

Well24™ Dim-to-FlameWarm

LED Flexible Strip

Introduction & Datasheet

Applications

- Architectural lighting
- Residential lighting
- Healthcare lighting



Features

- Extreme human circadian efficiency
- Ultra-smooth regulation for dimming to FlameWarm
- Consistent and precise color
- 24V DC, 168 LEDs per meter, can be cut every 12 LEDs (71.4mm)
- 5000mm (length) × 10mm (width)
- Improved adhesive backing for easy installation

[About Yuji Lighting](#)

Rev Version: 2.2

F3230023.00

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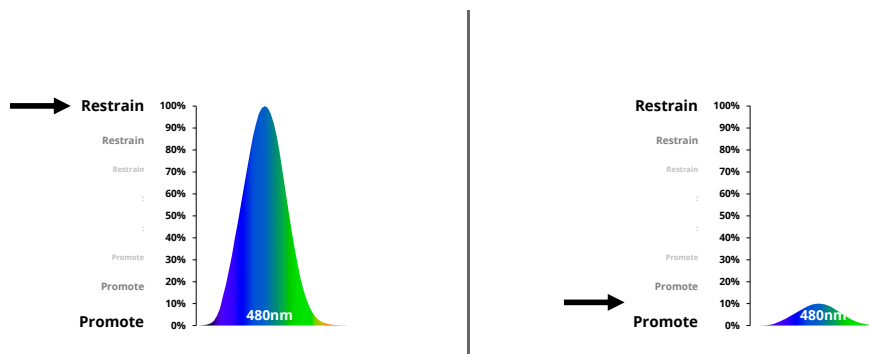
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Introduction



Welcome to the Yuji Lighting Well24™ family

Yuji Lighting [Well24™ technology](#) aims to provide the effective circadian rhythm stimulus lighting for both focusing and relaxing by the well-designed spectral engineering technologies. Unlike the visual sensitivity of 555nm, the intrinsically photosensitive retinal ganglion cells (ipRGCs) perceive the light wavelength at 480nm (typical) which affects the secretion of melatonin, and melatonin determines the circadian rhythm directly. A high-level radiance at 480nm will restrain the melatonin secretion hence making us alert and focused, and a low-level radiance at 480nm is helpful for relaxation or pre-sleep.



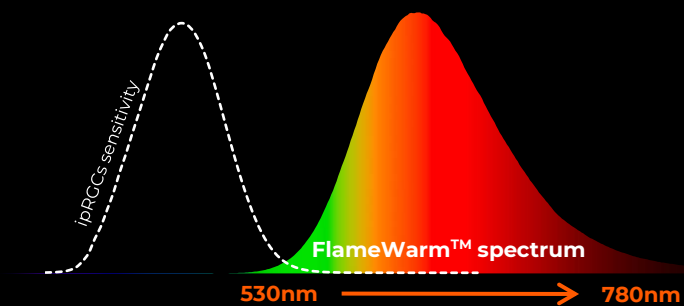
Focusing on providing the effective solution of circadian rhythm regulation, the Yuji Lighting Well24™ family has different spectral designs and products for different targeted lighting applications for night light, relax light, concentration light etc. With the specific designs and achievements of M/P ratio, M-DEI, M-DER...the Well24™ family will benefit for great experience of wellbeing lighting.

FlameWarm™ – the photon melatonin inside the spectrum

FlameWarm™ is a spectrum technology created by Yuji Lighting for achieving the extreme effect for cozy and relax lighting based on the circadian rhythm regulation theory, it is the light you can see by your eyes but it never “wakes up” your brain.

Reduce blue light

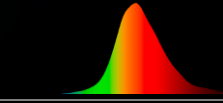
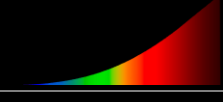
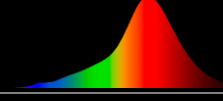
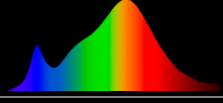
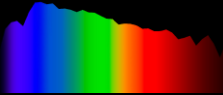
The broad-band design of the FlameWarm™ spectrum covers from 530nm to 780nm containing green, yellow, orange and deep-red wavelengths and reduces the blue light significantly which eliminates the risk of blue light hazard essentially.



