



From traditional lighting to energy efficient lighting in Finnish homes



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Towards better and energy saving lighting in Finland

With quality lighting you get a fresh and modern, positive look at home. You can even enjoy good lighting.

A quality lighting

- humane
- eye-friendly
- non glaring
- childproof
- shows the colours of interior as they are
- saves energy
- have no negative effect on the climate.



Warning examples



Problems and hazards of halogen and incandescent lighting

- Restless lighting
- Distorted colours
- Glaring, if incorrectly directed
- Too little light considering the energy consumption
- Fire hazard
- Risk of explosion (especially GU10, 230 V halogens)
- Negative impact on the climate
- Because most halogen and incandescent lamps will be banned, we should avoid them already now!

Avoid lighting, which causes glare and consumes too much energy



Downlight halogens give a restless image and they might even glare. Lighting effect is far too poor. Halogen lamps are not planned for general lighting. An expensive mistake.

Mistakes in kitchen lighting



Glare from drainboard even seen from a longer distance.

Mistakes in kitchen lighting



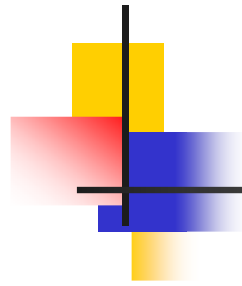
Too little light on drainboard. Glaring light for children.

Mistakes in kitchen lighting



Blending

Too little light, fire hazardous swan neck halogens. If the child throws a cloth on the lamp, the fire is obvious.



Mistakes in kitchen lighting



Warm light changes the colour of ceiling and wall.



Daylight, true colours. Warm light under the cupboard.

Indirect lighting would be better



This lighting should be improved.

Avoid fire-risky or glaring lamps in families with children!

Risk for fire – risk for glare. No hang-up fixtures with halogen lamps in childrens rooms. If a sock is thrown on the wire > fire!



A fire-risky lamp in an open fixture.



Glare, risk for fire.

Warning examples



Glaring halogen spotlights, restless impression.



On the table a very hot, fire risky lamp that has been chosen for appearance.

Avoid fire-risky or glaring lamps in families with children.

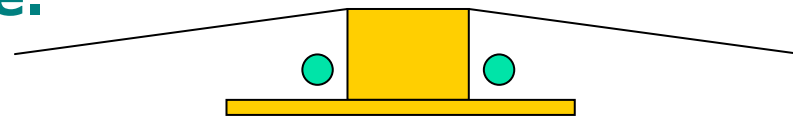
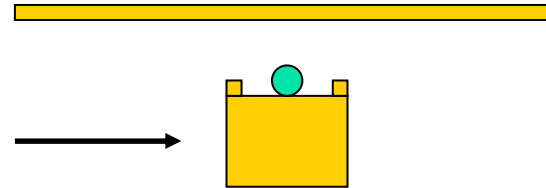


Risk for fire and glare. When children play and by accident throw e.g. a sock on the lamp there is an obvious risk for fire. Additionally the lamps are very glary.

Indirect lighting would be better



**Better solution with
fluorescent tubes, no glare.**



Indirect lighting would be better



The ceiling is too dark. Lighting way is very restless.



Avoid of glaring halogen lamps!



It is not comfortable to look at glaring lamps. Mirror doubles the glare. The light destroys the colours.

