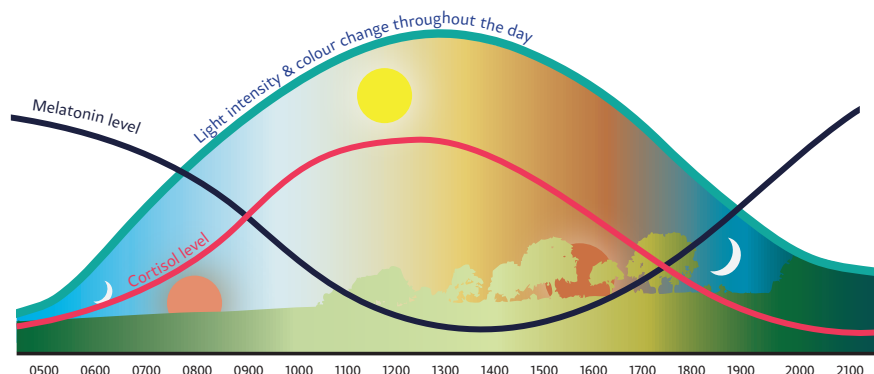


Lighting for Health and Wellbeing

Light plays an important part in our health and wellbeing. In the past, this was dictated by the natural rhythms of daylight and the changing seasons. In today's society, we spend up to 90% of our time indoors and thus are profoundly affected by artificial light, which can disrupt the body's natural rhythms.

Our biological clock or circadian rhythm is determined by the quality and quantity of light we are subjected to at certain times throughout the day. Biodynamic lighting mimics the daily variations of daylight through a control system, varying from cool white when we wake up to a warmer light when we are preparing to go to sleep, thus helping to preserve a healthy sleep/wake cycle.

Serenity Lighting® offers a range of biodynamic luminaires, drivers and control systems, which are ideal for delivering biodynamic, customisable, controllable and healthy lighting with no flicker.



Dawn – a good start

Cool and increasing light levels raise energy levels

Day – lunch and refresh

Cool to warm & decreasing light levels maintain energy levels

Dusk – relax & unwind

Warm, decreased light levels. Increased melatonin production.

Throughout the day, the intensity and colour of natural light is changing. Our eyes detect these changes, which affect our alertness and sleep/wake pattern through the release of melatonin.

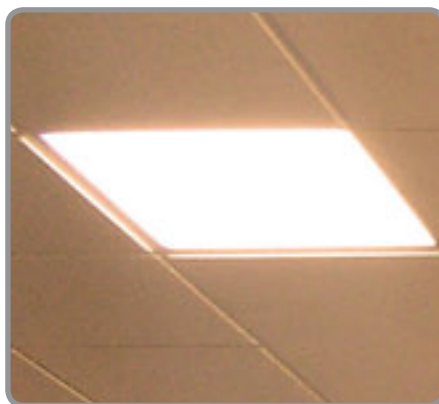
You can see the effect of natural light conditions on melatonin levels. Higher melatonin levels = more desire to sleep.

Biodynamic Lighting Design

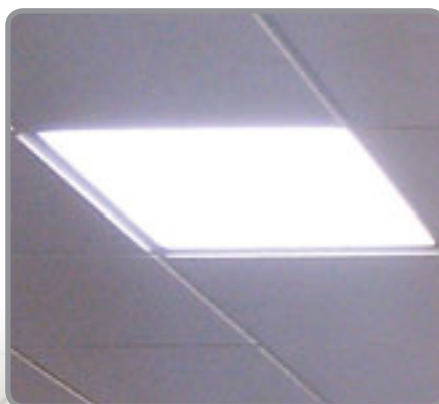
Serenity's DynaWhite® biodynamic lighting solution mimics the daily variations of daylight via a lighting control system, varying from cool white at the start of the day to warmer light when preparing to go to sleep.

Daylight access is not always possible in every indoor space, but artificial light with controllable colour and intensity can replicate the benefits generated by natural light.

In-depth research has proven that careful design of biodynamic lighting systems to replicate daylight patterns can have a positive impact on our health, wellbeing and mood. This in turn leads to increased human alertness, activity, productivity, as well as patient recovery & relaxation. Not only does biodynamic lighting hold potential benefits for dementia care and healthcare in general, but offers far-reaching benefits in other sectors, such as education and office environments.



2700K



5700K



BIODYNAMIC LIGHTING BENEFITS

- Improved sense of wellbeing
- Better sleep patterns
- Increased alertness & productivity
- Assists relaxation or stimulation
- Improved mood
- Assists mental & physical recovery
- Helps energise at the right times
- Reduces anxiety and confusion
- Conducive to learning
- Flicker-free, healthy lighting

NHS Case Study: Biodynamic Lighting for Dementia Care

In a first for the NHS, Serenity Lighting® has recently completed a ground-breaking PFI lighting installation in several NHS dementia wards. Installation of tuneable or 'biodynamic' white LED panels offers not only an energy efficient and cost effective lighting solution, but more importantly 'healthy lighting' compared to alternative artificial light sources.

