

PHASE**ONE**E

IMAGING BEYOND IMAGINATION

Phase One D8 R+ LED Panel

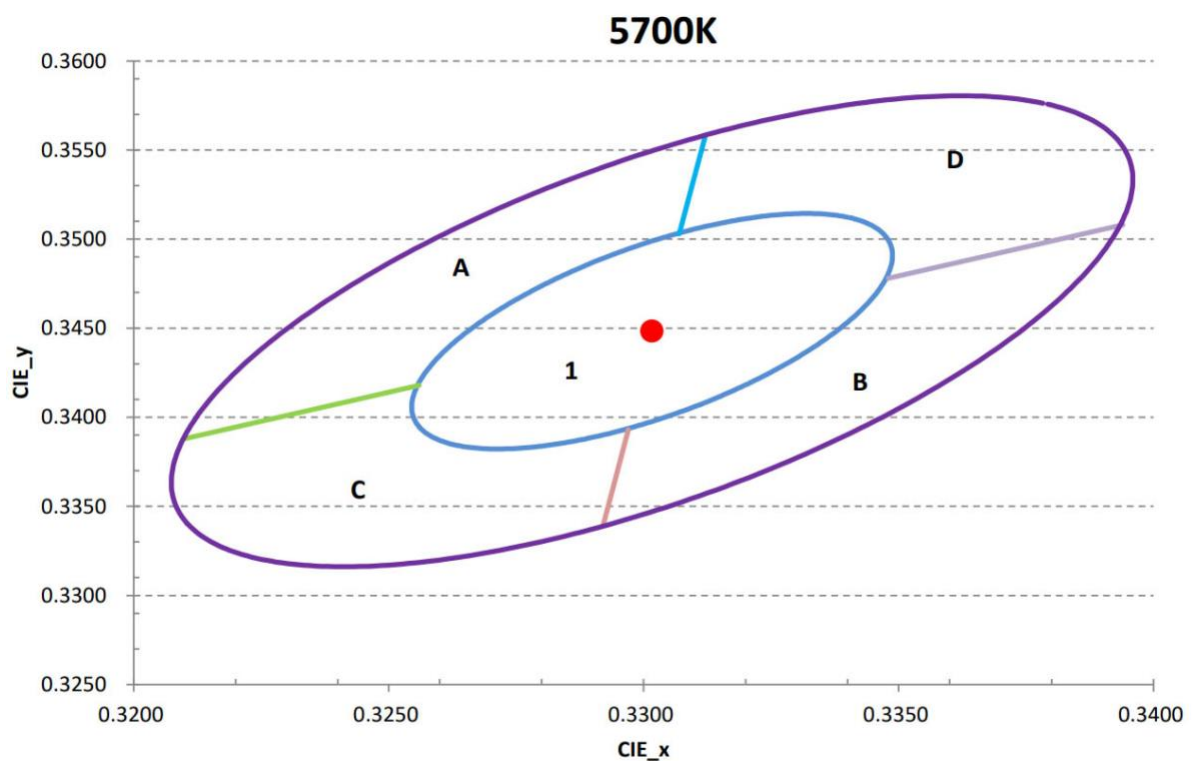
White Paper

The Phase One D8 R+ LED Panel is a high quality LED light source designed for exacting colour reproduction in Cultural Heritage digitization projects.

Using best in class components, the D8 R+ LED Panel delivers flicker free, constant light. Built on many years of technical expertise, experience and knowledge of lighting systems, the D8 R+ LED Panel delivers a remarkably stable light source.

