# HOW CAN LIGHT INCREASE PRODUCTIVITY & WELLNESS

## What you can't see can hurt you

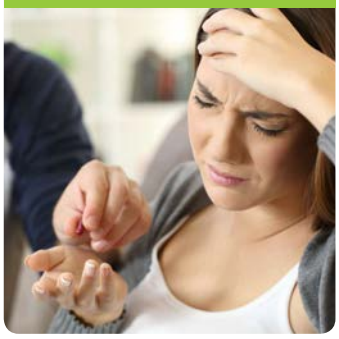
**The human eye can detect visible flicker below 90Hz. Flicker above our visual threshold may not be able to be seen by the human eye but this flicker is registered by our nervous system.**

**Whilst you may not be able to see the light flicker, your brain can still perceive it and it can cause multiple neurological problems depending on a persons sensitivity. Some of the side effects are migranes, eye strain, decrease in productivity and an increase in behavorial issues.[1]**

**Flicker impacts workplace safety as well as productivity. It can affect the comfort of work spaces and our overall health and emotional wellbeing.**

## Common neurological impairments from light flicker

### MIGRAINES



25-50% of migraine sufferers identified flicker as a trigger.*2

### DECREASE IN PRODUCTIVITY

Prolonged exposure to flickering light can contribute to a decrease in concentration and a lack of productivity and fatigue.*3

### INCREASE IN BEHAVIOURAL ISSUES

People suffering from Autism Spectrum Disorder (ASD) can have increased behavioral issues due to flicker.

### EPILEPTIC SEIZURES

A visible flicking light can cause epileptic seizures in susceptible people.

*1 IEEE. "IEEE Recommended Practices for Modulating Current in High-Brightness LEDs for Mitigating Health Risks to Viewers".
*2 L. Debney, "Visual stimuli as migraine trigger factors," Progress in Migraine Research, pp. 30-54, 1984.
*3 Veitch, J. A., & Newsham, G. R. "Lighting quality and energy-efficiency effects on task performance, mood, health, satisfaction and comfort." Journal of the Illuminating Engineering Society, 27(1), 107-129.

# OPTICAL FLICKER IN LIGHTING

## What you can't see can hurt you

The most common cause of flicker is the fluctuation in the power supply. The grid supplies AC power to offices and other buildings whilst the electrical device plugged in converts the AC to DC power.

Optical flicker is caused by the AC power changing direction, this results in the voltage changing direction with the current and the light then fluctuates or visually turning on and off.

Temporal light artefacts are the visual effects that change the way that we see our surroundings, triggered by a light source. Temporal light artefacts are divided into three different categories: flicker, stroboscopic effect and phantom array.

Not all LED panels are created equal... The drivers that assist with the AC current conversion to DC, sometimes may cause a ripple effect on the DC power supply which can result in flicker. How much flicker is influenced almost entirely on the driver design.

***Driver design reduces harmful effects from flicker***

enLighten's Skyline panel is low glare and flicker free. The high-quality driver delivers a flicker free, isolated and constant current power supply and this helps to reduce light flicker.

## WHERE COULD YOU BE AFFECTED?

### Offices

Poor lighting and lighting flicker can contribute to the 3pm slump. Sitting under flickering light can cause headaches, eye strain and loss of productivity.

### Classrooms

The effects from flicker in a classroom can contribute to a student and/or teacher's inability to concentrate and it also affects productivity. Flicker can cause headaches and eye strain. For those who suffer from Autism Spectrum Disorder, flicker can lead to an increase in behaviorial issues.

### Fast-moving machinery

Stroboscopic effect can be caused from flicker, this changes the way we see moving parts, they appear to move slower than they actually are. This could be dangerous when working with heavy machinery.

## DESIGNED TO PERFECTION

## SKYLINE OUTPERFORMS THE REST

# TIPS FOR CHOOSING THE RIGHT PANEL

- Choose a flicker free, isolated and constant current driver and stop any neurological impairments from flickering panels.
- Ensure the Light Guiding Plate (LGP) is made from PMMA (polymethyl methacrylate). This will prevent the yellowing of the light. Inferior materials like PS (polystrene) will turn yellow within 1 to 2 years due to UV aging.
- Don't let your lights fall out of the ceiling, choose a product with a reinforced back plate. Ensure your back plate is BUILT TO LAST.
- Check the structure of the light and ensure the LGP has a buffer between it and the LEDs, without an air gap the LEDs may get damaged and a shift in colour can occur. Who wants ceiling lights that look like a patchwork quilt?
- Choose a low glare panel with even light and heat distribution.

