

## Occupational Safety Screen-based Workplaces



**OCCUPATIONAL  
SAFETY STARTS  
AT YOUR DESK**

**Information about computer eyewear  
for Display Screen Equipment**

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### INFIELD® – Safety Solutions for your protection!

INFIELD® Safety, is a subsidiary of Essilor International SA, the global leader in custom-made, high quality protective lenses based in Paris.

While the use of protective glasses against mechanical influences is very advanced already, the eyes are still mostly unprotected when it comes to people working on display screens on a daily basis. There is still a great need for information, as well as action, when it comes to display screen eyewear.



## What you need to know

### Legal Requirements

The basis for the description of a screen-based workplace is the EU Screen Equipment Directive 90/270/ EWG of 1990. In Germany this is implemented by means of the Regulation on Occupational Health and Safety and the associated investigation G 37.

But also the latest amendment of the 10/23/2013 regulation does not take into account current developments. It merely provides that the relevant employee must be provided with an eye examination (sight test) and corrective eyewear, should the eye examination indicate that correction is required.

The requirements for a modern screen-based workplace is however continually changing. In the meantime, people are often working simultaneously with a second screen, an additional Notebook, or a Tablet not to mention printed documents, handwritten texts, mobile phones and many other types of necessary work equipment.

Every employer should therefore make this a priority based on his general duty of care in terms of screen-based workplaces. The minimum protection imposed by means of the Regulation on Occupational Health and Safety is no longer sufficient and up-to-date as far as this is concerned.

### Small investment, big benefits

Employee illness is expensive. A lost work day costs over € 420.00\*. Individual computer eyeglasses are the perfect solution for supporting employees who are working with a display screen. Stress at the screen-based workplace falls significantly and workplace incidents caused by optical stress are reduced. A decrease in downtime and increased productivity is therefore the logical result.

### Additional Stress

Over 80 % of the working population in Germany spend the majority their work day in front of a screen. More than 90 % of people who are between 40 and 60 years of age use screen devices on a daily basis.



Over 80 % of the working population in Germany spend the majority their work day in front of a screen

With more than 30 000 head and eye movements per day, your eyes, muscles and cervical spine are under stress. Constantly looking at different things, like your screen, the keyboard, and working documents requires continual maximum performance from your eyes. There are individual solutions to cater for such extraordinary stresses on the body.

People from the approximate age of 40, due to their reduced ability to focus on things that are closer in range, are particularly impacted by the potential consequences, and often need an appropriate visual aid.



More than 90% of people between the ages of 40 and 60 use screen devices on a daily basis

The age at which people have to get their first prescription eyeglasses is constantly decreasing. Younger people are now suffering from sight problems. Early detection and support is vital.

The right kind of PC eyewear promotes motivation

# Health Problems & Risks ...

# ... on the screen & PC workstations

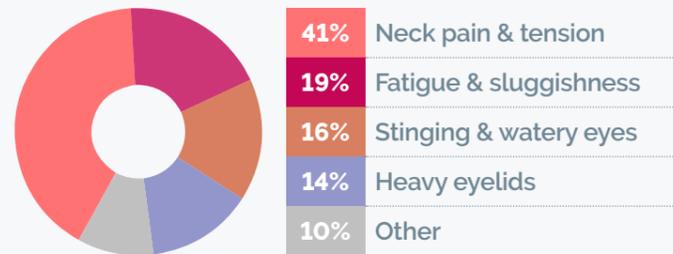
## Disease symptoms\* as a result of intensive screen work

Office-eye syndrome: People who predominantly work in front of a PC, place their eyes as well as the rest of their body under extraordinary stress. Unless preventative measures are taken, asthenopic injuries can result.

### Common symptoms include for example

- Feeling of pressure around the eyes
- Eye twitches
- Temporary blurred vision
- Headaches

### The most common effects of using screen devices ("Asthenopic injuries")



\*Source: Kuratorium gutes sehen e.V.

## Faulty posture resulting from varifocals

The correct sitting position at the screen-based workplace is of enormous importance. People who wear varifocals find this particularly difficult.

The head posture needs to be corrected quite often and in an unnatural manner, in order to be able to focus on the PC screen. This automatically and unconsciously leads to incorrect postures of the head and spine.

## Near-sightedness from screen work

Near-sightedness as a result of close distance work on a display screen can lead to undesired longitudinal development of the eyes. Because of this anatomical change of the eyes, objects that are far away appear rather vague.

This quickly leads to excessive stress and immediately presents a significant potential danger when driving a car, for example. Regular examinations of visual performance are therefore crucial. Near-sightedness can only be corrected by means of a pair of eyeglasses with the appropriate correction. This corrects any possible weakness of the eye that may have developed over time.