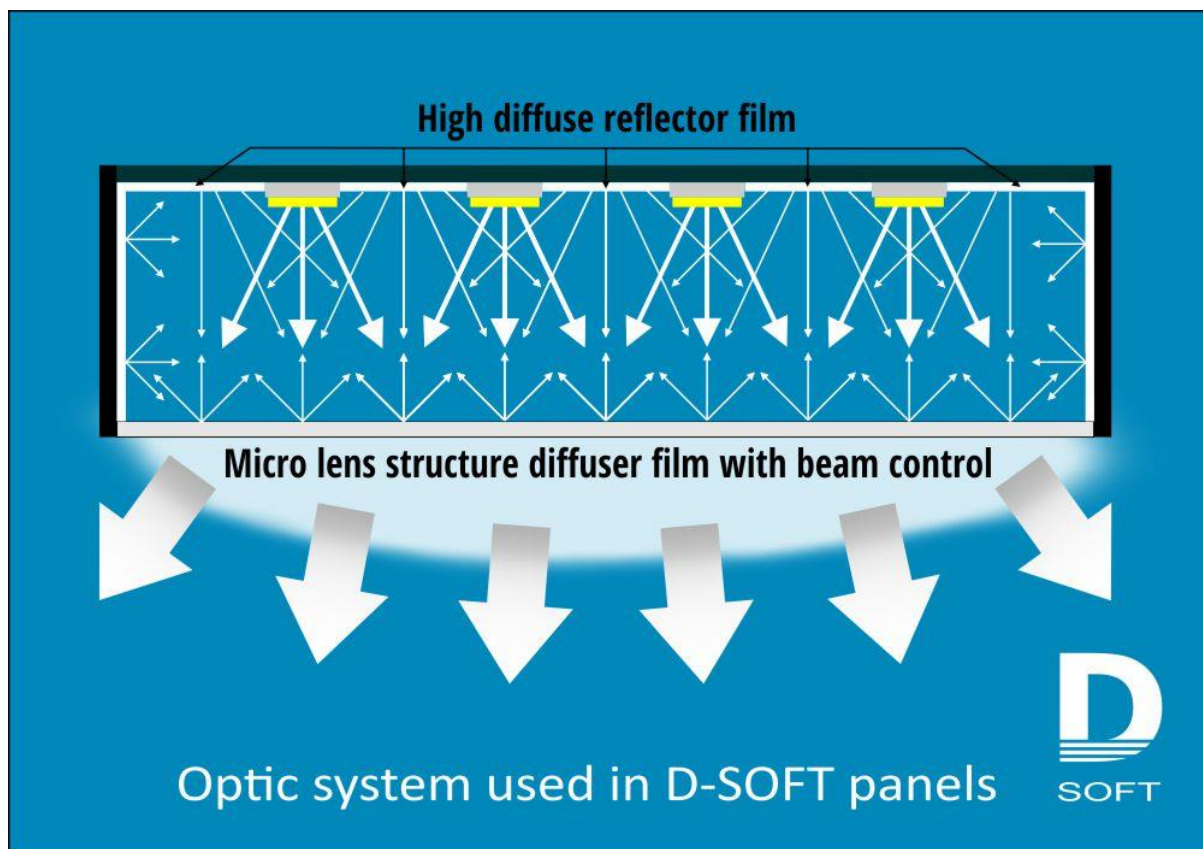
We use only the best available selection of the LEDs, with a spectrum that has no 'cyan gap', what we call "Natural Light" LEDs.

The LEDs are delivered in rolls containing 17,000 LEDs per roll. The LEDs are balance to CCT 5700K with an accuracy of 3 step McAdams ellipse. The x and y co-ordinates for each LED mounted on the panel are within the ellipse labelled '1' on the CIE1931 chromaticity diagram in the diagram below:



This does not mean that individual diodes from a single roll can have such a scatter of parameters, but rather that the parameters of diodes from any roll selected according to the above criteria throughout the multi-year production period will fit within this ellipse. In reality, diodes from a single roll do not differ by more than ~12 Kelvin, and that is as far as one can go in terms of repeatable measurement conditions. In a series of 480 units (the number of diodes in each D8 R+ panel), the differences cancel each other out and we do not observe any difference in CCTs greater than the measurement accuracy of our equipment between individual panels in a series.

