

# TRUE-LIGHT®

FULL SPECTRUM DAYLIGHT FLUORESCENT LAMPS

GOOD LIGHT · CONCENTRATED WORKING

BEST COLOUR RECOGNITION · INCREASED ACTIVITY

BETTER VISION · FOR WELL BEING · GOOD MOOD



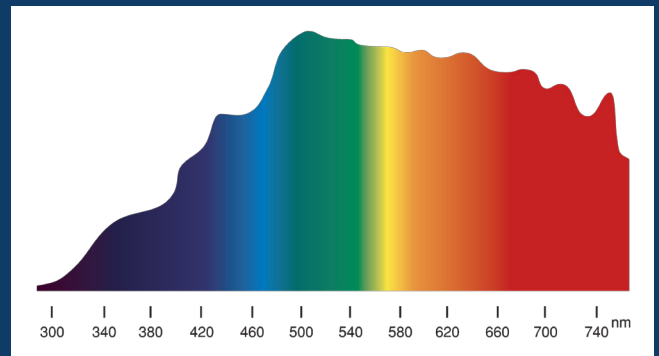
## Light is Life

- our life is significantly influenced by light

Natural daylight is an essential factor for life on earth. It has a decisive influence on the development and the well being of all creatures as well as on the course of nature.

Light radiation controls the biological processes within organisms. It has a positive effect on humans, animals and plants as it improves health and psyche. Natural daylight makes us feel good.

However, we spend most of our time in rooms with artificial lighting – both at work and during free time. This lack of natural daylight by wrong or insufficient sources of light can lead to unpleasant side effects like stress, a decline in concentration, fatigue, feeling unwell, headaches or even depression. Disorders of the vegetative nervous system can be the result of wrong lighting.



Spectral composition of natural daylight

## Good light

- not only a question of Lux and Lumen

Natural daylight as generated by the sun consists of a broad and continuous spectrum of radiation. Its visible spectrum from 380 nm to 780 nm includes the colours violet, blue, green, yellow, orange and red but also radiation in the invisible margins of the spectrum – ultraviolet (280 – 380 nm) and infrared (> 780 nm) – as characteristic elements.

Especially the UV spectrum of natural daylight emitted in a moderate and harmless dosage is of crucial importance for our health.

On the one hand because of its physical properties, that contribute to improve our vision and on the other hand because of its medical-biological effects on the organism and the psyche of human beings.

Therefore active artificial lighting for humans, animals and plants must be similar to daylight. High quality light is not only defined by creating enough brightness but primarily by a distribution of radiation over the entire spectrum that resembles natural daylight.

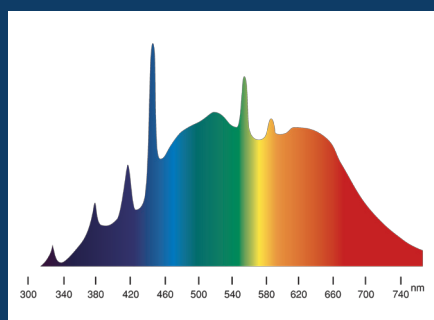
# TRUE-LIGHT®

- full spectrum daylight fluorescent lamps

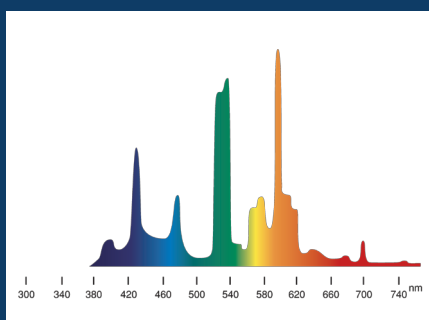
**TRUE-LIGHT®** True-Light lamps are fluorescent lamps that match closely the entire spectrum of natural daylight. They have been developed in the USA to simulate daylight in indoor environments. Space travel and submarines were the first application areas of **TRUE-LIGHT®**. **TRUE-LIGHT®** is the original in the field of full spectrum lamps. Intensive research in physics, photo-physiology and photo-psychology as well as continuous product development have made **TRUE-LIGHT®** lamps a unique source of light.