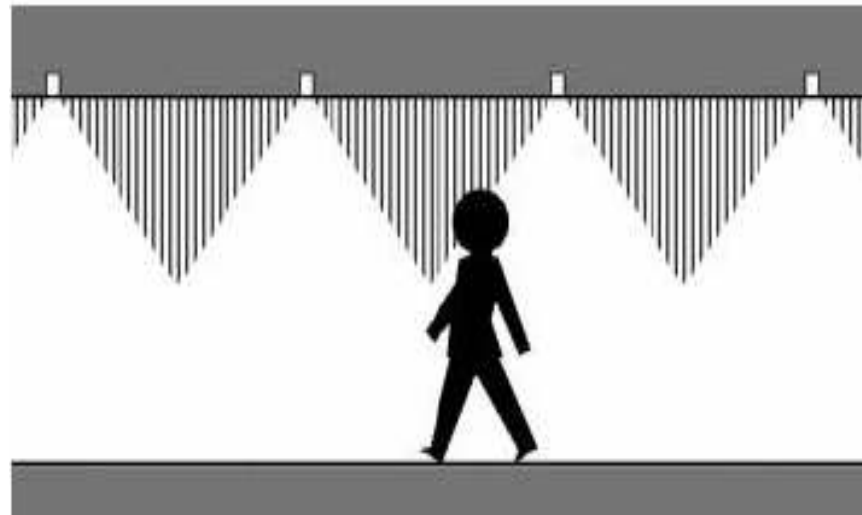
Avoid glare from the ceramic stove



One of the most important things to consider when choosing a kitchen hood is to get enough light on the stove. The lamp must not glare from the stove, so avoid halogen lamps.



Avoid down-light lamps



Down-light can be compared with a flickering light when you walk under the lamps.

Sauna lighting, traditional



Glare



Sauna lighting should not be restless



These are all bad, glaring examples



LED is coming – first trials not good



Good, but too yellow, too little light



Too bright, not good mirror light



Reflections



Daylight – 6500 K – too blue



Spectrum of this "daylight" light is not continuous

Warm light destroys colours



3000 K light

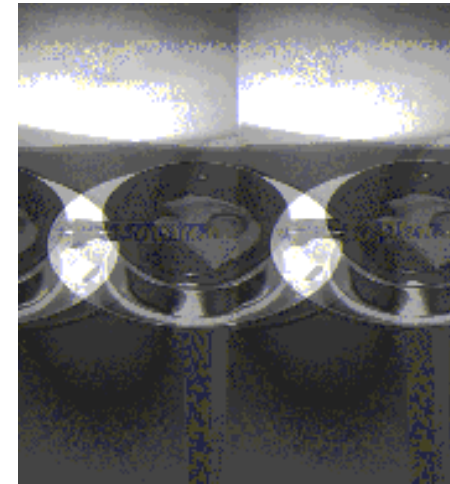
Original colours in daylight

Fire hazard



Replace incandescent lamp to energy saving lamp to avoid the fire hazard.

Ban the 300 W uplight halogens!



IAEEL newsletter 4/96

**You can fry an egg
on the lamp**

Fire hazard. These are banned in some states in the USA,
not in EU.



EU bans incandescent lamps, but...

Halogen lamps belongs to the group of incandescent lamps, but EU does not know this???

Surprising information on EU:

COMMISSION REGULATION (EC) No 859/2009 of 18 September 2009

First EU bans over 100 W incandescent lamps and now they do not ban 300 or 500 W halogen lamps. Why?

EU: *Recital 21 of Regulation (EC) No 244/2009 states that the requirements of the measure allow halogen lamps of socket G9 and R7s to remain on the market for a limited period of time. There is no indication in the Regulation of the length of this time period.*





EU bans incandescent lamps, but...

COMMISSION REGULATION (EC) No 859/2009 of 18 September 2009

EU: *The phasing out of G9 and R7s cap lamps is considered only in a longer term, as they are widely used and there is presently no suitable replacement available that would fit into the luminaires designed for such lamps.*

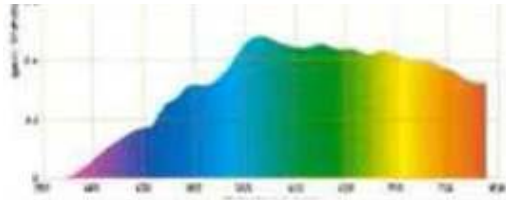


... but there are already suitable replacements!

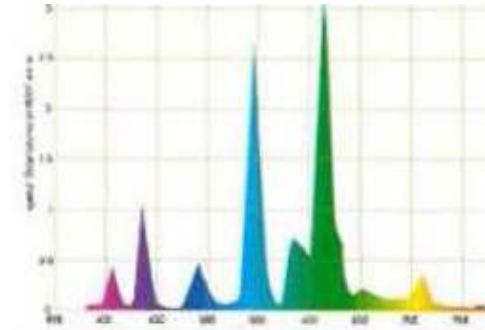
Article 15 of Directive 2005/32/EC requires that the ecodesign requirements should not affect functionality from the user's perspective, should not entail excessive costs.