Especially for PC workstations one should consider the use of special eyeglasses with low near addition, also for younger people. This relieves the stress on the eyes when working at a close distance and prevents a further increase in near-sightedness.



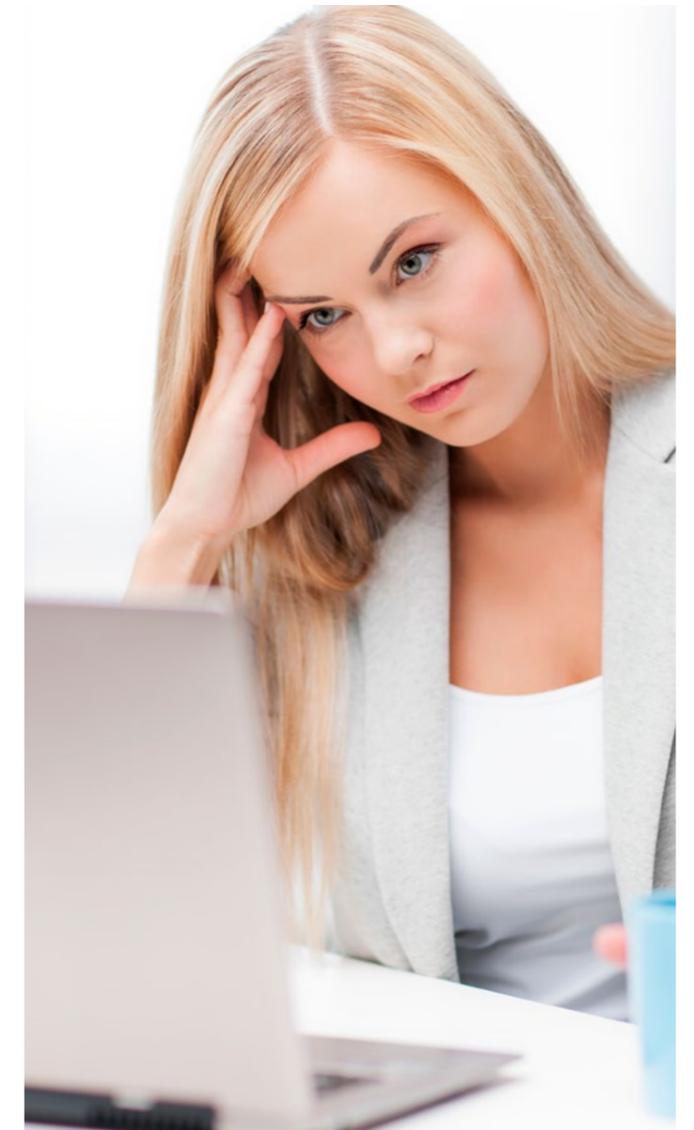
## Premature presbyopia in young people is underestimated

Young people not only work with computers, mobile phones, or tablets during office hours, but also in their free time. The continuous focusing on a short distance places enormous demands on the eyes. There is therefore no break from this - even after a hard day's work in front of the screen.

The eyes are unprotected to these daily stresses. The necessity for a visual aid may therefore already be evident at an early age - but we find that it is usually ignored for long periods of time

## Cornea damage from wearing smooth contact lenses

Cornea damage from wearing smooth contact lenses can be found in the most common so-called neovascularisation. The wearing of smooth contact lenses reduces the oxygen supply to the cornea. This effect is strengthened even more by means a significant reduction in blinking when performing intensive computer work. To compensate for this, the cornea forms blood vessels in an uncontrolled manner. The natural transparency of the cornea is restricted. This significantly hinders the natural viewing process.



# INFIELD Infor Office: Lens design ...

# ... for individual working conditions

## High-Tech eyewear for modern screen-based workplaces

Standard eyewear is well suited to everyday situations. This "everyday eyewear" however is a poor compromise when it comes to the screen-based workplace. The most commonly used are reading glasses and varifocals.

There are better solutions for the constantly rising requirements imposed on modern display screen-based workplaces: **The Infor Office design allows eyewear users to enjoy the best possible performance.**

## Screen-based workplace eyewear with INFIELD Infor Office lens

The visual range relevant for display screen work is decisively widened and the wearer experiences optimal visual relief.

The head and spine perform fewer corrective movements in an attempt to achieve a sharp image in the working area. This then results in a significantly more relaxed and healthier posture at the desk.



## Varifocals

The important visual range for the distance to the screen is normally too narrow. The head posture needs to be corrected quite often and in an unnatural manner, in order to be able to focus on the PC screen.

➔ The supposed "all-rounder" varifocal lens fails miserably when it comes to PC workstations.



## Reading glasses

The normal reading distance is approx. 40 cm. The display screen is usually situated at a distance of approx. 80 cm from the eyes. With reading glasses, one can see very clearly when things are very close but the display screen remains vague.