Another thing that will affect the final CCT of the panel is the diffuser and mixing chamber:



The diffuser reflects some of the light from the LEDs and returns it to the LED phosphor and the LED board. The response of the phosphor to the additional stimulation from the reflected white light is to lower the CCT. This is why the typical final CCT of a panel is 5300-5500K.

The materials used for the diffuse reflector film and diffuser film are sourced from the world's best manufacturers and guarantee the invariability of the optical performance of these materials throughout the life of the panel.

The long service life and stability of the LEDs is ensured by the operating parameters of the diodes. At 100% panel power, the diodes are only driven at around 60% of their nominal value, keeping the diode temperature below 60 degrees Celsius. This is almost 30 degrees below the manufacturer's recommended maximum operating temperature.

In the four years that "Natural Light" LEDs have been used in our products, we have seen no change in the spectral characteristics of the fixtures that we occasionally repair. No other long-term tests have been carried out.

Earlier versions of the panels have been used in the factory for process lighting, some of which have been in service for ten years. The spectral performance of these panels is checked regularly, and no change in the spectral characteristics has been recorded to date.

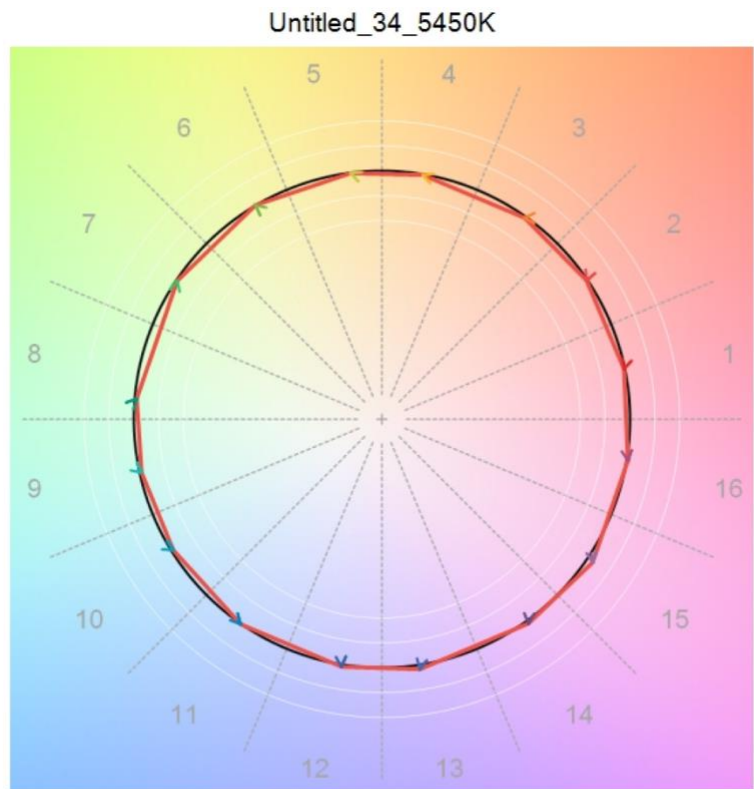
Phase One D8 R+ LED Panels are manufactured exclusively for Phase One by Akurat Lighting Sp. z.o.o. in Poland.

All measurement data provided by Akurat Lighting Sp. z.o.o.

Measurement data of a typical D8 R+ panel.