THE PROBLEM:

Dementia patients in several care units across the NHS were experiencing disrupted sleep patterns, thought to be as a result of the dominance of poor quality artificial lighting in corridors, patient rooms and communal areas, which is widely documented to be detrimental to natural biological rhythms. Armed with the research and knowledge that good quality lighting can assist with patient sleeping patterns, mood, behaviour and even analgesic medication use, the NHS sought to introduce better quality lighting, with the following aims:

AIMS:

- help regulate patient sleep patterns by 'bringing natural daylight indoors'
- improve the patient healing environment
- improve the patient experience and staff satisfaction
- enhance the reputation of the hospitals
- replace inefficient, standard fluorescent light fixtures with high efficiency, long-life, flicker-free LED lighting
- provide a low maintenance, cost-effective solution
- install user-friendly control system

THE SOLUTION:

Serenity Lighting® installed highly efficient Dynawhite® 600x600mm colour tuneable surface mount LED panels in dementia wards across various NHS sites. The ceiling panels were installed in communal areas, corridors, assisted bathrooms,

as well as a number of bedrooms. The intensity and colour of the white LED lighting was set automatically to mimic natural daylight patterns, in order to preserve the natural triggers generated by exposure to daylight and all the positive healing benefits associated with good quality lighting and a good night's sleep.

In addition to the white LED panels, Serenity Lighting® installed LED linear strips to produce 'colour walls' within a number of patient bedrooms, bathrooms and communal areas. Patients in these rooms now have the ability to control the colour scheme in their room to suit their mood via a control device, thereby assisting relaxation, improving patient comfort, and the overall patient experience.

Further aesthetic improvements to the sites include the installation of colour changing LED spots within the garden areas, which are also designed to enhance psychological wellbeing.

THE BENEFITS:

Healthy Lighting:

The lighting upgrade not only means a vastly improved patient experience, but also promises **health benefits** for patients, visitors and staff alike.

- **Maintains Circadian Rhythm:** patients' biological rhythms are improved as they would be after natural daylight exposure
- **No Flicker:** Serenity®'s patented technology eliminates the flicker, which can sometimes be associated with other LED lighting solutions on the market
- **Improved Psychological Wellbeing:** Coloured 'mood' lighting can improve psychological well being, aid relaxation and improve the overall patient experience

Saving Carbon & Cutting Costs

- At over 100lm/W luminaire efficiency, the Dynawhite® Quadrum panels are amongst the most energy efficient LED panels on the market, offering a significant carbon saving on large scale projects
- Centralised power supplies and emergency racks reduce commissioning time and installation costs
- Rack-mounted installation allows easy access for any future maintenance



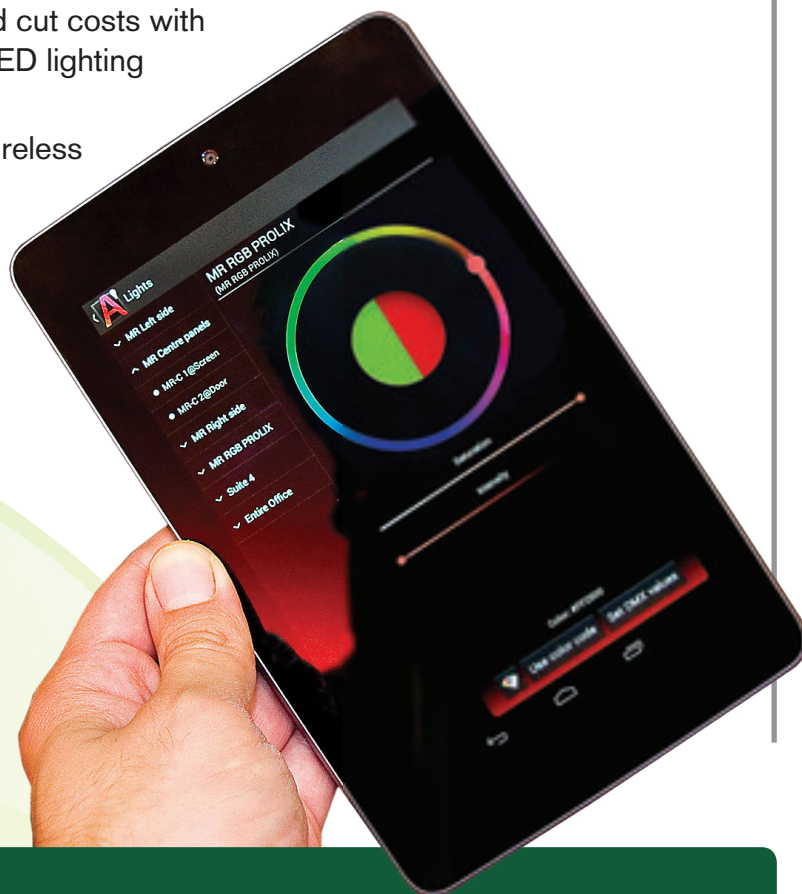
Serenity Lighting

Supporting Clients' Needs

Serenity Lighting® is a vertically integrated designer, manufacturer and installer of biodynamic lighting fixtures, power supplies and lighting control systems. The design & technical teams work with clients from the initial brief and site appraisal right through to system design, installation and commissioning of each project.

ADVANTAGES OF WORKING WITH SERENITY LIGHTING®:

- Specialists in 'healthy lighting': no flicker
- Unrivalled technical knowledge of biodynamic lighting solutions
- In-house design and UK manufacture of the entire lighting system ensures full compatibility (LED lighting fixture, LED power supply, lighting control system)
- Ability to solve complex end-user requirements
- Save carbon and cut costs with highly efficient LED lighting systems
- Highly secure wireless control systems
- Controls and sensors optimise energy efficiency



The Serenity Lighting® Project Management Approach:



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