Melanopic/Photopic* matters & FlameWarm™ ≤ 0.099

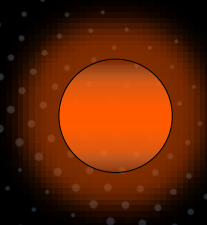
The Melanopic/Photopic (M/P) ratio measures the stimulative or suppressive of melatonin secretion from a light. M/P ratio is a scientific and objective index to evaluate if your light holds back or helps with your relaxation. With the FlameWarm™ technology we successfully achieve the M/P ratio down to 0.099 - even much lower than a candle, bringing the incomparable effect of super-low circadian rhythm stimulation than any light in the world – whatever the natural light or artificial light.

* Compliant to **CIE S 026/E:2018**: CIE System for Metrology of Optical Radiation for ipRGC-Influenced Responses to Light.

Spectrum	Light source	M/P	Circadian rhythm stimulation %
	FlameWarm™	≤ 0.099	≤ 10%
	Candle	0.278	28%
	1800K LED	0.304	30%
	3000K LED	0.552	55%
	Daylight	1.097	110%

Scientific color design of FlameWarm™

The color of light is relevant to the vision and psychology every much. During the experiments of the simulated color, our scientists picked carefully the most rational dominant wavelength and same as the real flame, making the light natural and comfortable. Peaked at 600nm, typical correlated color temperature of 1250K (for reference only) and the 16-digital color is #FF5A00, FlameWarm™ is similar to PANTONE 16-1358 TCX Orange Tiger.



The visual color of FlameWarm™



PANTONE color

Dim-to-FlameWarm



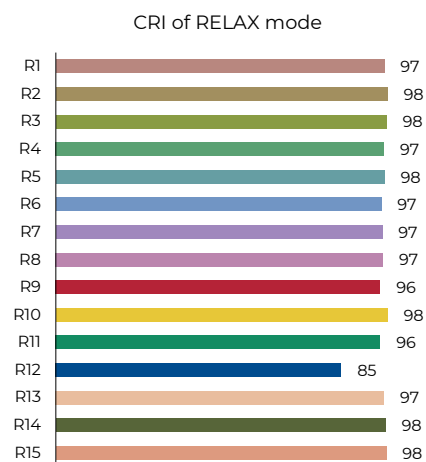
This unique Dim-to-FlameWarm LED solution is a specially designed tunable LED with optimized dimming process, and it is applied as a flexible strip to achieve the full compatibility for different lighting environments.

DEEP-SLEEP mode: FlameWarm™ technology LED

When activating the DEEP-SLEEP mode, there are 84 individual FlameWarm™ LEDs in every meter starting to work alternately to create the extremely dimmed and relieved lighting environment, which is the most ideal night light for pre-sleep or even already deep sleep status.

RELAX mode: 98 CRI grade of full spectrum quality LED

When activating the RELAX mode, there are another 84 individual 98 CRI LEDs in every meter will starting to work alternately to create the bright, excellent color quality and healthy light at 3000K as the incandescent lighting quality.



Reference of the progress of Dim-to-FlameWarm

According to the references of CCT & M/P ratio changing process, the Dim-to-FlameWarm will be experienced as from a halogen light environment to a super-warm candle or fireplace environment with sensitive switch without losing any color quality.

Light source	Typical CCT	M/P ratio ↓
Daylight	6500K	1.12
Standard LED	3855K	0.82
Sunset	3000K	0.67
Incandescent lamp	2810K	0.64
Dim-to-FlameWarm RELAX mode	3000K	0.57
Halogen	2785K	0.55
Candle	1910K	0.28
Dim-to-FlameWarm DEEP-SLEEP mode	1250K	0.099

Unique dimming method for ultra-smooth regulation

Unlike a standard bi-color LED strip, this Dim-to-FlameWarm LED strip simplifies the connection and control as only one pair of positive/negative anodes of 2-pin design with the help of high precision transistors. Thus it can be controlled by a standard driver but both brightness and color adjustments are achieved simultaneously.

In addition, with the optimized method, the dimming from the RELAX to DEEP-SLEEP mode performs ultra-smooth, which does not bring any abrupt effect compared to a general Dim-to-warm product on the market. Yuji Lighting Dim-to-FlameWarm technology makes the whole dimming process naturally.