➔ Conventional reading glasses do not offer any meaningful support at the PC workstation.



## More comfort through personal workplace eyewear with individualised lens design

Eyewear with INFIELD Infor Office lenses are individually adjusted for the most commonly used working distance to the precise centimetre. In addition, the desired distance must be measured in such a manner, that the wearer can enjoy a relaxed head and body posture at the workstation. The desired working distance for this should be somewhere between 40 cm and 1.5 m.

Because of its individual design, Infor Office lenses offer an expansion of the visual range past the working distance that has been determined, the so-called "comfort zone". The eyeglass wearer is also able to see clearly areas apart from the working distance that has been determined\* (Examples 1 & 2).

### Measurement example: "Eyes-screen"

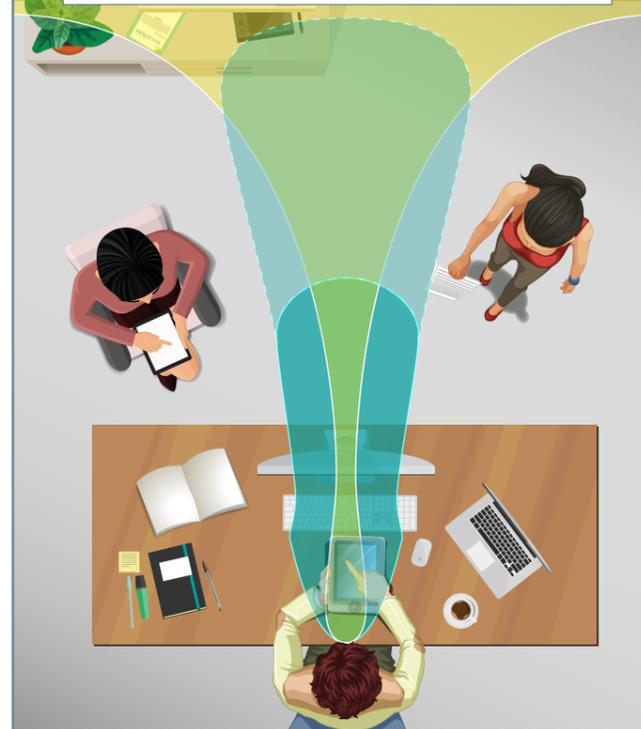
- Relaxed head and body posture
- Slightly downward view towards the middle of the screen



### Example situation 1: "Discussion/Room"

- Most commonly used working distance 1.5 m
- Expanded visual range up to approx. 3 m\*

INFIELD Infor Office vs. varifocals  
Visual range: Infor Office Comfort zone Varifocals



### Example situation 2: "PC work"

- Most commonly used working distance 80 cm
- Expanded visual range up to approx. 1 m\*

INFIELD Infor Office vs. varifocals  
Visual range: Infor Office Comfort zone Reading glasses



Clear and relaxed vision for between 0.4 and 3 metres

\* Expanded visual range / comfort zone is dependent on eyesight and the desired distance

## Young Office keeps your eyes fresh

### INFIELD Young Office - the workplace lens for younger people

The demands placed on our eyes have undergone significant changes in modern times. Through nature, our vision is designed to help us focus on things that are at a distance. When we do that, the muscle that is responsible for aiding focus is in a relaxed state (accommodative muscle). However, in our daily lives we are mostly confronted with things that are closer to us.

The daily use of Mobiles, Tablet and PC's places an increased demand on the eyes. We constantly have to focus on things that are at varying closer distances to us. The accommodative muscle is subject to a constantly alternating tension. This in turn leads to fatigued and burning eyes and is sometimes also the cause of blurred vision.

A subsequent effect can also be that the eyes are forced into an undesired longitudinal development. This would generally relieve the eyes when an object is close, but at the same time leads to blurred vision when objects are far away. This near-sightedness must later be corrected by means of the appropriate eyewear.

### Noticeable eye relief

In order to prevent all this from happening, the INFIELD Young Office lens is equipped with a slight near vision support in the lower area. The eyes are noticeably relieved and the negative symptoms for vision of nearby objects is minimised.

In the same way as with the INFIELD Infor Office lens, the INFIELD Young Office lens comes standard with our BlueProtect - blue filter coating.

