





Test Report issued under the responsibility of:



TEST REPORT IEC TR 62778 Application of IEC 62471 for the assessment of blue light hazard to light sources and luminaires	
Report Number	6016089.50P
Date of issue	2017-11-28
Total number of pages	28
Name of Testing Laboratory preparing the Report	DEKRA Testing and Certification (Shanghai) Ltd. 3/F, #250, Jiangchangsan Road building 16 Headquater Economy Park Shibe Hi-Tech Park, Zhabei District, Shanghai, P.R.C 200436
Applicant's name	Cree, Inc
Address	Durham, North Carolina, 27703, USA
Test specification:	
Standard	IEC TR 62778:2014 (Second Edition)
Test procedure	CB Scheme
Non-standard test method	N/A
Test Report Form No.	IEC62778A
Test Report Form(s) Originator	TÜV SÜD Product Service GmbH
Master TRF	Dated 2016-02
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Test item description	LED package	
Trade Mark	CREE	
Manufacturer	Cree, Inc Durham, North Carolina, 27703, USA	
Model/Type reference	Cree J Series JK3030	
Ratings	I_{max} : 400 mA, V_F : 3 Vdc	
Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):		
<input checked="" type="checkbox"/>	CB Testing Laboratory:	DEKRA Testing and Certification (Shanghai) Ltd.
	Testing location/ address	3/F, #250, Jiangchangsan Road building 16 Headquater Economy Park Shibe Hi-Tech Park, Zhabei District, Shanghai, P.R.C 200436
<input type="checkbox"/>	Associated CB Testing Laboratory:	
	Testing location/ address	
	Tested by (name, function, signature)	Yuelie Wu 
	Approved by (name, function, signature) ...:	Hanson Zhang 
Testing procedure: CTF Stage 1:		
	Testing location/ address	
	Tested by (name, function, signature)	
	Approved by (name, function, signature)	
Testing procedure: CTF Stage 2:		
	Testing location/ address	
	Tested by (name + signature)	
	Witnessed by (name, function, signature)	
	Approved by (name, function, signature)	
Testing procedure: CTF Stage 3:		
Testing procedure: CTF Stage 4:		
	Testing location/ address	
	Tested by (name, function, signature)	
	Witnessed by (name, function, signature)	





Approved by (name, function, signature).....:		
Supervised by (name, function, signature).....:		





<p>List of Attachments (including a total number of pages in each attachment):</p> <ul style="list-style-type: none"> ● Appendix 1: Photo Documentation ● Appendix 2: Model List ● Appendix 3: Low Current LED source Appearance ● Appendix 4: Relative Spectrum Of Tested Sample(s) ● Appendix 5: Blue Light Hazard-forward Current Relationship (Non-mandatory Information) ● Appendix 6: Table 6.1 Based On IEC 62471:2006 ● Appendix 7: Table 6.1 Based On EN62471:2008, Attachment To IEC 62471 European Group Differences And National Differences 	
<p>Summary of testing:</p>	
<p>Tests performed (name of test and test clause):</p> <p>These tests fulfill the requirements of standard ISO/IEC 17025. When determining the test conclusion, the Measurement Uncertainty of test has been considered.</p> <p>The tested sample of Cree J Series JK3030 list as below JK 3030 3V (Cool white & Neutral white) Have been tested according to the IEC 62471 (first edition, 2006-07) at 200mm and been classified as RG 2. Have been tested according to the EN 62471:2008 at 200mm and been classified as RG 2. Have been tested according to the IEC/TR 62778:2014 and been classified as RG 2 for blue light hazard.</p> <p>JK 3030 3V (Warm white) Have been tested according to the IEC 62471 (first edition, 2006-07) at 200mm and been classified as RG 0. Have been tested according to the EN 62471:2008 at 200mm and been classified as RG 0. Have been tested according to the IEC/TR 62778:2014 and been classified as RG 1 Unlimited for blue light hazard.</p>	<p>Testing location:</p> <p>DEKRA Testing and Certification (Shanghai) Ltd. 3/F, #250, Jiangchangsan Road building 16 Headquater Economy Park Shibe Hi-Tech Park, Zhabei District, Shanghai, P.R.C 200436</p>
<p>Summary of compliance with National Differences (List of countries addressed): EN Standards</p> <p>EN 62471:2008</p> <p><input checked="" type="checkbox"/> The product fulfills the requirements</p>	

Copy of marking plate:

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.

CREE		Kit: JK3030AWT-00-0000-000A0BL465E	
VENTURE LED COMPANY™			
Cree J Series™ JK3030AWT Light Emitting Diode Cool White			
Bin: JK3030AWT-00-0000-000A0BL465E			
Lot ID: 000000000	Qty: 00000		
Customer Item: Sample		Seal Date: 18-Aug-2017	
PO Num: MKT - SAMPLE			
Made in China			

CREE		Kit: JK3030AWT-00-0000-000A0BL440E	
VENTURE LED COMPANY™			
Cree J Series™ JK3030AWT Light Emitting Diode Neutral White			
Bin: JK3030AWT-00-0000-000A0BL440E			
Lot ID: 000000000	Qty: 00000		
Customer Item: Sample		Seal Date: 18-Aug-2017	
PO Num: MKT - SAMPLE			
Made in China			

CREE		Kit: JK3030AWT-00-0000-000A0BK430E	
VENTURE LED COMPANY™			
Cree J Series™ JK3030AWT Light Emitting Diode Warm White			
Bin: JK3030AWT-00-0000-000A0BK430E			
Lot ID: 000000000	Qty: 00000		
Customer Item: Sample		Seal Date: 18-Aug-2017	
PO Num: MKT - SAMPLE			
Made in China			