300 W halogen fittings may use energy in one year more than than the fitting has costed.

The spectrum of light specifies the quality of light



Daylight spectrum in summer between 10 am and 2 pm.
Perfect colours! **Grade 10**

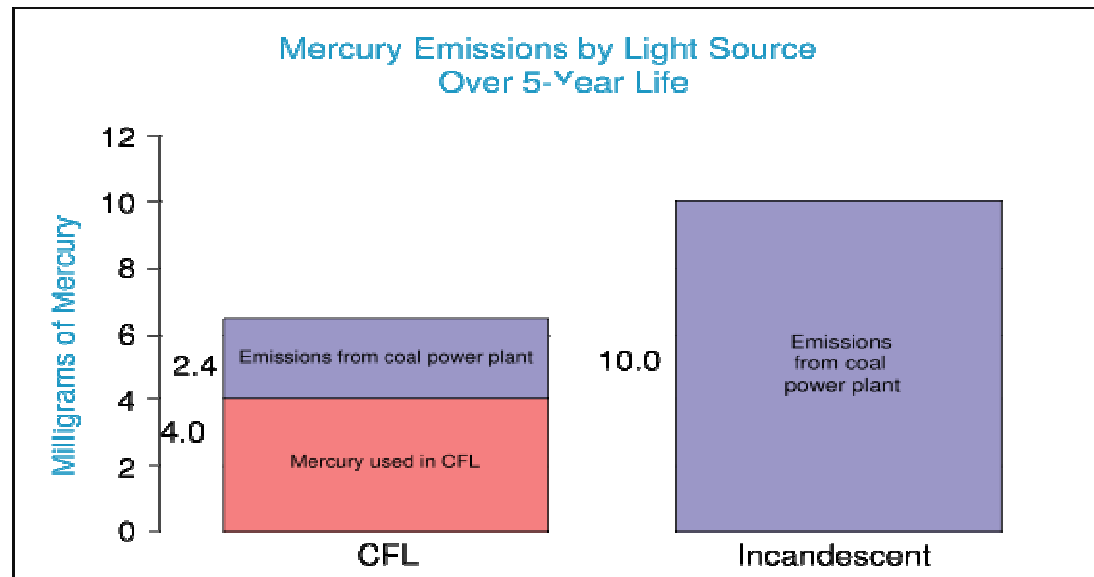


The spectrum of a bad quality fluorescent tube.
Grade 4 -



The spectrum of an incandescent and halogen lamp. Colours are distorted, reading is slow. Grade 4 -

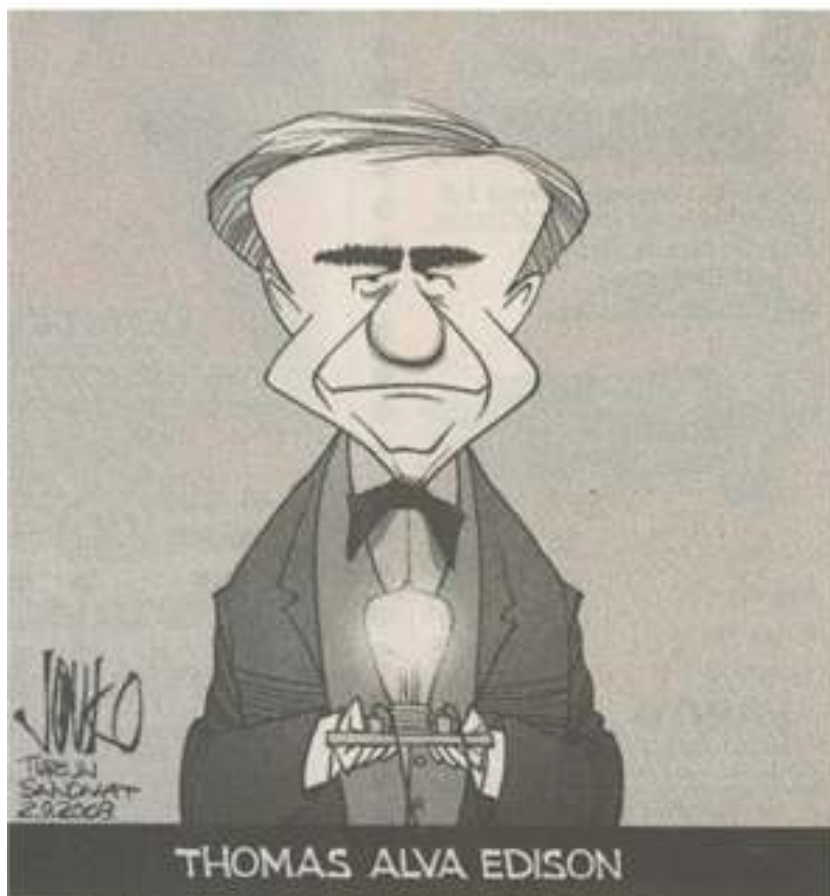
Fluorescent lamps vs. incandescent lamps and halogens