**Relaxed vision at the PC-screen with INFIELD Young Office**



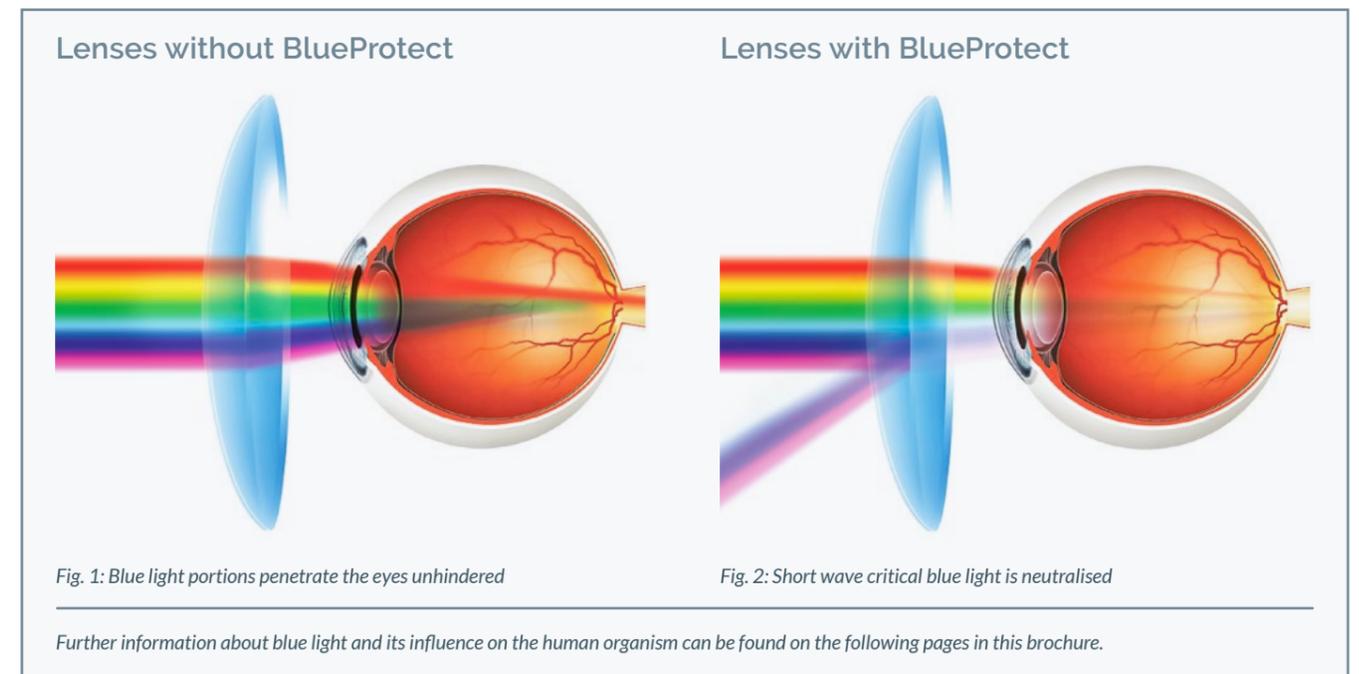
## BlueProtect – blue filter coating

### Changes in working & everyday conditions for our eyes

Today almost every screen-based workplace has an LED-flat screen. This includes laptops, Tablets, PC's, LED TV's and smart phones, all of which are used intensively on a daily basis. All these technical devices are operated with LED background lighting and have an unnaturally high portion of blue light. A high level of blue light has a negative influence on the human biorhythm.

### BlueProtect - Standard with all "Office-Eyewear lenses"

The INFIELD BlueProtect - coating technology filters out critical short wave blue light and prevents the potential dangers. The colour perception is not affected and contrasts can be seen clearly. The benefit is clearer vision and an improved visual comfort over a period of many years.



### BlueProtect including super anti-reflective & Hard coating & Cleaneffect

This coating combination offers even more. Wearers get a clear and fatigue-free vision, because disorders such as reflections and mirror images are clearly reduced. The lenses are more resistant against influences from the environment as well as heavy use and is especially easy to clean and maintain.

**BlueProtect protects the eyes from excessive amounts of blue light**

## BlueProtect for everyone



### Blue light takes its toll on everyone

But how do you protect your eyes from too much blue light if you are not wearing any eyewear in your everyday working situation?