## Essential features of TRUE-LIGHT® full spectrum lamps:

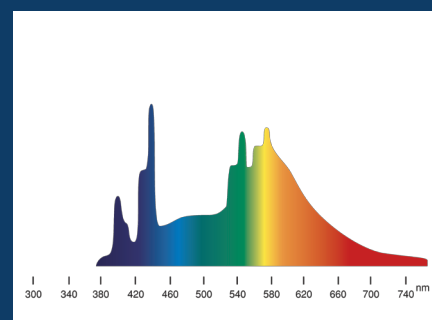
- a spectrum almost identical to natural daylight
- biologically stimulating effect
- best contrast vision
- definitely true to life color rendering by a colour temperature matching optimum daylight (5500 Kelvin)
- best colour rendering properties Ra 96
- broader and more continuous spectrum than other fluorescent lamps
- uniform and balanced light quality
- service life\* when operated with electronic ballast (preheating): 13.000h



**TRUE-LIGHT®**



Triphosphor colour neutral white



Standard colour universal white

- average life\*\* when operated with electronic ballast (preheating): 24.000h
- luminous efficacy up to 71 lm/W

\* the time in which the luminous flux reaches 80% of the 100h value

\*\* the average time in which 50% of a standardized number of lamps break down

The application is easy and uncomplicated:

**TRUE-LIGHT®** full spectrum lamps fit in common lights and sockets. To increase the lifetime, reduce energy consumption and to avoid distracting flickering, the application of an electronic ballast is recommended.

## The TRUE-LIGHT® product program consists of:

T8-lamps (26mm diameter):

- 15W, 18W, 30W, 36W, 36W-1m, 38W and 58W

T5-lamps (16mm diameter):

- HE (High-Efficient) - 14W, 21W, 28W and 35W
- HO (High-Output) - 24W, 39W, 54W, 49W and 80W

TC-L compact fluorescent lamps:

- single tube diameter 17,5mm;
- total broadness 37mm

- 18W, 24W, 36W, 40W, 55W and 80W

ESL compact fluorescent lamps E27:

- 15W, 20W and 23W

CFL compact fluorescent lamps:

- 13W, 18W



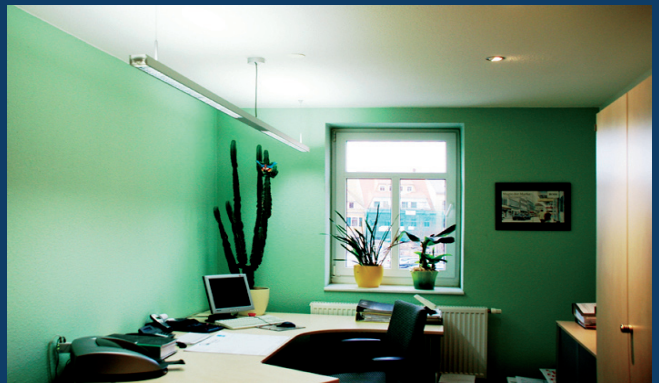
## ***Better quality of work***

- better light stimulates well being and productivity

In offices or at computer workplaces, which already make higher demands on eyes, nerves and concentration, it is important not to be exposed to any further stress by bad and wrong lighting.

There are important facts to decide for **TRUE-LIGHT®** full spectrum fluorescent lamps:

- A spectral energy distribution very close to that of daylight, which has a stimulating effect on humans
- Very good contrast vision
- Better concentration and improvement of performance
- Fatigue-proof vision



- Enhancement of productivity with lower error rates
- Less time lost due to illness
- Higher performance on the job

Many materials and objects like paper- and textile fibres, colour pigments and metals contain more or less fluorescent contingents.

Details and contrast can only be perceived in a lifelike way by the eye, if the incoming light contains UV rays in proportions like in natural daylight.

Accurate colour rendering is made possible by a near daylight, spectral composition by **TRUE-LIGHT®** full spectrum fluorescent lamps.

Deviation of the colour impression and the choice of unmeant colour shades can be avoided thereby.

Therefore printing houses, artists, dentists and dental laboratories appreciate our products very much.

## Health

- needs natural daylight as essential source

Scientific investigations have proved that a lack of natural daylight can have serious effects on health, such as:

- sleep disorders
- headaches
- malaise
- depression

**TRUE-LIGHT®** lamps with their characteristic spectrum of radiation and low levels of UV-A and UV-B – similar to natural daylight – stimulate the metabolism and gland functions. They also have a positive effect on the vegetative nervous system.