Mercury emissions by CFL vs. mercury emissions by incandescent lamps, considering the polluting emissions from coal power plants. Incandescents, as well as halogens, produces 36 % more mercury than CFL. CFL's can also be recycled, but not incandescents that are thrown in dumps and both glass and metal remains in nature forever. Source: [Wikipedia](#).

The end of incandescents

The inventor of incandescent lamp



The inventor of the banning of the incandescent lamp





Towards perfect quality of light

Evaluating lighting only by measuring lux is not a correct way to go. *Music is not evaluated only by decibels.*

Choose the colour of light

Decide what is the colour of light you want and above all experiment and compare. Colour of 2 700 – 4 000 Kelvin (K) is yellowish, even tiring. 6 500 K light is bluish, "cold". 5 500 K is white and pleasant for many.

Spectrum is more important

Colour temperature does not tell everything about the quality of light. You need to know the **spectrum** of colour too. Is your light "polluted" like in this picture? Does it distort colours? Does it strain eyes?

Animals more important than children?



We often pay a lot more attention to lighting e.g. pigs and hens than to lighting human beings. Stressed pigs must not be born. Laying eggs is activated by light. A lot more important would be to impact on the physical and mental development of our children with light.



Children needs more daylight

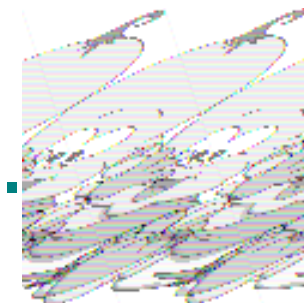
School study from Stockholm: Gasping teenagers can be helped by new full spectrum fluorescent lamps in schools. When researchers changed lighting in classroom the students became more alert in the morning and got a better nightsleep.

Results are so good that other schools are getting interested in lighting in schools, says Arne Lowden. a researcher in a stress research institute in the Stockholm University.

In the darkest wintertime in two classrooms regular yellowish fluorescent lamps were changed to so called full spectrum fluorescent lamps. The classrooms were the students homeclassrooms so they had almost all their lessons there.

Children-safe lighting

- **Indirect lighting is the safest choice in childrens rooms.**
- **Neither non-firesafe nor glaring incandescent or halogen lamps.**
- **No fixtures that fall easily.**
- **No lamps with risk for explosion= candle lamps.**
- **No electronic flicker disturbing childrens brainwork and concentration.**
- **Give up traditional reading lamps (50 Hz).**
- **Get rid of hot fixtures.**



Why daylight also inside the house?

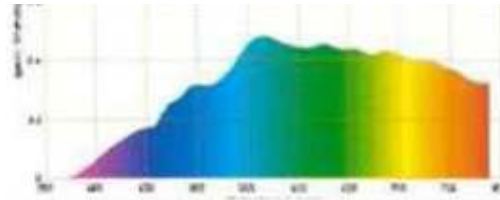
Home lighting has the past decades been monotonously warm, yellowish and not showing colours correctly. A question arises: why??

Almost everyone who experiments with light that has the wavelengths or the colours of real daylight consider it excellent.

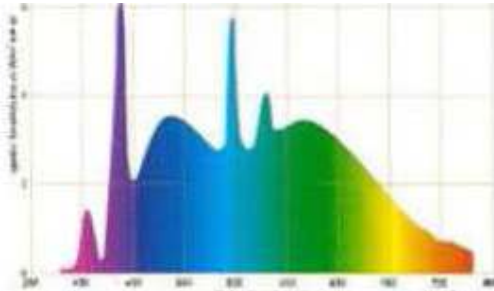


A cavewoman came up with lengthening his working day with light.