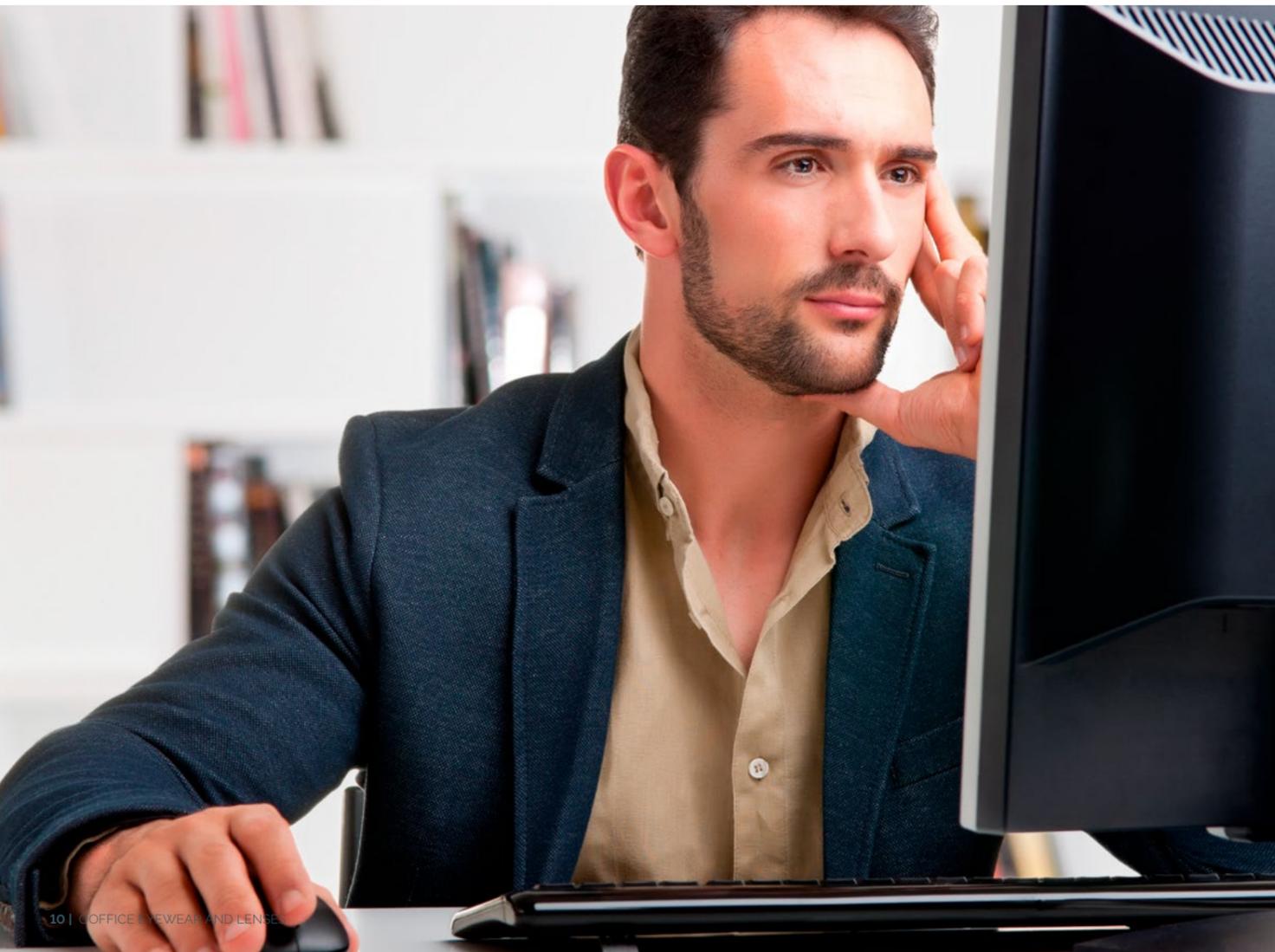


### It is so simple: Plano BlueProtect – The eyewear for all those who don't need corrective lenses

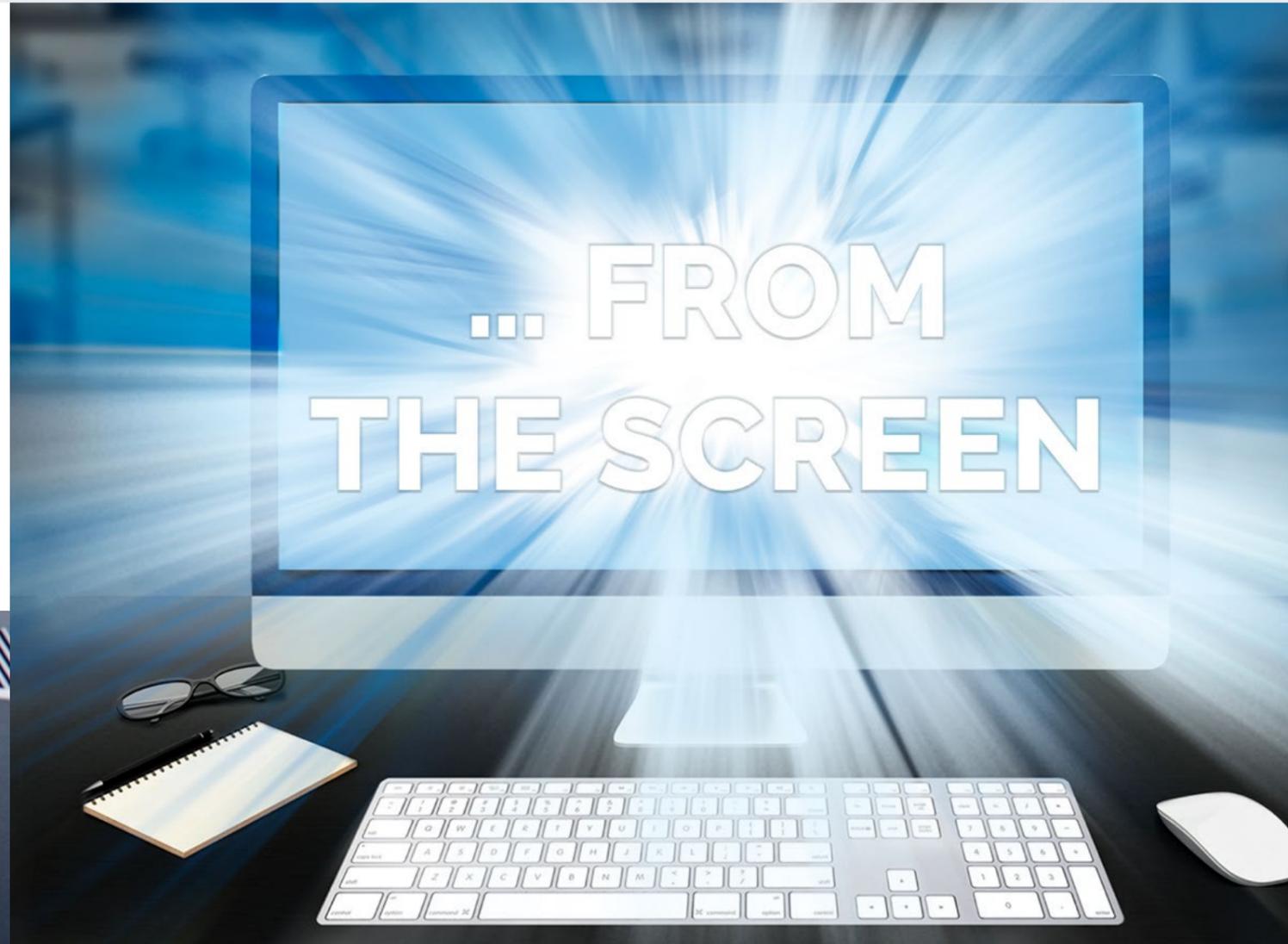
Total protection against too much blue light in eyewear without eyesight correction. For protection against risks and their consequences, such as for example sleep disruption and excessive stress.

Every model in our Office Eyewear collection is available as "Plano" design with **BlueProtect Blue Filter Coating**. That is eyeglasses WITHOUT optical correction but with blue filter.

Plano BlueProtect – computer eyewear WITHOUT optical correction



## Blue light – The constant danger ...



**Blue light – The constant danger emanating from the display screen. Scientific studies prove the dangers of blue light for humans. Over the last 10 years, users have experienced an increasing level of disequilibrium when it comes to their biorhythm.**

Causes of this include the extended use of highly effective and energy saving LED technologies that are increasing on a daily basis in computers, tablets, smart phones, and TV's.

#### *The impact of blue light on our body*

Daylight consists of a colour spectrum, in which all the colours are represented, the so-called spectral colours. The colour blue is strongly amplified. (Fig. 1 – next page). Blue light is perceived positively by the eyes and

then signals the brain to be alert, leading to physical activity.

