

Minimum Energy Performance Standards (MEPS) for LED Bulbs, LED Downlights, LED Tubes, & LED Outdoor Lighting in Pakistan

Applicability: The following standards shall come into force from December 2020. Products placed on the market before the application date can be sold till end of June 2021.

PARAMETERS	LED LAMPS	LED TUBES	LED DOWNLIGHTS	LED OUTDOOR LIGHTING
Minimum efficacy level	60 ≤ Φ < 600 : 80 lm/W 600 ≤ Φ < 1200 : 90 lm/W 1200 ≤ Φ < 3300 : 100 lm/W	2 feet : 106 lm/W 4 feet : 114 lm/W 5 feet : 116 lm/W	60 ≤ Φ < 600 : 70 lm/W 600 ≤ Φ < 1200 : 75 lm/W 1200 ≤ Φ < 3300 : 80 lm/W	100 lm/W for up to 90W, 120 lm/W for more than 90 W
Minimum rated lamp lifetime L70B50 @ 25°C	8,000 hours Till June 2021 10,000 hours July 2021 onwards ^{*1}	10,000 hours Till June 2021 12,000 hours July 2021 onwards ^{*1}	10,000 hours Till June 2021 12,000 hours July 2021 onwards ^{*1}	15,000 hours Till June 2021 20,000 hours July 2021 onwards ^{*1}
Early failure rate (maximum)	10% at 3,000 hours	10% at 3,000 hours	10% at 3,000 hours	10% at 3,000 hours
Color rendering index (CRI)	≥ 80	≥ 80	≥ 80	≥ 70
Correlated Color Temperature (CCT)	< 6,500 Kelvin Till June 2021 < 6,000 Kelvin July 2021 onwards	< 6,500 Kelvin Till June 2021 < 6,000 Kelvin July 2021 onwards	< 6,500 Kelvin Till June 2021 < 6,000 Kelvin July 2021 onwards	< 6,500 Kelvin Till June 2021 < 5,000 Kelvin July 2021 onwards
CCT tolerance	± 300 K	± 300 K	± 300 K	± 300 K
Compatibility with existing fixtures and ballasts (for tubes) and dimming compatibility (for street lighting)	—	2 feet : flux ≥ 1,000 lumens 4 feet : flux ≥ 2,200 lumens 5 feet : flux ≥ 3,200 lumens able to work on ferromagnetic ballast	—	Street lighting luminaires must be dimmable
Fundamental power factor ^{*2} (displacement factor)	2 W < P ≤ 25 W : ≥ 0.5 P > 25W : ≥ 0.9	2 W < P ≤ 25 W : ≥ 0.5 P > 25W : ≥ 0.9	2 W < P ≤ 25 W : ≥ 0.5 P > 25W : ≥ 0.9	≥ 0.9
Voltage rating operation range	160 VAC to 250 VAC (50 Hz)	160 VAC to 250 VAC (50 Hz)	160 VAC to 250 VAC (50 Hz)	160 VAC to 250 VAC (50 Hz)
Maximum Standby Power (connected lamps or internal sensor)	< 0.5 Watt	< 0.5 Watt	< 0.5 Watt	< 0.5 Watt
Short term flicker perceptibility (PstLM)	≤ 1.0 at full load and a sinusoidal input voltage.	≤ 1.0 at full load and a sinusoidal input voltage.	≤ 1.0 at full load and a sinusoidal input voltage.	≤ 1.0 at full load and a sinusoidal input voltage.
Photobiological risk group (blue light and UV hazard)	RG0 or RG1 are allowed.	—	—	—
Warranty duration	minimum 1 year	minimum 1 years	minimum 1 years	minimum 3 years

^{*1} If achievable at reasonable cost based on the registration database.

^{*2} Fundamental Power Factor: Also known as Displacement factor. Displacement (phase-shift) between the fundamental (first harmonic) current and voltage waveforms by calculating the cosine of the phase-shift angle. It is a more detailed measure to quantify the displacement of the current and its effect on the power supply network.

Energy Performance Star Label

FLUX (LM)	60 ≤ Φ < 600	600 ≤ Φ < 1200	1200 ≤ Φ
1 star*	≥ 80 lm/W	≥ 90 lm/W	≥ 100 lm/W
2 stars**	≥ 90 lm/W	≥ 100 lm/W	≥ 110 lm/W
3 stars***	≥ 100 lm/W	≥ 110 lm/W	≥ 120 lm/W
4 stars****	≥ 110 lm/W	≥ 120 lm/W	≥ 130 lm/W
5 stars*****	≥ 120 lm/W	≥ 130 lm/W	≥ 140 lm/W

Reference: Φ is the flux in lumen (lm) of the lamp or luminaire of power expressed in Watt (W).