# SKYLINE

IPART VEET

## ULTRA LONG LIFE SPAN >120,000 HOURS

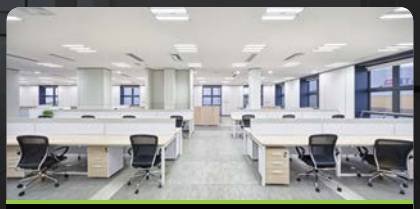
UP TO 67% ENERGY SAVINGS

BUILT TO LAST

>90% LIGHT UNIFORMITY

DOUBLE EDGE LIT PANEL

FLICKER FREE



LOW GLARE UGR<19

**DON'T GET CAUGHT OUT**

*"It would be easy to select cheap inferior panels to sell... but there is little point in replacing all your lights to do it all again in 1-2 years time and this time at your cost. Choosing the right product first time has never been so important, there are a lot of cheap inferior products on the market at the moment. Don't get caught out."*

**Steve Cahill, CEO enLighten**

# INVESTING IN PEOPLE MEANS
# INVESTING IN GOOD OFFICE LIGHTING

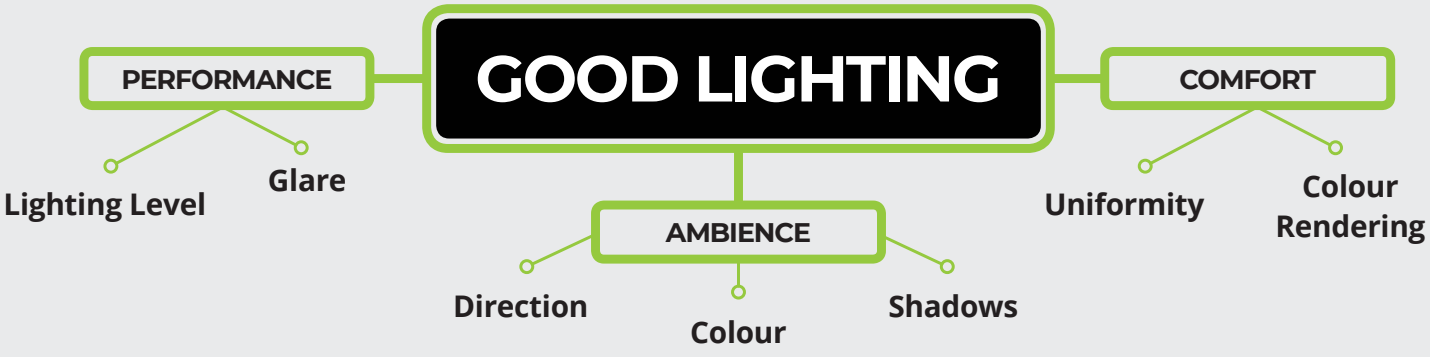
In a commercial office building, it's important to get the lighting right to create a comfortable and safe working environment. It is essential to use the right lux levels for the task at hand and to consider glare index.

## Best practice office and lighting design can

| ↑ 16% | ↑ 24% | ↓ 52% | ↑ 15% |
|---|---|---|---|
| Increase in productivity | Increase in job satisfaction | Decrease in accidents when spaces are well lit | Increase in comfort |

*Impact of Design Series, Vol.1 American Society of Interior Designers*

## UNDERSTANDING HOW IT WORKS: IMPROVE PRODUCTIVITY, EMPLOYEE MOODS AND VISUAL ACCURACY.



# OFFICE , EDUCATION FACILITIES, WORKSHOPS AND LIBRARIES

Recommendations as per AS 1680

| Entrances | LUX | MAX UGR |
|---|---|---|
| Entrance halls, lobbies, foyers | 160 | - |
| Waiting rooms | 160 | 19 |
| Enquiry desks | 320 | 19 |

| Circulation areas | LUX | MAX UGR |
|---|---|---|
| Corridors, passageways, ramps | 40 | - |
| Stairs | 80 | - |

| Staff canteens, cafeteria, dining room | LUX | MAX UGR |
|---|---|---|
| General | 160 | - |
| Counters | 240 | - |

| Staff rooms | LUX | MAX UGR |
|---|---|---|
| Changing rooms, locker rooms | 80 | - |
| Cloakrooms | 80 | - |

| First Aid Centres | LUX | MAX UGR |
|---|---|---|
| Treatment rooms | 320 | 19 |

| Toilets | 80 | – |
|---|---|---|

| Control and monitoring rooms | LUX | MAX UGR |
|---|---|---|
| – *Intermittently monitored* | 240 | - |
| – *Continuously monitored* | 320 | 19 |