#### *The daily rhythm of life on earth has adjusted to the sunlight*

We as people are therefore very active when the sun is shining. Any deviation from the natural daylight however has a direct impact on our biological equilibrium. Light is an important facet of life as our body is full of light sensitive cells.

# Blue light – The constant danger ...

*Visual perception is controlled by the retina of the eyes.*

The retina processes the incoming light by means of a multitude of light sensitive cells and channels it to the brain as image information. It consists of multiple cellular layers, among others the sensitive Melanopsin Ganglion Cells. The highest sensitivity of these cells are in the blue range. These photo receptors are not only responsible for visual perception, but also con-

nected to a number of areas in the brain, in particular the Epithalamus in the area of the Pineal Gland. With this gland the sensitive Melanopsin Ganglion Cells directly influences the distribution of the hormone Melatonin.

**Melatonin as control unit for the biorhythm**

Melatonin is a hormone that controls the human biological rhythm. The melatonin level in the blood slowly increases as it gets dark and signals to the body the natural propensity for sleep. The melatonin level falls again the next morning, as its production is inhibited by daylight.

**Blue light while doing your everyday work but also in your free time**

Today almost every screen-based workplace has an LED-flat screen. This includes laptops, Tablets, PC's, LED TV's and smart phones, all of which are used intensively on a daily basis. All these technical devices operate with LED background lighting. These omit an unnaturally high portion of blue light (Fig. 2).

