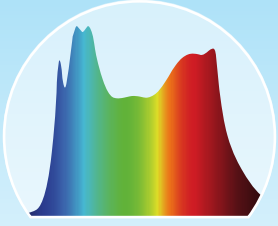
SPECTRASOL
PROCOGNITIVE LIGHTING

PHOTOTHERAPY PANEL



PATENT NO. 308363
PATENTED

Developed and validated in collaboration with

NIMH NATIONAL INSTITUTE OF MENTAL HEALTH

ČVUT UCEEB

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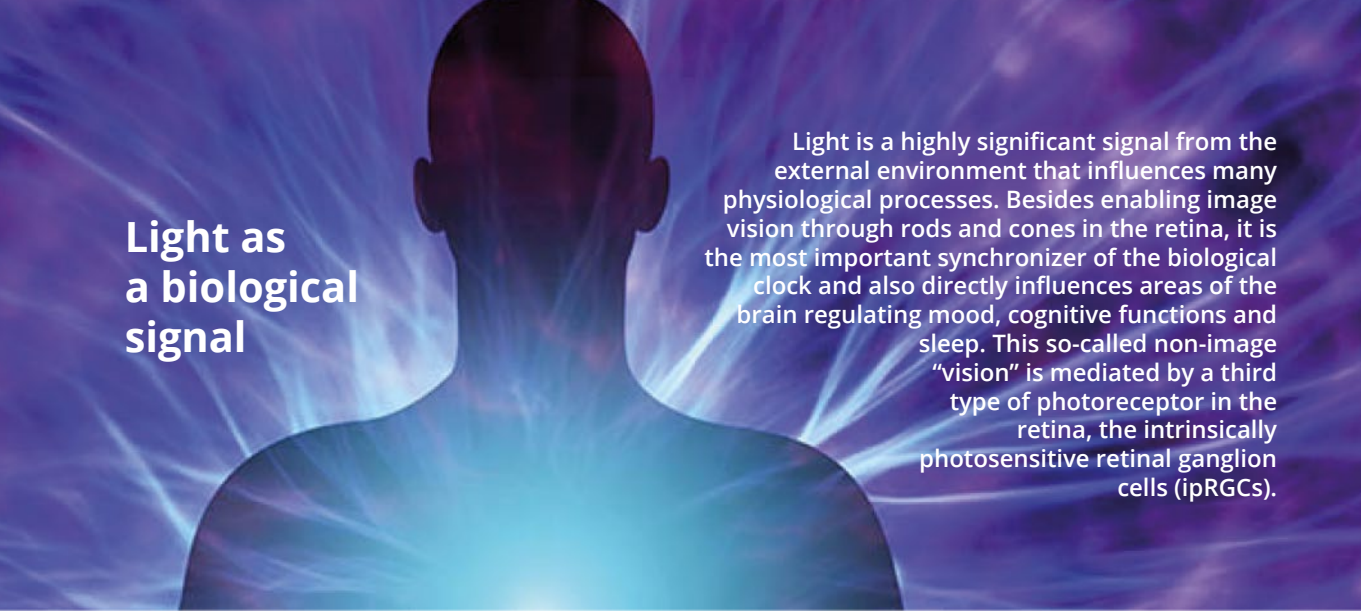
Patented full-spectrum LED technology with unique circadian effect

The development and application methodology of this device were created in cooperation with CTU UCEEB (Czech Technical University - University Centre for Energy Efficient Buildings) and NIMH in project No. FW02020025 funded with the support of the Czech Technology Agency and the Ministry of Industry and Trade of the Czech Republic within the TREND Programme.



Light as a biological signal

Light is a highly significant signal from the external environment that influences many physiological processes. Besides enabling image vision through rods and cones in the retina, it is the most important synchronizer of the biological clock and also directly influences areas of the brain regulating mood, cognitive functions and sleep. This so-called non-image "vision" is mediated by a third type of photoreceptor in the retina, the intrinsically photosensitive retinal ganglion cells (ipRGCs).