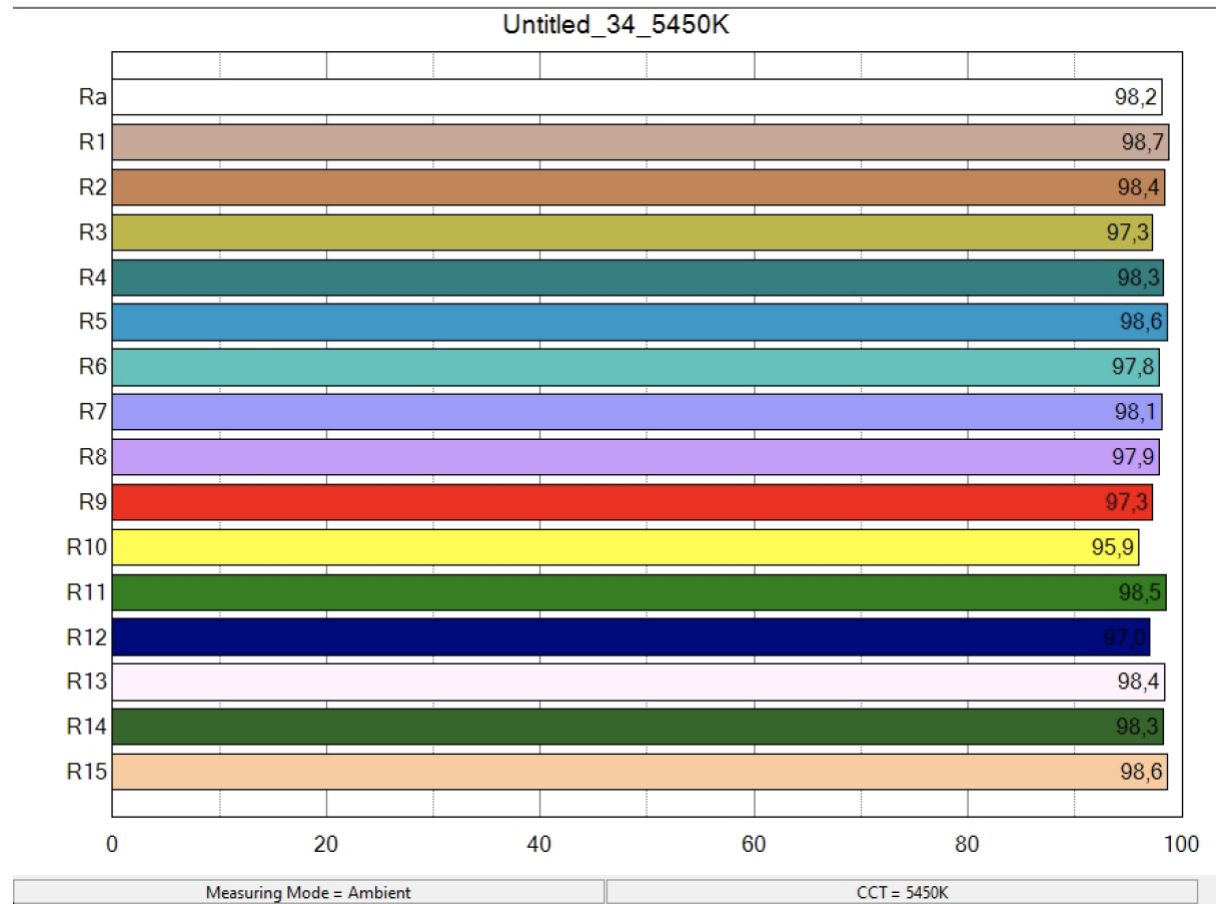
Measurements are taken during the quality inspection of the panels prior to packaging using a Sekonic C-800 spectrometer.