General Dim-to-Warm solution with abrupt effect.

Warming



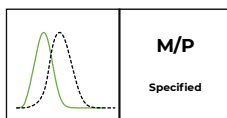
Dimming

Yuji Lighting ultra-smooth Dim-to-FlameWarm solution.

Optimized design of the flexible strip

This Dim-to-FlameWarm strip has also optimized in designs including introducing 3oz copper electrodes, 1% accuracy resistors, high precision transistors and 0.4mm spacing between neighboring emitters in a pair, which eliminates the visible light spots during the dimming process, and a variety of PWM compatible controlling units of DALI, TRIAC, or 0/1-10V dimmers.

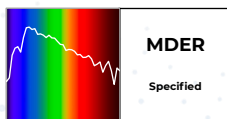
The Dim-to-FlameWarm flexible strip also supports the unique service/certification by Yuji Lighting as described below.



M/P
Specified

M/P ratio specification

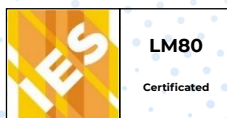
For comparing the circadian effect between the ipRGC sensitivity and photopic vision.



MDER
Specified

MDER specification

For evaluating the circadian effect of the melanopsin secretion based on the [CIE S 026/E:2018](#).



LM80
Certificated

IESNA LM-80-08 certification (LED)

9000 hours data of chromaticity shift and TM-21 reported L70 lifetime at 55°C, 85°C and 105°C.



**Simple
Binning**

SimpleBinning specification

Simplify the chromaticity binning with TrueChroma data support to provide the most economical, simple, and practical solution to customers.

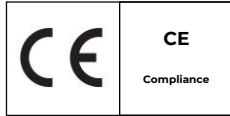


Photometric data

Luminous intensity distribution and illuminance data for simplifying the lighting design.



RoHS 2011/65/EU compliance



CE compliance



REACH compliance (Phosphor)

Datasheet



Ordering information

PRODUCT CODE	VOLTAGE (DC)	DESCRIPTION	CCT
F3230023.13	24V	Well24™ Dim-to-FlameWarm	3000K – 1250K

Characteristics

Electrical-optical characteristics ($T_A = 25^\circ\text{C}$, 24V DC)

PARAMETER	SYMBOL	VALUE			UNIT
		MIN.	TYP.	MAX.	
Power per meter⁽¹⁾	P	-	-	16.8	W
Forward current per meter	I_f	-	-	0.70	A
Correlated color temperature	CCT _{DEEP-SLEEP}	-	1250 ⁽²⁾	-	K
	CCT _{RELAX}	-	3000	-	
Luminous flux per meter	$\Phi_{\text{DEEP-SLEEP}}$	-	-	1200	lm
	Φ_{RELAX}	-	-		
M/P ratio (M-EER)⁽³⁾	M/P _{DEEP-SLEEP}	-	0.099	-	-
	M/P _{RELAX}	-	0.571	-	
M-DER⁽³⁾	M-DER _{DEEP-SLEEP}	-	0.084	-	-
	M-DER _{RELAX}	-	0.519	-	
Color rendering index (RELAX MODE)	R _a	-	98	-	-
TCS R9 (CRI red) (RELAX MODE)	R ₉	-	90	-	-
View angle	$2\theta_{1/2}$	-	120	-	Deg

(1). Unless otherwise noted, specifications are based on a 1 meter segment. Due to electrical resistance, power draw per meter decreases approximately by 0.05A for each additional meter increase per segment.

(2). Only for reference.

(3). M/P ratio (Melanopic/Photopic ratio) - also known as M-EER (Melanopic Equal-Energy Efficacy Ratio) and M-DER (Melanopic Daylight Efficacy Ratio) are based on [CIE S 026/E:2018](#).