The spectrum of light specifies the quality of light



**Daylight spectrum in summer
between 10 am and 2 pm.
Perfect colours! Grade 10**



**The spectrum of a
fullspectrum daylight lamp
Great colours, reading is
easy. Grade 10 -**



Full spectrum daylight is better

Some benefits

- You can read faster
- See the colours as original
- Proper seeability
- Less glare from the paper
- Bigger contrast
- You feel better

This text is easy to read under Viva-Lite lighting. The contrast between black and white is excellent. Letters are black, paper is white. Reading speed can be even 20 % faster than under normal light.

Fullspectrum Light literally translated means the suns full light spectrum that reaches us on earth. Having evolved millions of years under this particular light, one would expect this spectrum to be ideal, balanced and healthy for the human mind and body. And surely it is: Everybody knows how we feel on a bright sunny day and the difference it makes to our moods compared to dark grey days. However our lives have changed tremendously over the past 100 years. When previously most people were working somewhere outdoors – farmers for instance – exposure to the natural daylight was common and absolutely normal. Of our daytime we spent around 90% outside and 10% or even less inside.

This text is difficult to read under standard, warm tone light. The contrast is bad. Letters are grey, paper is yellowish. Reading speed can be even 20 % slower than under normal light.

Offices, homes, shopping centres etc. use double glazing and energy efficient building methods and therefore are almost completely closed and thus hermetically sealed. As a result, we generally spend much less than 10% of our daytime outside and many of us are now unable to receive their daily dose of natural daylight including the full range of the suns spectrum. This we need not only for our daily dose of "good mood" but also on a pure physical level: Some parts of the suns full spectrum are essential for maintaining healthy and balanced body functions and are also controlling the release of hormones. Such parts of the suns spectrum are simply not included normal incandescent lamps and most energy saving lamps and tubes.

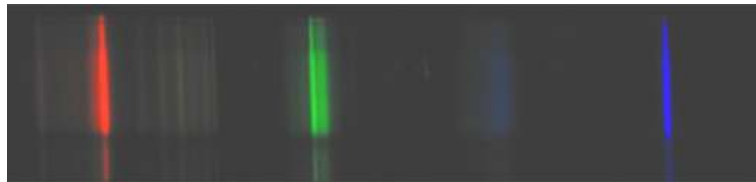
Full spectrum

3000 K light

Comparison of spectrums



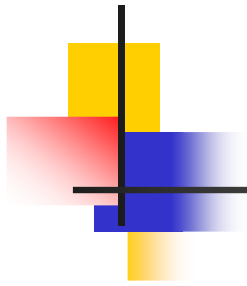
The spectrum of full spectrum is continuous, all wavelengths of visible light are present.