Mechanism of phototherapy effect

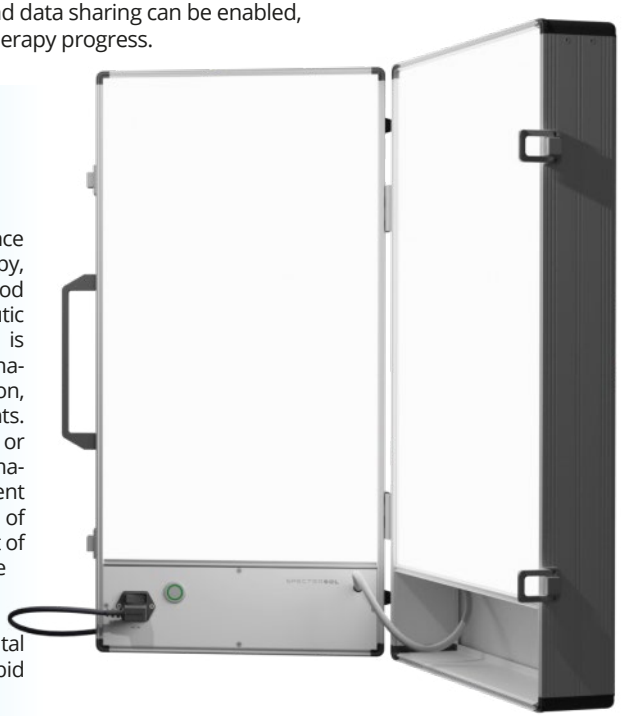
The mechanism of the phototherapy effect is mediated by the ipRGC pathway. These cells form part of the optic nerve and their axons affect many areas of the brain. The dominant part leads to the hypothalamic region that controls circadian rhythms (suprachiasmatic nuclei, SCN). The human circadian clock runs with a genetically determined period typically slightly longer than the 24h length of the solar cycle, according to which social, conventional time is set. In healthy individuals, exposure to daylight during the day is sufficient to synchronize this internal time through phase shifts with the solar cycle, thus adjusting the length of its endogenous period. Disrupted synchronization between the master pacemaker in the SCN and peripheral clocks in other brain structures and peripheral organs, or inefficient light synchronization, tend to be concomitant phenomena of many psychiatric and other illnesses, and may be the primary cause of some disorders. In these cases, phototherapy acts as an amplified synchronization signal that modifies the phase, period and amplitude of circadian rhythms and, as a result, ameliorates symptoms and accelerates the treatment of psychiatric disorders in particular. For people with disrupted circadian systems, the phase-response curve is a useful tool to help find the optimal time for phototherapy to achieve the maximum expected effect. Since morning light is essential for humans to adjust the internal long period, morning hours also tend to be the first choice for the application of light intervention.

In addition to the synchronizing effect of phototherapy on the circadian system, light also has a direct effect on brain structures that regulate cognitive function and mood. In particular, ipRGCs affect the perihabellar nucleus, connected to the lateral habenula, whose neuronal activity is significantly altered in patients with depression and other forms of psychiatric illness. Light also directly influences serotonergic, dopaminergic, and noradrenergic neurotransmission via ipRGCs and their indirect impact on relevant neurons in the brainstem (via the lateral habenula and the dorsomedial nucleus of the hypothalamus).

Spectrasol phototherapy panel

It is designed with the dimensions of a cabin bag to be placed on a table so that its luminous surface is at the eye level of a seated person. It is designed to provide treatment during hospitalization, outpatient care, and during the transition from clinical care to daily life as part of a home application.

- A high therapeutic impact is made possible by the use of Spectrasol Therapeutic's unique light spectrum technology (protected by patent no. 308363) with a high representation of wavelengths in the sensitivity range of ipRGC cells, which act on the circadian system. At the same time, the composition of the spectrum is beneficial for the eyes of the user due to the limitation of harmful blue wavelengths below 450 nm and the content of red wavelengths around 670 nm.
- Compared to other available devices, the device is equipped with an extra-large illuminating area. This makes it possible to create a pleasant environment during therapy without glare for the patient, with the possibility to perform activities during the application (reading, breakfast, working on the computer, etc.).
- The panel is available in two versions - ON/OFF and with remote management. In the version with remote management, the doctor can pre-set the appropriate timing of the therapy and thus adapt the lamp to the individual needs of the client. At the same time, online connection and data sharing can be enabled, so the attending physician is informed about the client's therapy progress.

