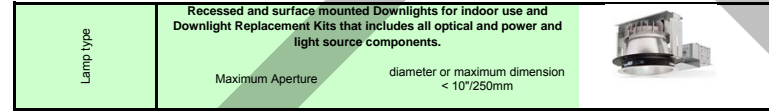


Solid State Lighting Annex 2010-2014

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Minimum Fixture luminous efficacy (lm/W)	Color temperature target (K) and tolerance	Chromaticity tolerance (Du, V)	Center beam luminous intensity	Color spatial uniformity	Color Maintenance (a.u.v. at 0.000h)	Luminous intensity distribution 0-180°	CRI	Lag start time (ms)	Lumen Maintenance (Minimum time to L70)	Minimum Rated Lamp lifetime (B50)	Flicker (Flicker Index)	Glare Luminance (cd/m2)	Minimum power factor	Harmonic distortion	Dimmer compatibility	Photobiological hazard class (UV & blue light)	Safety marking	Warranty Duration	RoHS Compliant	Recyclability (%)	Rapid Cycling Cycle on-off time TBD
Tier 0 This type of product is unusual for off-grid applications and the IEA 4E SSL Annex will not define performance criteria for this Tier.																					
Tier 1 >40 lm/watt	follow ANSI C78.377, excluding flexible CCT		For products with a distribution similar to a MR or PAR lamp with a beam angle <65°, Center beam intensity should meet equivalent levels using the online tool: http://www.energystar.gov/ia/products/lighting/led/IntLampCenterBeamTool.zip	The variation of chromaticity across the field angle of the fixture shall be within 0.007 from the weighted average point on the CIE 1976 (u',v') diagram	<0.007	Must be provided by manufacturer and 50% of flux shall be in declared beam angle	≥70	<0.5sec until continuous light output	At 30,000h, Lumen Maintenance > 70% of initial	At 30,000h 50% of population will be operative.	At full power flicker index ≤ 0.3	Above 60degrees, no more than 10,000candela/m²	> 0.50	EAC 7.3A/B FCC CFR47 Section 15 and 18. Dimmers are considered incidental radiators and they need to be tested as SSL products act as antennae for the dimmers' EM/RFI.	Products may be dimmable or non-dimmable. Product packaging must clearly indicate whether the product is dimmable or not dimmable. If a product is declared as dimmable, they must also declare the conditions under which the product will operate as declared, and they must provide on a website a list of dimmer makes and models with which the product is compatible. For each compatible dimmer, the manufacturer must also list the minimum and maximum number of fixtures that can be satisfactorily dimmed, and the minimum relative luminous flux level that a given luminaire/dimmer can achieve.	Complies with IEC 62471-2	Must meet regional requirements (ANSI/UL 1598 or CE Mark)	Minimum 3 year warranty/guarantee unless regional requirement is higher. Warranty covers replacement of defective parts and catastrophic failure	Yes	Yes, following electronic component process	Product will survive rapid cycle for every hour of rated life
	2700K (2725 ± 145)	0.000 ± 0.006																			
	3000K (3045 ± 175)	0.000 ± 0.006																			
	3500K (3465 ± 245)	0.000 ± 0.006																			
	4000K (3985 ± 275)	0.001 ± 0.006																			
	5000K (5028 ± 283)	0.002 ± 0.006																			
5700K (5665 ± 355)	0.002 ± 0.006																				
6500K (6530 ± 510)	0.003 ± 0.006																				
Tier 2 >55lm/watt	follow ANSI C78.377, excluding flexible CCT		For products with a distribution similar to a MR or PAR lamp with a beam angle <65°, Center beam intensity should meet equivalent levels using the online tool: http://www.energystar.gov/ia/products/lighting/led/IntLampCenterBeamTool.zip	The variation of chromaticity across the field angle of the fixture shall be within 0.007 from the weighted average point on the CIE 1976 (u',v') diagram	<0.007	Must be provided by manufacturer and 50% of flux shall be in declared beam angle	≥80, R9 > 0	<0.5sec until continuous light output	At 35,000h, Lumen Maintenance > 70% of initial	At 35,000 hours 50% of population will be operative.	