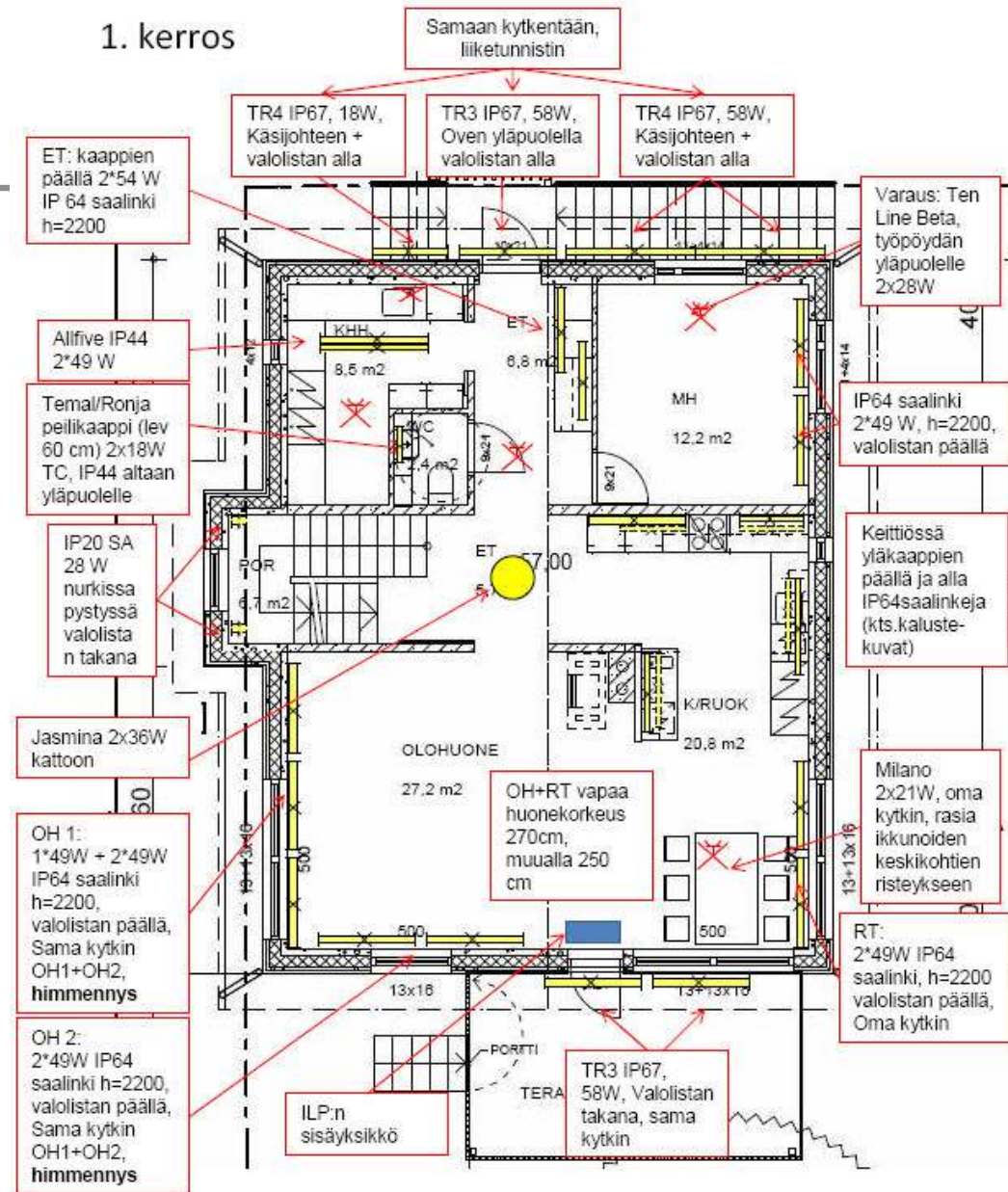
The spectrum of a ordinary daylight lamp (3-band) is discontinuous. Areas, where full spectrum has colours, are just dark.



That light may be harmful, if you stay there for long periods of time. We need all wavelengths (colors) of the light for our well-being.



An example of the lighting plan made by the customer.



Modern lighting of kitchen



“Saalinkki”-fixtures on top of the cupboards and underneath behind moulding. Excellent visibility.



Modern lighting of a kitchen island



A light ceiling can be made above the island of decoration board. There are several alternatives. Lamps can be placed on the edge and/or in the middle.

Lighting the ceramic stove



Good way of lighting the ceramic stove. Fluorescent light is better than halogen or led.



Indirect and direct lighting of living room



Indirect daylight-lighting is beautiful, non-glaring.

Good indirect lighting



**Indirect daylight-lighting is beautiful
in wooden and in stone houses**



Good lighting



Beautiful way to light, instead of the yellow light I prefer white, full spectrum daylight.

In the right picture: a fitting, which gives light to two room at the same time.

Bathroom



Lighted ceiling in bathroom



Lightpoles in bathroom



Sauna lighting



Light comes out beautifully between the slots of the bench on soapstone behind the stove. LED´s and fibre lights can not create such a feeling, especially not that inexpensively. Waterproof fixture, IP67. Light can be directed after install.



Natural daylight - best of all



Ambient lighting

In the evening light could be warm-toned, "more ambient" light, especially if light is not needed e.g. for reading. In the end you can turn off the lamps and light candles.

Many people become so fond of daylight type light, that they want to have it all day long, also in the evening.