For years now, **TRUE-LIGHT®** lamps have been used successfully in the field of light therapy.



Nowadays, a lack of vitamin D is classified as one of the main reason for rachitis at children, osteoporosis as well as amyesthenia.

A chronic lack of vitamin D can cause raised blood pressure, sclerosis, different types of carcinomas as well as insulin-dependent diabetes.

Numerous verified studies prove, that by artificial UV exposure therapeutic successes are monitored at all mentioned symptoms.

An investigation conducted by Dr.-Ing. Mehmet Yeni (TU Berlin) with 36W-T8 True-Light lamps has shown, that "due to UV-A and UV-B exposure by **TRUE-LIGHT®** lamps a vitamin D3 effective exposure rate is produced which is generally considered as beneficial for one's health."

Common fluorescent lamps do not offer this composition.

Hence, an additional burden for the eye is generated what can lead to decreasing concentration and early fatigue. The resulting lack of well-being influences the performance in a negative way.



## ***There are many arguments in favour of TRUE-LIGHT®***

- Investigations and reports of experiences with **TRUE-LIGHT®**

Due to their special properties, **TRUE-LIGHT®** full spectrum fluorescent lamps and their effects have been the subject of many investigations. They offer a light source particularly similar to natural daylight for the specific applications of full spectrum fluorescent lamps.

A number of positive statements and publications from investigations or experience reports confirm their advantages:

*„If we speak about health, balance and physiological control, we refer to the essential health-preserving systems of the body: the nervous system and the endocrine system. These important control centers of the body are directly stimulated and regulated by light – to an extent far exceeding what modern science would have accepted until recently.“*

J. Liberman, oculist: Die heilende Kraft des Lichts – der Einfluß des Lichts auf Psyche und Körper (The healing power of light – the influence of light on psyche and body), Piper-Verlag, München, 1996



*„By now numerous medical investigations have demonstrated that the human organism also needs a minimum degree of radiation containing UV light for a number of bodily functions.“*

K.Stanjek: Zwielight – die Ökologie der künstlichen Helligkeit (Twilight – the ecology of artificial brightness), Raben Verlag, München 1989

*„We have finally realized that light is a nutrient like food, that the wrong light just like the wrong nutrition makes us sick, and that the right light can preserve our health. Research has made a giant step, but there is still a lot left to be done.“*

Dr. John Ott, photobiologist: Risikofaktor Kunstlicht – Stress durch falsche Beleuchtung (Risk factor artificial light – stress by wrong lighting), Knauer-Verlag, München 1989

*„Light stress is the sum of many disregulations of the nervous system, such as irritability, and – depending on the temperament – aggression or melancholy, or exhaustion and reluctance to work. The American space agency NASA drew the consequences from this experience. In the late sixties they have developed the full spectrum lamp with some important improvements in the spectrum as compared to conventional fluorescent lamps: the light color corresponds to sunlight, and the radiation is much more uniformly distributed over the spectrum. The astronauts perform much better, and other users also report improved attention and better moods.“*

Dr. Johannes Holler, internist: Das neue Gehirn (The new brain), Junfermann'sche Verlagsbuchhandlung, Paderborn, 1996

*„Artificial lighting has an influence on the depressive behavior of students during winter months (fluctuations in mood, lack of energy, increasing appetite, irritability and increasing anxiety are indicators of what is called Seasonal Affective Disorder, SAD or winter depression), as it influences motivation for learning. Students exposed to lighting with full spectrum lamps showed a significant decrease in depression and depressive symptoms as opposed to students exposed to cool white fluorescent lamps.“*

W. Tithof: The Effects Of Full Spectrum Light On Student Depression As A Factor In Student Learning  
Dissertation, Walden University, 1998



*„Owing to the good experience with full spectrum lamps, they have now been installed not only in all American Polaris submarines but also in hospitals, sanatoriums, schools, universities and factories, and also at many workplaces and in private rooms as normal lighting for the whole day.“*

Elke Brandmayr, Bodo Köhler: Licht schenkt Leben (Light donates life), Fit fürs Leben-Verlag, Ritterhude, 1997

*„The absence rate due to illness decreased significantly in American elementary school with full spectrum lighting“*

