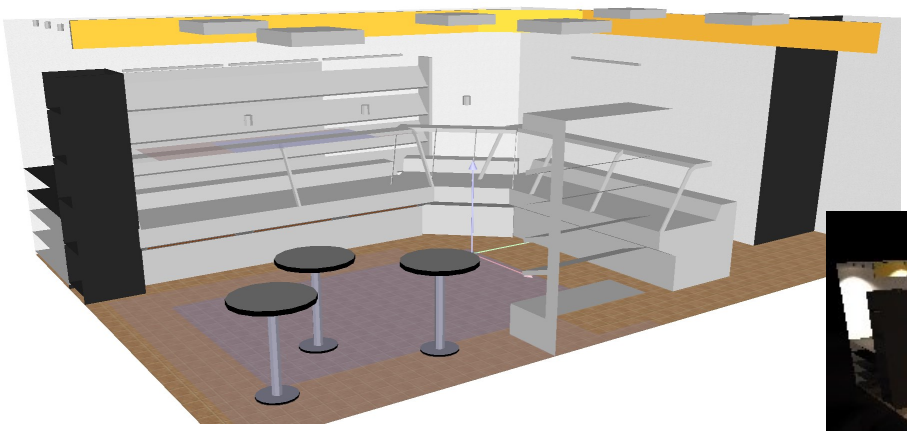
In many instances shops are fitted using a uniform lighting array, with little consideration to the use and goods on offer.

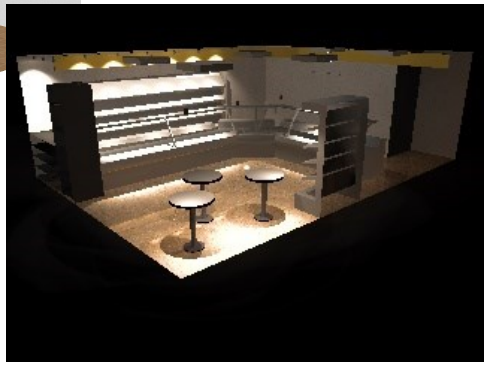
In any design it should be a requirement that the client has direct contact with the designer and in the information exchange confidence should be provided by the designer that design risks are his /her/ their direct responsibility, and that measurement surfaces related to the consumer goods are well presented.

When to use a **DESIGNER**

- Where visual comfort is important.
- To control hash glare using appropriate products
- To create interest in the goods on display
- To create accent on the display goods
- To provide appropriate colour appearance and colour spectral rendering on the display goods
- Manage power to preserve against premature aging of products.

The designer should be able to model the space in a 3D environment and incorporate lighting photometry files.
These files are replicated by the software model to give a good representation of the lit effects

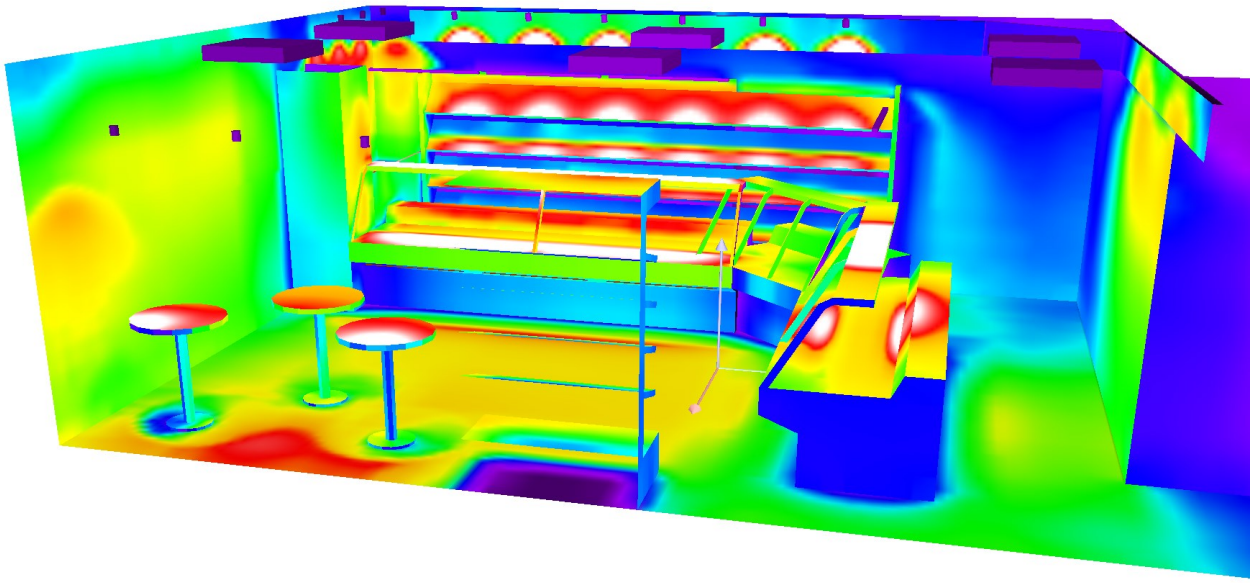




6. DESIGNERS & SHOP FITTERS

Intensity levels can be displayed with rendered images, in order the client can be expected to have the best information available to make an informed decision.

Approval for the design and costs needs to be agreed and provided



7. Conclusion

There is now far more choice available in retail display.
Whatever choice is finally agreed, this should include a high proportion of good colour spectral rendering content. This will directly exclude 98% of all high street and general lighting available to the public at time of writing.

This means specialists will be required in some form, to locate and offer those products with the correct colour, optical control and energy options.

Specialist lighting can improve on the visual effects of the display goods, but this can be perceived as artificial.
Care should be taken with decision to use specialist sources for specific products, or use very high performing artist series lighting, or a combination of the two.

Specialist product sources are a rarity, expect higher costs and long lead times. Artist series will also be rare but has a wider audience, and therefore more choice.

An issue is the light source is part of the luminaire, with heat sinks to control longevity. Spares may only be available for as long as the luminaire remains in production.

Each retail space has a corporate identity, Therefore, the lighting approach may be specific to each client. This document only seeks to illustrate some changes in this market and help to guide clients to a reasonable decision.

When to use **CONTROLS**

- Where the space is multi-use,
- To group circuits in large spaces
- To create interest in architectural features using automated switch cycles
- For Lighting and Blind Control
- To combine Lighting and Heating
- To link to intruder alarms