Temperature

PARAMETER	SYMBOL	VALUE			UNIT
		MIN.	TYP.	MAX.	
Case	T_C	-20	-	85	°C
Ambient	T_A	-20	-	40	
Storage	T_S	-20	-	50	

Thermal data

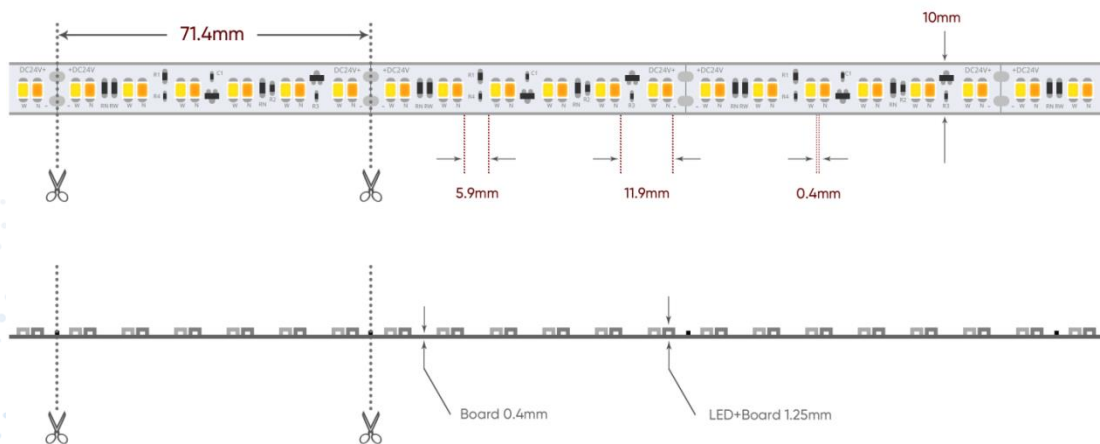


Condition and recommendation:

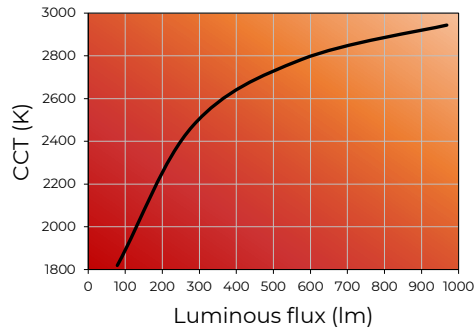
1. Ambient temperature 25°C, hung in the air without a heatsink.
2. The test devices are thermocouple and infrared imagery.
3. Test after 20 minutes at the hottest spot of the strip.
4. The temperature is typical 67.7°C.
5. The heatsink is not necessary.

Dimension drawing

Tolerance unless mentioned is ±1mm.

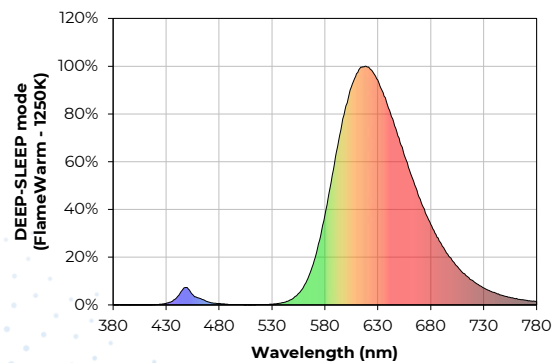
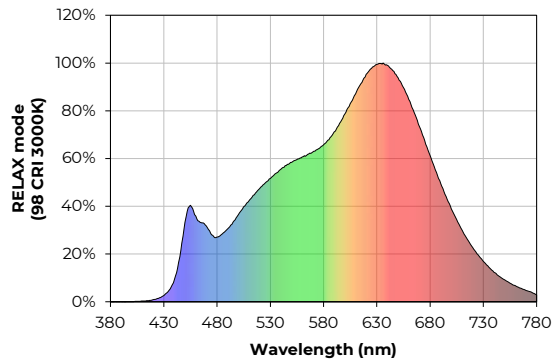


Dimming curve



Characteristic graph

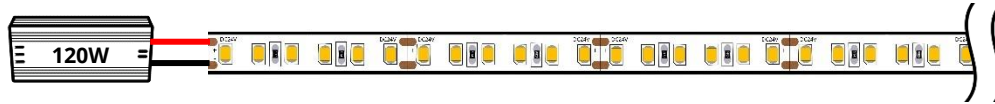
Typical spectral power distribution (normalized)