At full power flicker index ≤ 0.3	Above 60degrees, no more than 10,000candela/m²	> 0.50	EAC 7.3A/B FCC CFR47 Section 15 and 18. Dimmers are considered incidental radiators and they need to be tested as SSL products act as antennae for the dimmers' EM/RFI.	Products may be dimmable or non-dimmable. Product packaging must clearly indicate whether the product is dimmable or not dimmable. If a product is declared as dimmable, they must also declare the conditions under which the product will operate as declared, and they must provide on a website a list of dimmer makes and models with which the product is compatible. For each compatible dimmer, the manufacturer must also list the minimum and maximum number of fixtures that can be satisfactorily dimmed, and the minimum relative luminous flux level that a given luminaire/dimmer can achieve.	Complies with IEC 62471-2	Must meet regional requirements (ANSI/UL 1598 or CE Mark)	Minimum 3 year warranty/guarantee unless regional requirement is higher. Warranty covers replacement of defective parts and catastrophic failure	Yes	Yes, following electronic component process	Product will survive rapid cycle for every hour of rated life
	2700K (2725 ± 145)	0.000 ± 0.006																			
	3000K (3045 ± 175)	0.000 ± 0.006																			
	3500K (3465 ± 245)	0.000 ± 0.006																			
	4000K (3985 ± 275)	0.001 ± 0.006																			
	5000K (5028 ± 283)	0.002 ± 0.006																			
5700K (5665 ± 355)	0.002 ± 0.006																				
6500K (6530 ± 510)	0.003 ± 0.006																				
Tier 3 >70lm/watt	follow ANSI C78.377-2011 Table 6A, for 4-step quadrangle excluding flexible CCT		For products with a distribution similar to a MR or PAR lamp with a beam angle <65°, Center beam intensity should meet equivalent levels using the online tool: http://www.energystar.gov/ia/products/lighting/led/IntLampCenterBeamTool.zip	The variation of chromaticity across the field angle of the fixture shall be within 0.007 from the weighted average point on the CIE 1976 (u',v') diagram	<0.004	Must be provided by manufacturer and 50% of flux shall be in declared beam angle	≥80, R9 > 0	<0.5sec until continuous light output	At 40,000h, Lumen Maintenance > 70% of initial	At 40,000h 50% of population will be operative.	At full power flicker index ≤ 0.3	Above 60degrees, no more than 10,000candela/m²	> 0.50	EAC 7.3A/B FCC CFR47 Section 15 and 18. Dimmers are considered incidental radiators and they need to be tested as SSL products act as antennae for the dimmers' EM/RFI.	Products may be dimmable or non-dimmable. Product packaging must clearly indicate whether the product is dimmable or not dimmable. If a product is declared as dimmable, they must also declare the conditions under which the product will operate as declared, and they must provide on a website a list of dimmer makes and models with which the product is compatible. For each compatible dimmer, the manufacturer must also list the minimum and maximum number of fixtures that can be satisfactorily dimmed, and the minimum relative luminous flux level that a given luminaire/dimmer can achieve.	Complies with IEC 62471-2	Must meet regional requirements (ANSI/UL 1598 or CE Mark)	Minimum 3 year warranty/guarantee unless regional requirement is higher. Warranty covers replacement of defective parts and catastrophic failure	Yes	Yes, with recovery of materials (phosphors, base materials)	Product will survive rapid cycle for every hour of rated life
	2700K (2723 ± 82)	0.0006 ± 0.0033																			
	3000K (2940 ± 98)	-0.0008 ± 0.0033																			
	3500K (3397 ± 125)	-0.0002 ± 0.0033																			
	4000K (4036 ± 154)	0.0016 ± 0.0033																			
	5000K (4991 ± 220)	0.0033 ± 0.0033																			
5700K (5665 ± 270)	0.0024 ± 0.0033																				
6500K (6432 ± 340)	0.0071 ± 0.0033																				