TM30

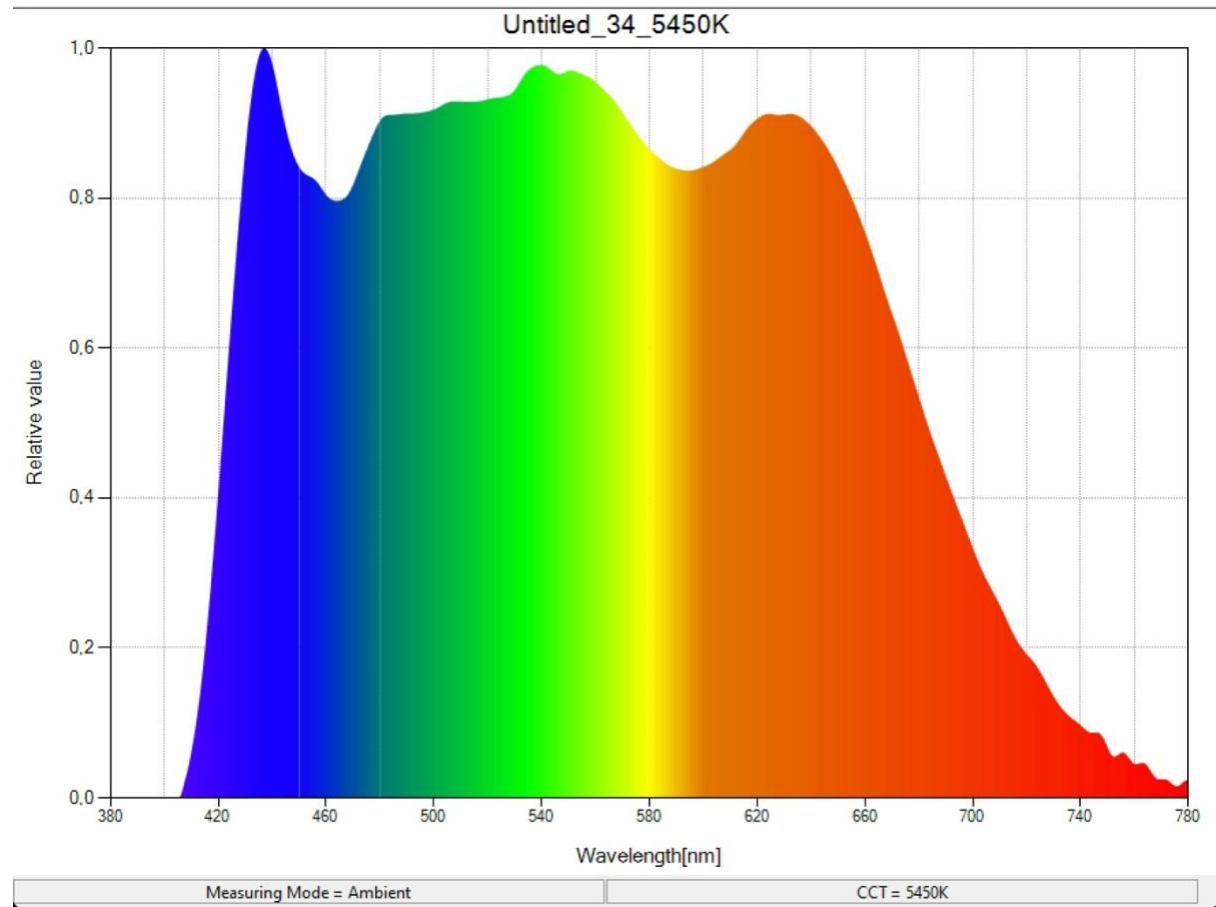


Measuring Mode = Ambient		CCT = 5450K	
Rf = 98	Rg = 101	Ra = 98,2	

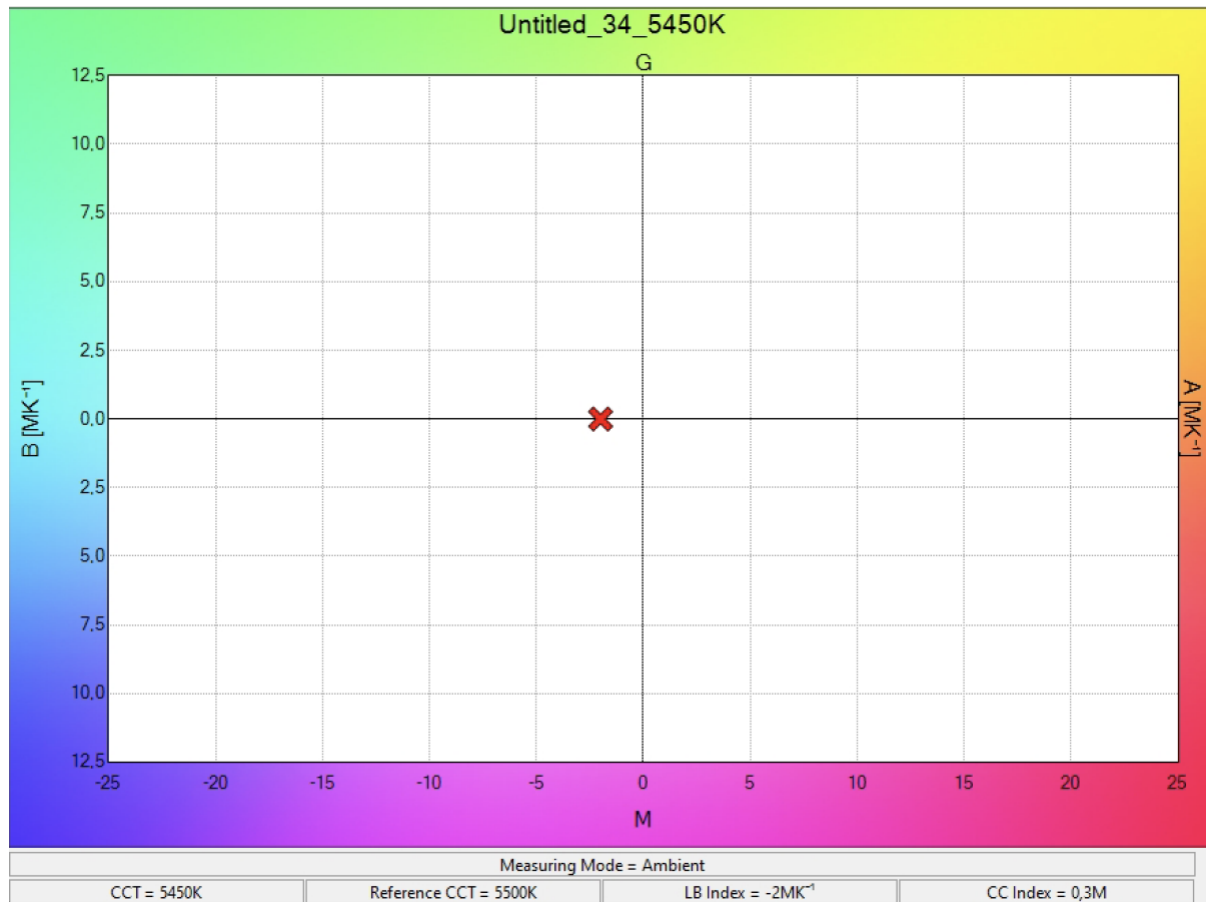
Color Rendering



Spectral Distribution



White Balance



Date Saved	19.07.2024 20:05:41	
Title	Untitled_34_5450K	
Measuring Mode	Ambient	
Color Space / White Point	HSI	D65
CCT [K]	5450	
Δuv	0.0041	
Illuminance [lx]	60500	
Illuminance [fc]	5630	
Reference CCT [K]	5500	
LB Index [MK ⁻¹]	-2	
LB Camera Filter	82	
LB Lighting Filter	-----	
CC Index	0.3M	
CC#	0.8M	
CC Camera Filter	CC025M	
CC Lighting Filter	L279 1/8 MINUS G	
CRI Ra	98.2	
CRI R1	98.7	
CRI R2	98.4	
CRI R3	97.3	
CRI R4	98.3	
CRI R5	98.6	
CRI R6	97.8	
CRI R7	98.1	
CRI R8	97.9	
CRI R9	97.3	
CRI R10	95.9	
CRI R11	98.5	
CRI R12	97.0	
CRI R13	98.4	
CRI R14	98.3	
CRI R15	98.6	
TM-30-18 Rf	98	
TM-30-18 Rg	101	
SSIt	58	
SSId	83	
SSI1	---	
SSI2	---	
TLCI	100	
TLMF	---	
CIE1931 x	0.3337	
CIE1931 y	0.3503	
Hue	47deg	
Saturation	17%	