*Candle light full of feeling
is also suitable sometimes.*

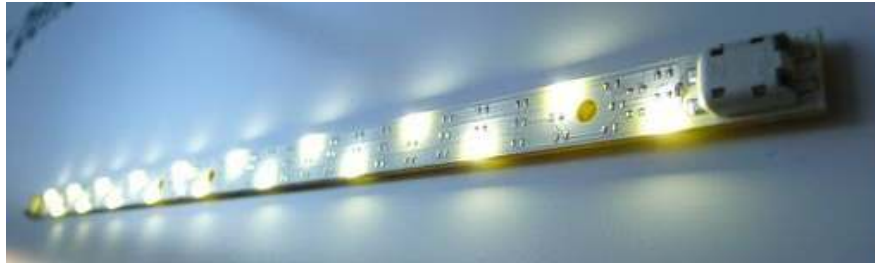


LED-lighting is coming

LED-fixtures are already now good enough for home Lighting, if you choose the best ones.

- The amount of light is many times insufficient, a lot of LED ´s are needed and that is expensive.
- Colour rendering is normally bad, "white" LED ´s Ra is 70, yellow LED ´s Ra is 80. Yellow LED ´s still distort colours more than "white" LED ´s. You should demand Ra 95.
- Glare is one of the biggest problems.
- LED ´s are energy saving, but a fluorescent tube are still a good choice.

LED-lighting is coming



Wattage	Typ. VF	IF	Lumens*
1,1 W	3,2 V	350 mA	108 lm
2,2 W	6,4 V	350 mA	216 lm
3,4 W	9,6 V	350 mA	324 lm
4,5 W	6,4 V	700 mA	432 lm

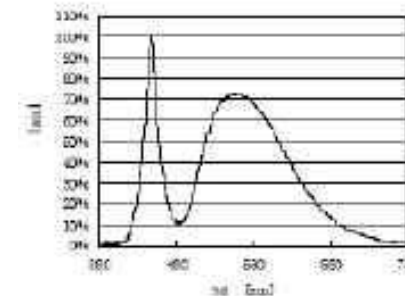
*5000 K



DAYLIGHT WHITE LED

For general lighting

- Light power even 100 lm/W
- Good colour rendering
- High Ra 95
- Long life, 40 000 hours
- Easy screw fastening
- High efficient heat release mechanism
- I prefer the colour temperature 5000 K



The spectrum is continuous

Led lighting



This LED solution is restless

Led lighting



Stair lighting with LED



LED on the ceiling. I do not prefer.

Led lighting



This LED fixture gives pure, white light like daylight. No glare.

Users testimonials



In artificial daylight the colours are as natural as in daylight outdoors.



Daylight lamps has similar effects to the animals as natural daylight.



Users testimonials

23.4.2009: Today my working friend bought the first daylight lamp in his life. He was very excited. He had never before seen a light like this. I too thought that daylight must be blue and cold. But it was something totally different. If there is heaven, it is lighted with full spectrum lamps ;-). And I too was "sold" on this light.

My comment: Very well, many people think that daylight lamps only give blue light because they have bought "ordinary" , not fullspectrum daylight lamps in a market. But there is a difference like day and night. However, even a human eye cannot tell all differencies but our brain and body can – unfortunately sometimes too late.



Users testimonials

28.4.2008. Lamps are now installed. I have to say that I really enjoy the lighting. Not missing old yellow incandescent lamps. Have a sunny spring, Virpi.

31.3.2008: Hello and thanks for the links. We installed daylight lamps into fixtures in our living room and the difference really is amazing! Now the light from any other lamp really is disturbingly yellow and you can see how bad lighting it really is. Greetings, Henna

30.1.2008 Thank you! 216 W in kitchen sounded like a lot, but now I´m used to it already and there is not too much light at all. I even borrowed a lux-meter, on eye level when sitting there are 700 lx, when standing 1000 lx. Our kitchen is light toned, it is of 10sqm, ceiling height normal 2,60m. There is light up to 21,6 W/sqm. Pertsu

Users testimonials

Daylight lamps have been tested e.g. in the Zoo in Helsinki. Zoo. If daylight is good enough for monkeys, why not for... Before decision reacting usually is suspicious.



Even monkeys in Helsinki Zoo like the daylight – examined.

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