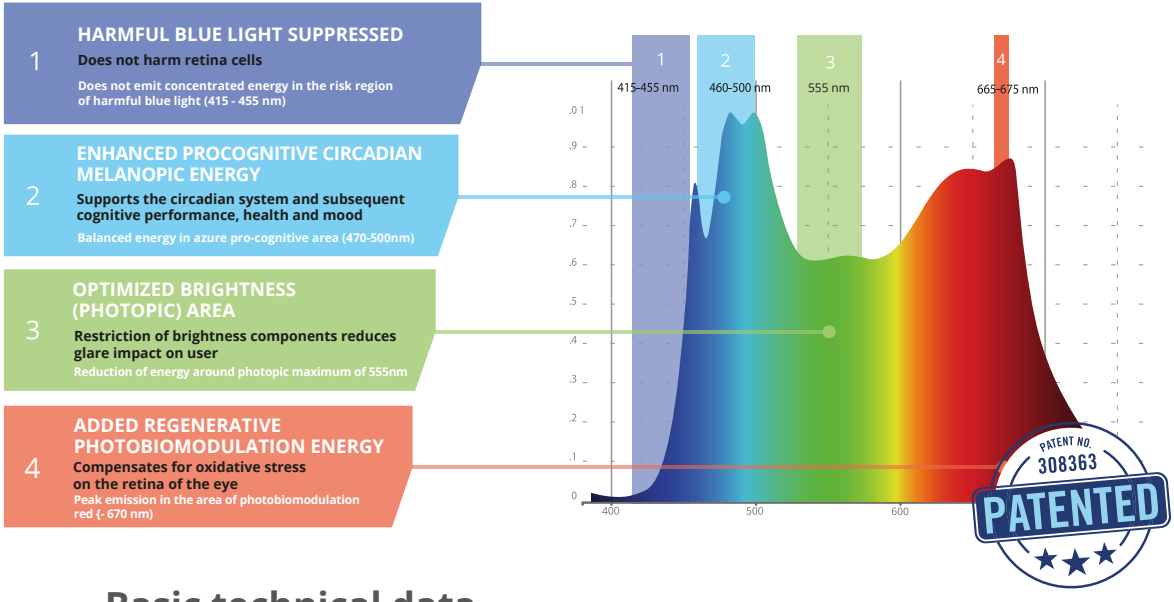


Application of chronobiological phototherapy

Bright light has been used in the treatment of the mentally ill since ancient times. Phototherapy (chronobiological phototherapy, bright light therapy, BLT) as a scientific and therapeutic method began to be used in the 1980s in the scientific and therapeutic treatment of seasonal affective disorder (SAD). Today, it is considered the go-to treatment for this diagnosis, and meta-analyses confirm its effectiveness even in non-seasonal depression, with an effectiveness comparable to that of antidepressants. Light therapy can also be combined with other psychological or pharmacological treatments. Unlike conventionally used pharmacotherapy, phototherapy produces significant improvement within days and can therefore help to bridge the long latency of onset of action of antidepressants. In addition to the treatment of depression, phototherapy is also considered an effective method of treating circadian rhythm sleep disorders and has been successfully applied to a number of other diagnoses - bipolar depression, premenstrual dysphoric disorder, perinatal depression, borderline personality disorder with comorbid depression, Parkinson's disease, Alzheimer's disease, etc.

This phototherapeutic device is intended for treatment provided by specialized physicians and medical professionals only.

Unique spectral composition and key areas of emitted therapeutic light Spectrasol



Basic technical data

Basic dimensions in transport mode	**648 x 355 x 157 mm**
Light area	**535 x 600 mm (3210 cm²)**
Weight	**8 kg**
Input power	**max 40 W**
Relative melanopic device efficiency (melanopic DER)	**0,934**
Photopic luminance *	**3000 lx**
Equivalent melanopic daylight illuminance *	**2750 lx**
Correlated colour temperature (CCT)	**5000 K**
Colour rendering index (CRI)	**>80**

* at the recommended illumination distance of 50 cm

Verified efficacy

The National Institute of Mental Health has verified the efficacy of phototherapy using the Spectrasol phototherapy panel in the following areas:

- **Affective experience and mood**
- **Sleep**
- **Circadian rhythms**
- **Monitoring of patient cooperation**

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The detailed NIMH certified methodology, available as part of the delivery, can be used in the application see. QR link on the reverse side.

The therapy panel is intended for use in particular in the early to late morning. Therapy can only be carried out on the recommendation and as instructed by a specialist doctor or therapist. Violation of these instructions may cause adverse effects on the body.

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Spectrasol.eu - phototherapy

Product information

Certified application methodology - National Institute of Mental Health

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