**PORTION OF BLUE LIGHT IN VARIOUS LIGHT SPECTRUMS**

FIG. 1: SPECTRAL DISTRIBUTION OF DAYLIGHT

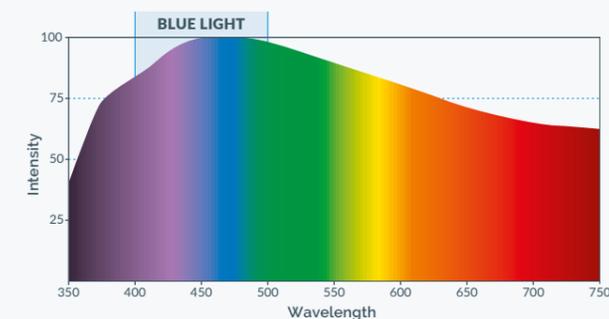


FIG. 2: SPECTRAL DISTRIBUTION OF AN LED

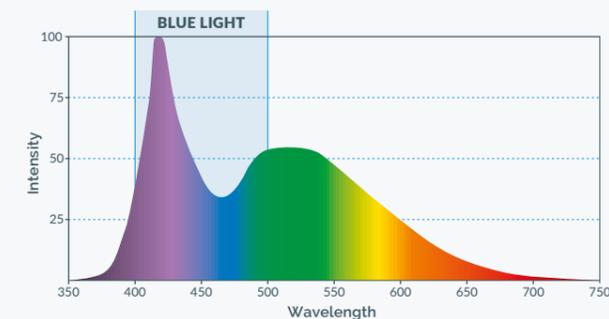
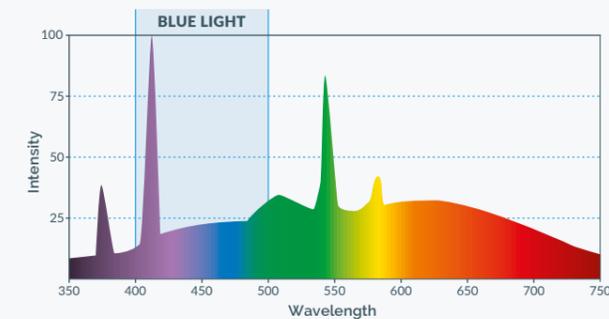


FIG. 3: SPECTRAL DISTRIBUTION OF A FLUORESCENT LAMP



# ... from the screen



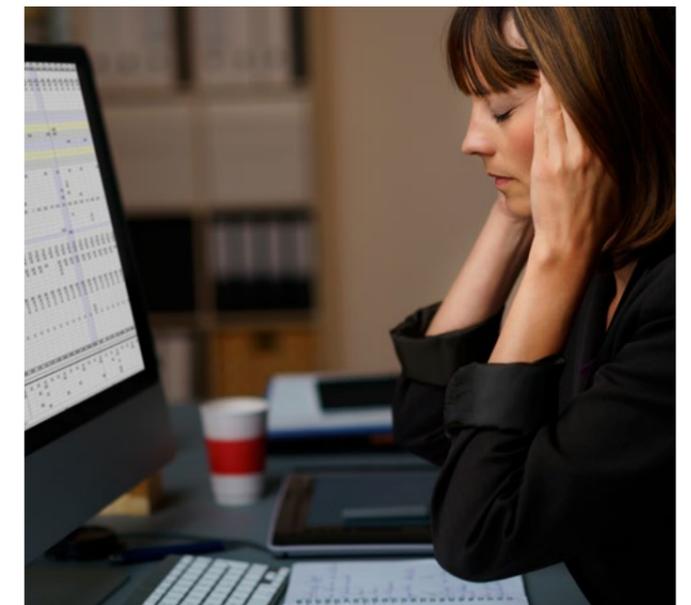
You only have a low portion of beneficial red light, which has a regenerative effect. Red light promotes the cell regeneration in the human body, whilst blue light opposes it. Many offices and work spaces are illuminated by fluorescent lighting; this also emits a high portion of blue light. (Fig. 3).

under artificial light. This flooding with blue light tricks the body into thinking it is daylight, the production of melatonin is hindered, and the biorhythm of the body changes. The natural propensity for sleep is

**Over 1/3 of the German population suffers from sleep disruption**

**What this means for us as people**

Suppression of melatonin production leads to distortions of the biorhythm! According to studies by the Federal Statistics Office, around 80% of the working population in Germany spend the majority of their work day in front of a computer. This may even extend into the evening hours, where one is working



## Blue light – continued

suppressed and the body reacts in an unnatural way, leading to stress symptoms and sleep disruption.