| General tasks involving typing, reading and writing | LUX | MAX UGR |
|---|---|---|
| Task | 320 | 19 |
| Background/environment | 160 | 19 |

| Screen based tasks | LUX | MAX UGR |
|---|---|---|
| Keyboards | 160 | 19 |
| Reference material<br>– *Good, simple* | 240 | 19 |
| – *Average detail* | 320 | 19 |
| – *Poor, fine detail* | 600 | 19 |
| Background environment | 160 | 19 |

| Drafting offices | LUX | MAX UGR |
|---|---|---|
| Drawing board | 600 | 19 |
| Reference material<br>– *Good, simple* | 320 | 19 |
| – *Poor, fine detail* | 600 | 19 |
| Background environment | 240 | 19 |

*Higher lux levels (>400 lux) may require localised task lighting in addition to general lighting

# OFFICES, EDUCATION FACILITIES, WORKSHOPS AND LIBRARIES

Recommendations as per AS 1680

| Meeting rooms | LUX | MAX UGR |
|---|---|---|
| Meeting rooms | 320 | 19 |
| Training rooms, seminar rooms | 240 | 19 |
| Conferring rooms, boardrooms | 240 | 19 |

| Photocopying and printing rooms | LUX | MAX UGR |
|---|---|---|
| Intermittent | 160 | 25 |
| Sustained, collating, colour copying | 240 | 19 |

| Filing areas | LUX | MAX UGR |
|---|---|---|
| Sorting<br>*– Simple, clear detail* | 240 | 19 |
| *– Difficult, fine detail* | 320 | 19 |

| Auditoriums | LUX | MAX UGR |
|---|---|---|
| Assembly halls – general use | 160 | 19 |
| Social activity | 80 | 19 |
| Examinations | 240 | 19 |

| Conference rooms | LUX | MAX UGR |
|---|---|---|
| Video conferencing<br>*– Conference table* | 600 | - |
| *– Rear Wall* | 160 | - |

| Classrooms | LUX | MAX UGR |
|---|---|---|
| General use | 240 | 19 |
| Laboratories | 320 | 19 |
| Lecture rooms | 240 | 19 |
| Music rooms | 320 | 19 |
| Reading rooms | 320 | 19 |
| Sewing rooms<br>*– General* | 320 | 19 |

| Libraries | LUX | MAX UGR |
|---|---|---|
| Audio listening areas | 160 | 19 |
| Audiovisual areas | 240 | 19 |
| Book stacks | 240 | 19 |
| Individual study areas | 320 | - |
| Circulation desk | 320 | 19 |

*Higher lux levels (>400 lux) may require localised task lighting in addition to general lighting

# SKYLINE

## ULTRA LONG LIFE SPAN >120,000 HOURS

LED PANEL LIGHTING FOR OFFICES & SCHOOLS

UP TO 67% ENERGY SAVINGS

FLICKER FREE

>90% LIGHT UNIFORMITY

LOW GLARE UGR<19


### FLICKER & GLARE FREE

The Skyline panel is engineered to give you a uniform, low glare and flicker free light to ensure the highest level of lighting comfort.

### SUPERIOR OPTICAL DESIGN

**>90% LIGHT UNIFORMITY**

Achieves up to 92% light transmission through a high quality internal PMMA light guiding plate.

There is no yellowing of panels over time, so your fitting will remain attractive for years to come.

### BUILT TO LAST

Superior design with an edge-folded backplate & welded frame for strength and durability.

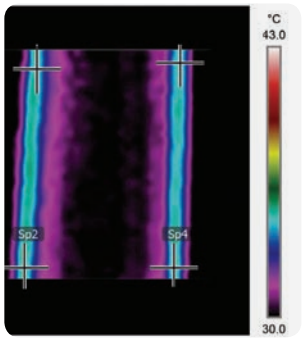
Skyline is a slim lined LED panel designed to achieve the Australian Standard lux levels (AS 1680) for the office and school environment.


### QUICK & EASY RETROFIT

Quick and easy to install the Skyline panel has flexible mounting options such as surface, recessed and suspended mounting options.

### AIR GAP PROTECTED LEDS

Designed to perfection the double interior frame uses two spacers, one offering protection against LED crushing and the second for expansion of the Light Guide Plate under heat.




### DOUBLE EDGE LIT PANEL

Cooler temperatures are achieved using LEDs on both sides, this ensures a longer lifetime for the panel.

Skyline has been designed to last.

enLighten
Innovation in Lighting Solutions

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enLighten

Innovation in Lighting Solutions

5 YEAR WARRANTY

# SKYLINE

## DOUBLE EDGE LIT LED PANEL

Outperform. Outlast.

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