

This document contains a summary of the technical data for the Mid-power LEDs used at ERCO.

www.erco.com/led

Technical data
(overview)

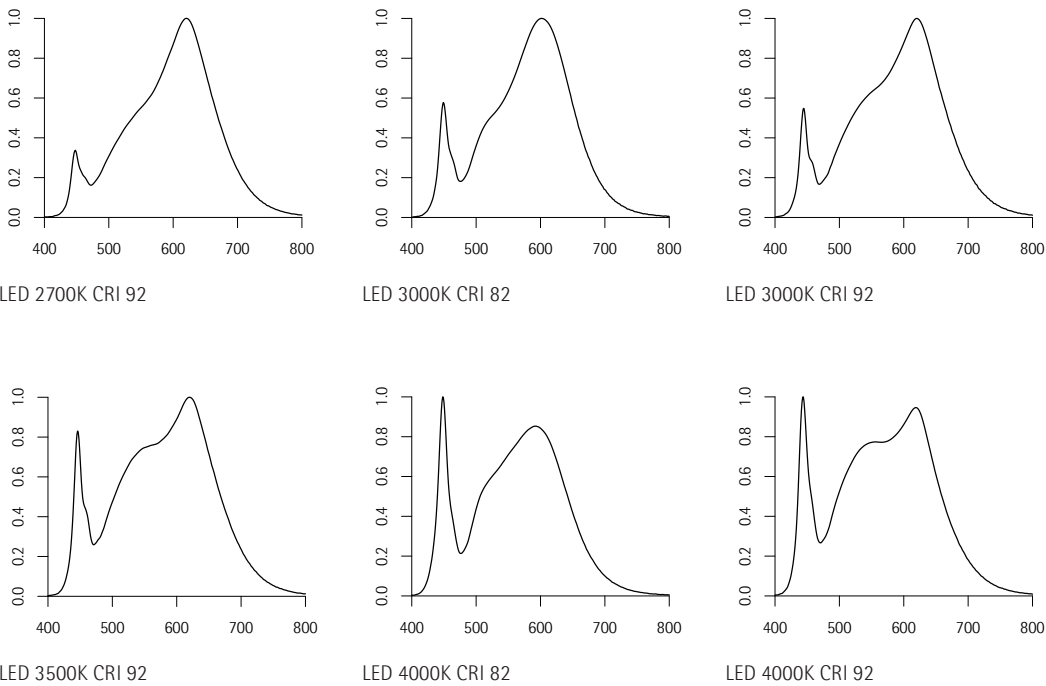
General technical data on the Mid-power LEDs used at ERCO can be found below. Detailed data on a specific luminaire can be found on the product data sheet of the luminaire.

Specific information on a luminaire can be found at www.erco.com/<article number>

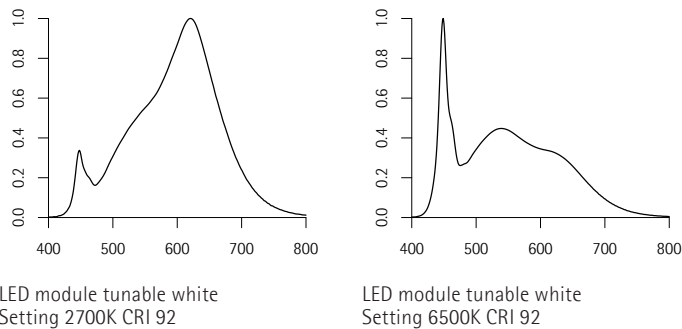
LED						
Colour temperature	2700K	3000K	3000K	3500K	4000K	4000K
Luminous efficacy (lm/W)	143	162	159	154	179	157
Colour rendering	CRI 92	CRI 82	CRI 92	CRI 92	CRI 82	CRI 92
LED module tunable white						
Setting	2700K/6500K					
Luminous efficacy (lm/W)	143/156					
Colour rendering	CRI 92					

Note: all data are statistical averages.

Spectra
LED



Spectra
LED module tunable white



Melanopic
efficacy ratios

The melanopic effect of light can be calculated from photometric quantities by means of efficacy ratios. The ratios are the same for all LEDs of a certain design and can be taken from the table below. The melanopic equivalent daylight illuminance $MEDI (E_{mel,v,D65})$ is obtained by multiplying the melanopic daylight equivalent efficiency factor $MDER (\gamma_{mel,v,D65})$ by the visual illuminance E_v . In addition to the $MEDI$ and the $MDER$, the melanopic efficacy ratio of visible radiation (MR) is also listed. This ratio, which is no longer used according to current standards, is used to calculate the EML (also no longer used). Nevertheless, these specifications are still used in practice.

For further information on the melanopic light effect, see the Light Knowledge at www.ercos.com.