W.London: The Lancet, S. 1205, 1987



*„We have recently realized that we breathe in polluted air, eat poisoned food and drink dirty water. However, we have mostly failed to notice the most obvious nutrient of all – light. „*

J. Liberman, oculist: Die heilende Kraft des Lichts – der Einfluß des Lichts auf Psyche und Körper (The healing power of light – the influence of light on psyche and body), Piper-Verlag, München, 1996

*„Students at an American university working under full spectrum lighting stayed attentive for a longer time and became less tired when doing perceptive tasks.“*

Maas, Jayson, Kleiber:  
Effects Of Spectral Differences In Illumination On Fatigue,  
Journal of applied psychology 59, 1974

*„The incidence of colds decreases with more than 40% in companies and schools equipped with UV-enriched light.“*

R. Küller, Prof. f. Umweltpsychologie (Prof. f. environmental psychology): Non-visual effects of daylight, Daylight Symposium, CIE, Berlin, 1980

*„Children working in classrooms with full spectrum lighting had a caries rate one third below that of children learning in classrooms with normal fluorescent lighting.“*

Sharon, Feller, Burney:  
The Effects Of Lights Of Different Spectra On Caries Incidence, Archives Of Oral Biology 16, No. 12, 1971, S. 1427  
and Dr. John Ott, photobiologist: Risikofaktor Kunstlicht – Stress durch falsche Beleuchtung (Risk factor artificial light – stress by wrong lighting), Knauer-Verlag, München 1989

**For further experiences, investigations and reports please visit:  
[www.true-light.eu](http://www.true-light.eu)**





Type	Watt (W)	Luminous flux (lm/100h)	L. efficacy (lm/W)	Diameter (mm)	Length wo. pins (mm)	Cap	Packing unit (pcs)	Article-No.
<b>True-Light T8 • Natural Daylight 5500K • Colour Rendering Index 1A • Ra96</b>								
15 T8	15	610	41	26	438	G13	25	1015
18 T8	18	1000	52	26	590	G13	25	1035
30 T8	30	1500	50	26	900	G13	25	1065
36 T8-1m	36	2200	61	26	970	G13	25	1043
36 T8	36	2370	66	26	1200	G13	25	1036
38 T8	38	2450	64	26	1050	G13	25	1044
58 T8	58	3850	66	26	1500	G13	25	1038
<b>True-Light T5 HE • Natural Daylight 5500K • Colour Rendering Index 1A • Ra96</b>								
14 T5	14	925	66	16	549	G5	25	1614
21 T5	21	1450	69	16	849	G5	25	1621
28 T5	28	2000	71	16	1149	G5	25	1628
35 T5	35	2500	71	16	1449	G5	25	1635
<b>True-Light T5 HO • Natural Daylight 5500K • Colour Rendering Index 1A • Ra96</b>								
24 T5	24	1300	54	16	549	G5	25	1624
39 T5	39	2300	59	16	849	G5	25	1639
54 T5	54	3400	63	16	1149	G5	25	1654
49 T5	49	3000	61	16	1449	G5	25	1649
80 T5	80	4700	59	16	1449	G5	25	1680
<b>True-Light TC-L • Natural Daylight 5500K • Colour Rendering Index 1A • Ra96</b>								
18 TC-L	18	950	53	37	225	2G11-4p	10	7218
24 TC-L	24	1500	63	37	320	2G11-4p	10	7224
36 TC-L	36	2350	65	37	415	2G11-4p	10	7236
40 TC-L	40	2600	65	37	535	2G11-4p	10	7240
55 TC-L	55	3650	66	37	535	2G11-4p	10	7255
80 TC-L	80	4500	56	37	565	2G11-4p	10	7280
<b>True-Light Compact Fluorescent Lamps with Integrated Electronic Ballast Natural Daylight 5500K • Colour Rendering Index 1A • Ra96</b>								
ESL 15	15	720	48	60	127	E27	10	5015
ESL 20	20	960	48	60	130	E27	10	5020
ESL 23	23	1200	52	60	147	E27	10	5023
<b>True-Light Compact Fluorescent Lamps for operation with External Electronic Ballast Natural Daylight 5500K • Colour Rendering Index 1A • Ra96</b>								
CFL 13	13	720	55	60	113	GX 24q-1	20	7013
CFL 18	18	1150	64	60	125	GX 24q-2	20	7018

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