FOR MORE INFORMATION:

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Testing Standards

PARAMETERS	LED LAMPS	LED TUBES	LED DOWNLIGHTS	LED OUTDOOR LIGHTING
Luminous flux	PS:5252/2018 IEC 62612 CIE S 025	CIE S 025	PS:5253/2018 IEC 62722-2-1 IEC 62717 CIE S 025	PS:5253/2018 IEC 62722-2-1 IEC 62717 CIE S 025
Power	PS:5252/2018 IEC 62612 CIE S 025	CIE S 025	PS:5253/2018 IEC 62722-2-1 IEC 62717 CIE S 025	PS:5253/2018 IEC 62722-2-1 IEC 62717 CIE S 025
Lifetime claim	L70B50 definition of IEC 62612 The lumen maintenance factor X_{LMF} % after endurance testing according to annex 2 ^{*4} shall be at least $X_{LMF,MIN}$ % calculated according to annex 1 ^{*3}	L70B50 definition of IEC 62722-2-1 The lumen maintenance factor X_{LMF} % after endurance testing according to annex 2 ^{*4} shall be at least $X_{LMF,MIN}$ % calculated as explained in annex 1 ^{*3}	L70B50 definition of IEC 62722-2-1 The lumen maintenance factor X_{LMF} % after endurance testing according to annex 2 ^{*4} shall be at least $X_{LMF,MIN}$ % calculated as explained in annex 1 ^{*3}	L70B50 definition of IEC 62722-2-1 The lumen maintenance factor X_{LMF} % after endurance testing according to annex 2 ^{*4} shall be at least $X_{LMF,MIN}$ % calculated as explained in annex 1 ^{*3}
Early failure rate	test according to annex 2 ^{*4}	test according to annex 2 ^{*4}	test according to annex 2 ^{*4}	test according to annex 2 ^{*4}
Color rendering index (CRI)	CIE 13.3 ; CIE S 025	CIE 13.3 ; CIE S 025	CIE 13.3 ; CIE S 025	CIE 13.3 ; CIE S 025
Correlated Color Temperature	CIE 015:2018 ; CIE S 025	CIE 015:2018 ; CIE S 025	CIE 015:2018 ; CIE S 025	CIE 015:2018 ; CIE S 025
Fundamental power factor ^{*2} (displacement factor)	PS:5252/2018 IEC 62612	IEC 62612 Annex C	PS:5253/2018 IEC 62722-2-1 IEC 62717	PS:5253/2018 IEC 62722-2-1 IEC 62717
Voltage rating operation range	IEC 61547	IEC 61547	IEC 61547	IEC 61547
Standby Power (connected lamps or internal sensor)	IEC 63103	IEC 63103	IEC 63103	IEC 63103
Short term flicker perceptibility (PstLM)	IEC TR 61547-1	IEC TR 61547-1	IEC TR 61547-1	IEC TR 61547-1
Photobiological risk group (blue light and UV hazard)	IEC 62471 IEC/TR 62778			

^{*3} annex 1: calculation of $X_{LMF,MIN}$ % $X_{LMF,MIN}\% = 100 \times \exp[(3000 \times \ln(0.7))/L_{70}]$ If the calculated value exceed 96.0%, $X_{LMF,MIN}\% = 96\%$

^{*4} annex 2: endurance testing as of ANNEX V of European regulation 2019/2020 of 1 October 2019 **extract :** The light source is operated for 1,200 cycles of repeated, continuous switching cycles without interruption. One complete switching cycle consists of 150 minutes of the light source switched ON at full power followed by 30 minutes of the light source switched OFF. The hours of operation recorded (i.e. 3 000 hours) include only the periods of the switching cycle when the light source was switched ON (i.e. the total test time is 3 600 hours). For ambient conditions (test setup and complete method) please refer to ANNEX V of European regulation 2019/2020 of 1 October 2019.

Reference:

STANDARDS	TITLE
PS: 5252/2018	Self-Ballasted LED-Lamps for General Lighting Services
PS: 5253/2018	LED modules for general lighting - Performance requirements
IEC 62612	Self-ballasted LED lamps general lighting services
IEC 62717	LED modules for general lighting - Performance requirements
IEC 62722-2-1	Luminaire performance - Part 2-1: Particular requirements for LED luminaires
IEC 62471	Photobiological safety of lamps and lamp systems
IEC/TR 62778	Application of IEC 62471 for the assessment of blue light hazard to light sources and luminaires
IEC 63103	Lighting equipment - Non-active mode power measurement
IEC 61547	Equipment for general lighting purposes-EMC immunity requirements
IEC TR 61547-1	Equipment for general lighting purposes - EMC immunity requirements- Part 1: An objective light flickermeter and voltage fluctuation immunity test method
IEC TR 63158	Equipment for general lighting purposes - Objective test method for stroboscopic effects of lighting equipment
CIE S 025	Test Method for LED Lamps, LED Luminaires and LED Modules
CIE 015:2018	Colorimetry, 4 th edition (technical report)
CIE 13.3:1995	Method of Measuring and Specifying Colour Rendering of Light Sources