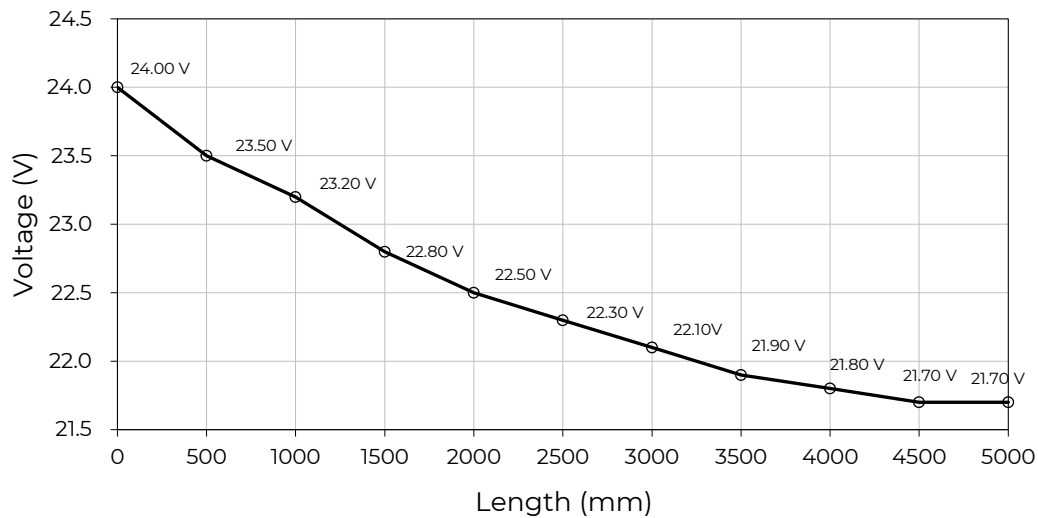
Characteristic graph

Connection and derating (one reel of 5000mm)

Single-ended side connection



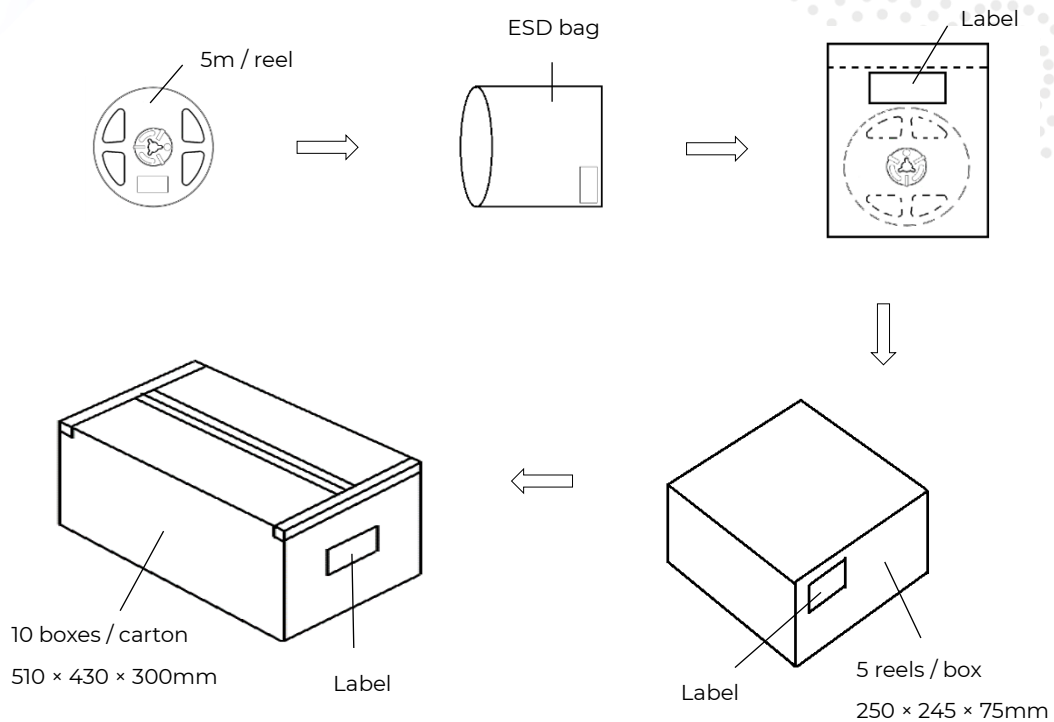
All characteristic curves are for reference only and not guaranteed.