### *Damage to the retina as a result of intensive blue light stress*

The eyes are exposed to uninterrupted optical irritation. Everything that we observe directly, is displayed on the macula of the retina. The macula is the most important part of the retina. With the largest density of photo receptors, it is able to resolve the finest point of human vision. The photo receptors outside the macula and on the periphery of the retina are for ambulatory vision. The non-visible UV rays are, to a large extent filtered out by the eye lenses in a natural manner, while the blue light can penetrate the eyes almost unhindered.

### *When working with LED displays we focus on a source of blue light for hours on end.*

This blue light portion has an oxidizing effect on the photo receptors of the retina, in particular on the macula and can, in cases of intensive blue light stress even destroy the photo receptors. Experts believe that this can cause irreparable damage to the entire retina over time and also promote Age Related Macula Degeneration.

### *AMD – Age Related Macular Degeneration*

This eye disease is the main cause of severe visual impairment in persons above approximately 60 years of age. Photo receptors that have been destroyed leave behind a blacked out area within the range of vision. The larger the area of the destroyed photo receptors is, the larger the observed blind spot. Advanced Age Related Macular Degeneration can even lead to blindness.

### *Conclusion*

As shown in this article, blue light, because of its strong influence on the distribution of melatonin, is actually a control unit for the human biorhythm. Too much blue light can disturb the sensitive system of the phases of wakefulness and sleep.

This often results in a shorter and restless sleep duration, which then does not provide the body with sufficient recovery time. The physical stress and the susceptibility to mental stress increases.

This needs to be protected against. On the one hand, it is important to think about one's behaviour in terms of using modern screen devices. On the other hand, one should look at enforcing the use of the latest eyewear lens technology.



## PC / Laptop computer eyewear



## EYEWEAR FASHION IN THE OFFICE

Besides the most modern eyeglass technology available we also offer a wide range of quality and comfortable eyewear designs. The multitude of materials, colours and shapes follow current fashion trends. In our collection, every wearer can easily find a suitable model to suit them and their screen-based workplace.

Plastic frames



Model: D1B1 DBLU Size: 53-18



Model: D1B1 HAV Size: 53-18



Model: E2C4 RED Size: 49-17



Model: E2C5 BLU Size: 52-17



Model: E2C5 HAV Size: 52-17



Model: E2C5 RED Size: 52-17

Plastic frames



Model: A 1002 C2 Size: 50-16



Model: A 1003 C2 Size: 52-17



Model: B 2001 C2 Size: 52-15



Model: B 2003 C1 Size: 53-16



Model: F3A1 BUR Size: 51-17



Model: B 2003 C3 Size: 53-16



Further tips for healthy vision at the screen-based workplace

- 👍 Conscious blinking of the eyes
- 👍 Take breaks when working on the computer
- 👍 Ensure sufficient lighting
- 👍 Distance to screen approx. 60-80 cm
- 👍 Relieving the eyes by means of regularly focussing on distant objects
- 👍 Select the screen distance and height in such a manner, that a comfortable head posture is achieved



Model: F3A1 HAV Size: 51-17

Nylor frames

Metal frames



Model: D1C3 BLU Size: 52-19



Model: D1C3 SIL Size: 52-19



Model: F3B3 BRN Size: 53-17



Model: F3B3 PUR Size: 53-17



Model: H3 B5 BLUTUR Size: 55-16



Model: B 2006 C1 Size: 52-17



Model: 5103 C1 Size: 52-17



Model: 5103 C2 Size: 52-17



Model: D1D2 GUN Size: 54-18



Model: D1D2 DBLU Size: 54-18



Model: D1D3 BLK Size: 55-18



Model: B 2011 C4 Size: 60-17



# Products for Occupational Safety and More

## Safety glasses and protective eyewear

The custom-made protective glasses of INFIELD meet the highest material-specific requirements. In development we also place the emphasis on both functionality as well as an appealing design. We also offer the possibility to have our protective glasses fitted with custom-made corrective lenses in order that the user is still guaranteed the best possible vision. For further information, please request the brochure for protective glasses from INFIELD.



## Outdoor and sports eyewear

For many years now, INFIELD protective glasses have been worn outside the workplace. Outdoor eyewear from INFIELD meet the same high demands as all our protective products. They impress with light, unbreakable materials, sporty designs and individual style and are available in the widest variety of colours. While they are especially suitable for all outdoor sports, they can in fact be used for anything where you need clear vision and eye protection during your free time activities. Some models can also be manufactured with corrective lenses based on the particular needs of the user.



## Individualized hearing protection

Perfect fit and low cost - INFIELD also offers individually adapted solutions for hearing protection. Customised ear moulds are manufactured for a wide range of applications and a variety of attenuating filters can be fitted, best suited to the environment in which they will be used. Thanks to long life durability of approx. 4 - 5 years, life costs can be much reduced when compared to conventional standard solutions. For further information, please request a customised hearing protection brochure from INFIELD Safety.



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SAFETY