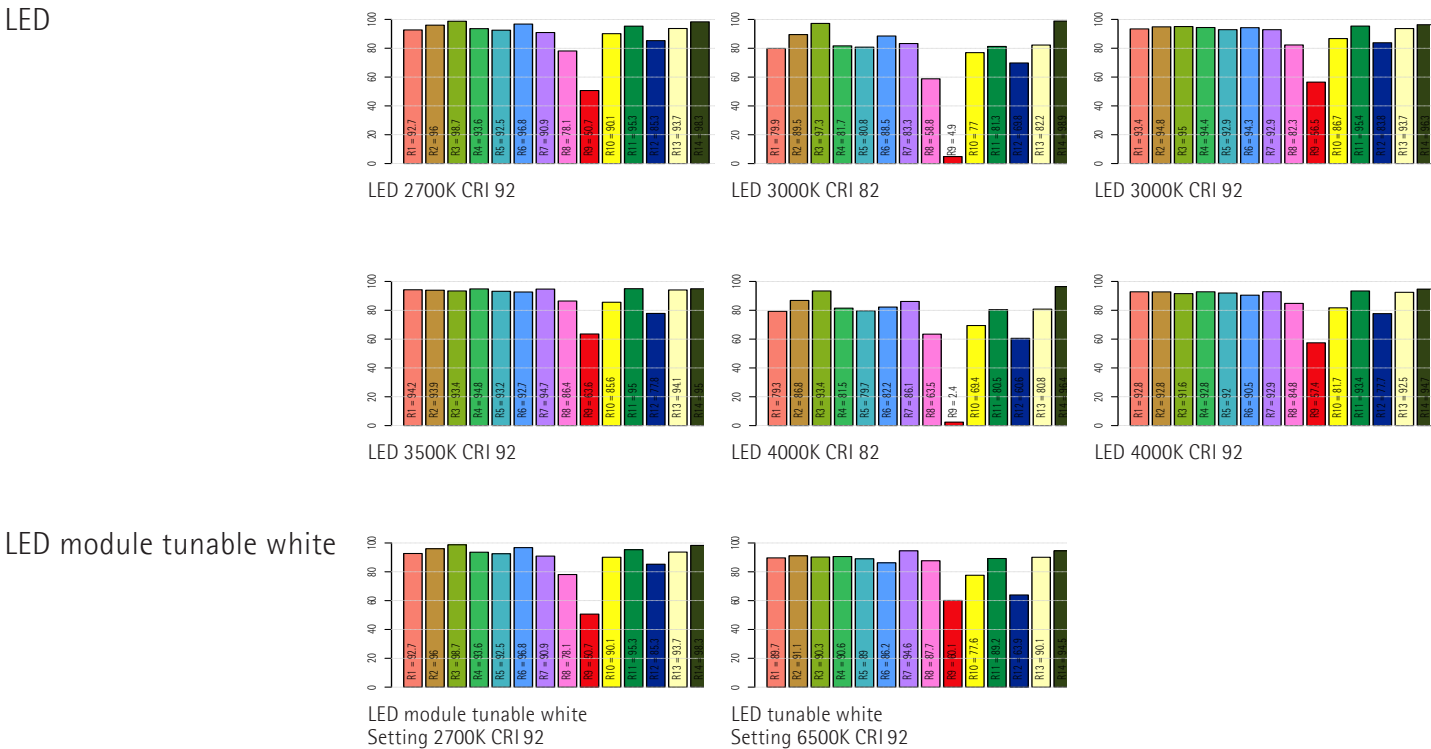
LED	2700K CRI 92	3000K CRI 82	3000K CRI 92	3500K CRI 92	4000K CRI 82	4000K CRI 92
MDER	0.436	0.471	0.487	0.577	0.608	0.629
MEDI (at $E_v=1000lx$)	436lx	471lx	487lx	577lx	608lx	629lx
MR	0.481	0.520	0.538	0.637	0.671	0.695

LED module tunable white	2700K/6500K
Setting	0.436/0.912
MDER	438/912
MEDI ($E_v=1000lx$)	0.481/1.007

Colour rendering
according to CRI

The CRI value compares the light source being tested with a reference light source, based on 8 reference colours. All ERCO Mid-power LEDs have very good colour rendering, ranging from CRI 82 to CRI 92 depending on the LED type.

Further information on colour rendering in Light Knowledge at www.ercos.com



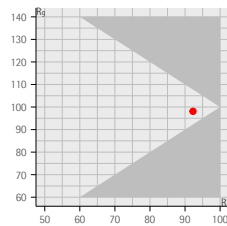
Colour rendering according to TM-30-20

As an alternative to the CRI method, TM-30 defines the values R_f (fidelity) and R_g (gamut). R_f is based on 99 reference colours, in contrast to CRI.