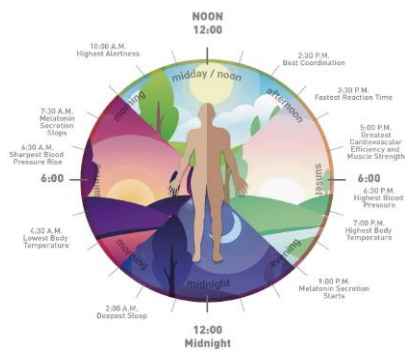
Additional notes

- Selecting a power supply**
 The wattage / amperage requirement is directly proportional to the length of LED flexible strip installed. Calculate the power requirement by multiplying the total length in meters by the maximum wattage or amperage per meter. For additional power supply stability, we recommend specifying 20% additional power capacity above the requirement. For example, a 5 meter length would require 5 meters x 20 W / meter = 100W; for power supply stability, we would recommend a power supply that is capable of supplying at least [100W + 20% x 100W].
- Dimming**
 Compatible to PWM, DALI, TRIAC, or 0/1-10V dimmers.
- Heat management**
 Heatsinking is not necessary if product is used in standard indoor environments where ambient temperatures do not exceed 50°C. Our testing at $T_A = 25^\circ\text{C}$ shows LED solder point temperatures stabilizing at 68°C. Maximum allowed LED solder point temperature is 105°C.

Box packaging



- Each inner box contains up to 5 reels (total maximum length is 25m). Box package size: 250 mm × 245 mm × 75 mm.
- Each outer package contains 10 inner boxes. Box size: 510 mm × 430 mm × 300 mm.
- Outer package is sealed with protective bubble wrap and foam. (Part numbers, lot numbers, quantity should appear on the label on the moisture-proof bag, part numbers).
- This packaging merely intended as a reference for standard quantity orders only – please note that actual packaging can differ depending on the order circumstances.

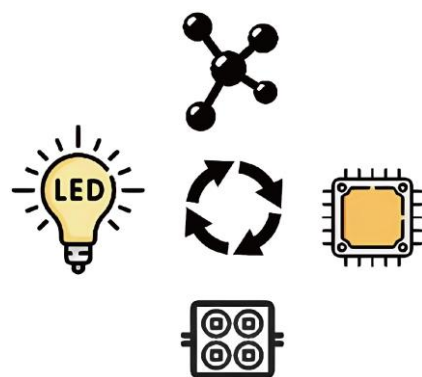


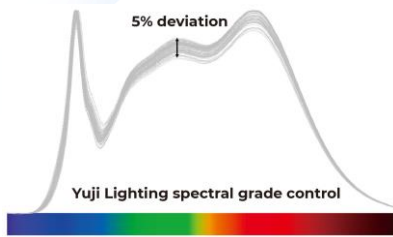
Innovating for Wellness

Since our inception in 2006, Yuji Lighting has been at the forefront of LED technology, dedicated to enhancing the journey to wellness through lighting. Our passion for excellence and deep understanding of light's impact drives us to create technologies that harmonize with natural rhythms, enhance daily experiences, and soothe the senses.

Mastery in Light Craftsmanship

Our meticulous control over the LED manufacturing process, from phosphor production to the final assembly, grants us the ability to shape light like no other. We develop countless LED spectra with innovative designs which cover an extensive range of applications, ensuring the extraordinary fidelity in color and lighting quality.





Spectral Precision in Light Quality Control

Yuji Lighting excels in spectral precision, limiting LED deviation to a mere 5%—significantly tighter than the typical 25%. This stringent standard minimizes color inconsistencies, ensuring each Yuji LED emanating true, reliable hues.

HSE - Health, Safety and Environment

We follow the concept of HSE standard by regulating all Yuji Lighting products with:

- Flicker index below 0.001;
- Risk Group Zero (RG0) from IEC62471;
- Recyclable materials.

Our commitments support the sustainable well-being for our customers.



Contact us - We look forward to providing our efficient service for you.

LED lighting website: www.yujilighting.com

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