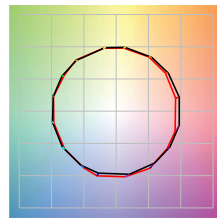
Further information on TM-30 at www.erco.com

— Reference
— ERCO LED

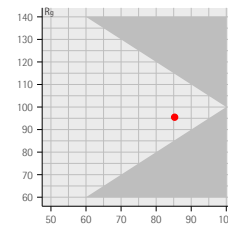
LED



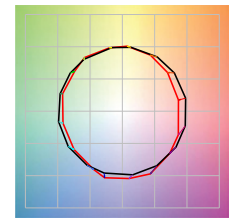
LED 2700K



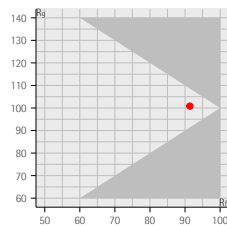
R_f 92
 R_g 98



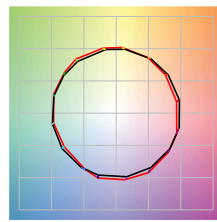
LED 3000K



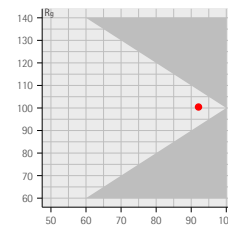
R_f 85
 R_g 95



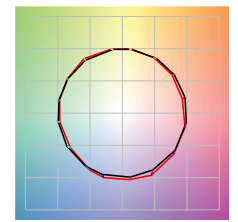
LED 3000K



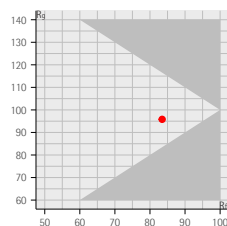
R_f 91
 R_g 101



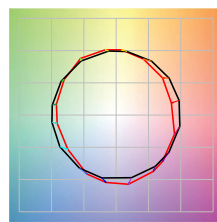
LED 3500K



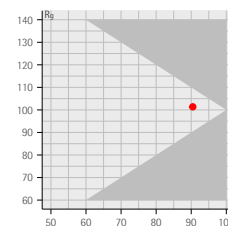
R_f 92
 R_g 100



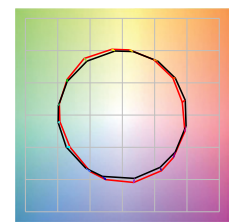
LED 4000K



R_f 83
 R_g 96

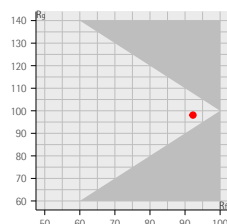


LED 4000K

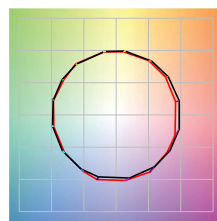


R_f 90
 R_g 101

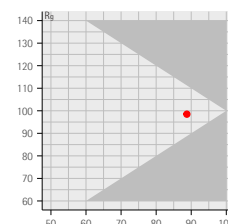
LED module tunable white



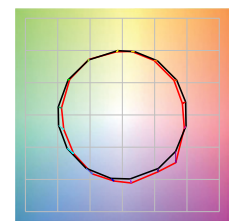
LED module tunable white
Setting 2700K



R_f 92
 R_g 98



LED module tunable white
Setting 6500K

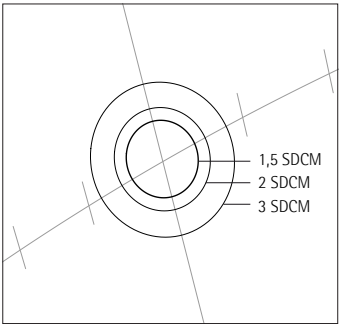


R_f 89
 R_g 99

Colour tolerance SDCM

All ERCO LED modules have a colour tolerance of 1.5 SDCM. Values < 3 are considered imperceptible colour differences. The exact values for each luminaire can be found in the luminaire data sheet and the LED module data sheet compliant to EPREL.

Further information on colour consistency at www.ercos.com



Damage factor

The relative damage factor is used to evaluate suitable light sources for conservation requirements, for example in museums.

Further information on the damage factor at www.ercos.com

Light source	Relative damage factor f (mW/lm)
LED	
LED 2700K, CRI 92	0.137
LED 3000K, CRI 82	0.146
LED 3000K, CRI 92	0.153
LED 3500K, CRI 92	0.171
LED 4000K, CRI 82	0.184
LED 4000K, CRI 92	0.190
LED tunable white	
Setting	
2700K, CRI 92	0.137
6500K, CRI 92	0.255



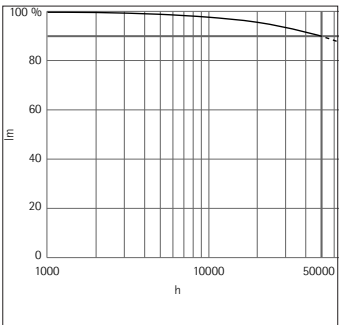
Luminous flux maintenance

Measurement according to LM 80; projection of luminous flux maintenance according to TM-21. The specified value is identical for all Mid-power LEDs used by ERCO.

The L-value describes what percentage of the original luminous flux an LED still emits after the specified time.

The B-value indicates what percentage of the LEDs fall below the L-value at the end of the specified period.

Further information on luminous flux maintenance at www.ercos.com



Luminous flux maintenance	L90/B10 ≤50,000h
LED manufacturer specification	L80/B50 ≤100,000h

Projection of luminous flux maintenance after 50,000 hours according to TM-21

Failure rate

The failure rate of LEDs used by ERCO is 0.1% ≤50,000h