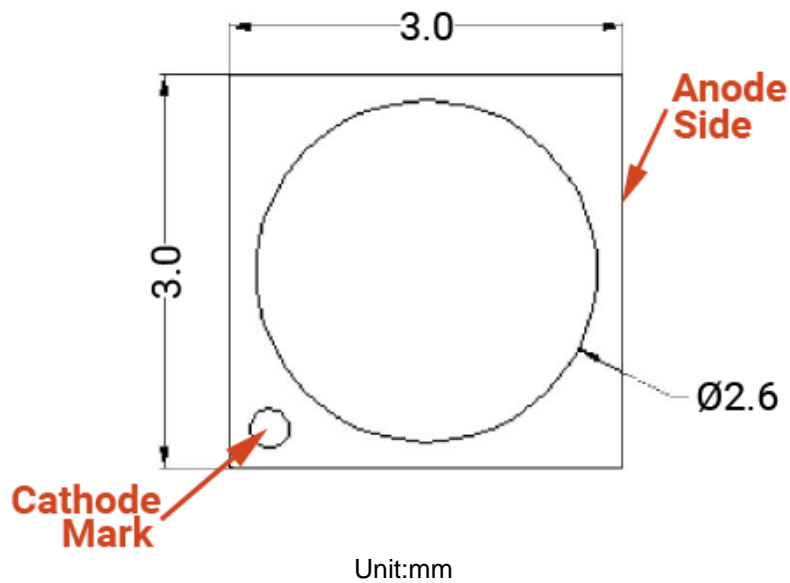
Test item particulars.....:	
Product evaluated.....:	<input checked="" type="checkbox"/> LED package <input type="checkbox"/> LED module <input type="checkbox"/> Lamp <input type="checkbox"/> Luminaire
Rated voltage (V)	3 Vdc
Rated current (mA)	400 mA
Rated CCT (K).....:	Cool White Neutral White Warm White
Rated Luminance (Mcd/m²)	--
Component report data used	<input checked="" type="checkbox"/> Not applicable <input type="checkbox"/> LED package <input type="checkbox"/> LED module <input type="checkbox"/> Lamp Report number: --
Possible test case verdicts:	
- test case does not apply to the test object.....:	N/A
- test object does meet the requirement.....:	P (Pass)
- test object does not meet the requirement.....:	F (Fail)
Testing.....:	--
Date of receipt of test item	2017-08-28
Date (s) of performance of tests	2017-08-28 to 2017-11-28
General remarks:	
"(See Enclosure #)" refers to additional information appended to the report. "(See appended table)" refers to a table appended to the report.	
Throughout this report a <input checked="" type="checkbox"/> comma / <input type="checkbox"/> point is used as the decimal separator.	
The product complied with the following standards: <input checked="" type="checkbox"/> IEC 62471:2006 <input checked="" type="checkbox"/> EN 62471:2008 <input type="checkbox"/> IEC/TR 62471-2:2009 <input checked="" type="checkbox"/> IEC/TR 62778:2014	
Manufacturer's Declaration per sub-clause 4.2.5 of IEC 60385:	
The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> Not applicable

When differences exist; they shall be identified in the General product information section.

Name and address of factory (ies) : Fujian Lighting Optoelectronic, Co., Ltd.
Building 5 Optoelectronic Industry Park, Hutou Town,
Anxi County, Quanzhou City, Fujian Province, China,
362411

General product information:

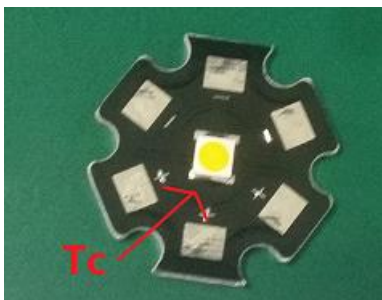
This test report covered J Series 3030 series.
The dimension overview is as following:



The products have different colors and luminous fluxes.
For details please refer to appendix 2.
The test performed on model JK3030AWT-00-0000-000A0BL465E; JK3030AWT-00-0000-000A0BL440E and JK3030AWT-00-0000-000A0BK430E with different CCTs.

The test samples were considered as non-GLS products which should be tested at the distance of 200mm.

During the test, the temperature monitored at the Tc point reached a maximum of 32,2°C.



The sample of JK3030AWT-00-0000-000A0BL465E was tested at 200 mm from the light source. CCT of the spectral irradiance was found at 6819K (Cool White).

The sample of JK3030AWT-00-0000-000A0BL440E was tested at 200 mm from the light source. CCT of the spectral irradiance was found at 4317 K (Neutral White).

The sample of JK3030AWT-00-0000-000A0BK430E was tested at 200 mm from the light source. CCT of the spectral irradiance was found at 3268 K (Warm White).

According to IEC/TR 62778:2014, the drive current and color temperature of a test sample (LED component product) can have a significant influence on the risk group ranking. When the manufacturer's maximum rated drive current (I_f) is not used in a final application (i.e.: a luminaire), refer to Appendix 5 to identify the risk group associated with the drive current to be used. This information is presented for each CCT (color temperature) tested.

The Type test was performed according to IEC 62471:2006 procedure.

IEC TR 62778			
Clause	Requirement + Test	Result - Remark	Verdict
7	MEASUREMENT INFORMATION FLOW		P
7.1	Basic flow		P
	'Law of conservation of luminance' applied		N/A
	Use of only true luminance/radiance values		P
	In case of luminaire: The light source is operated in the luminaire under similar conditions as when tested as a component		N/A
	In case E_{thr} value for RG2 was established the peak value was derived from angular light distribution		N/A
7.2	Conditions for the radiance measurement		P
	Standard condition applied (200mm distance, 0,011rad field of view)		P
	Non-standard condition applied		N/A
7.3	Special cases (I): Replacement by a lamp or LED module of another type		N/A
	Light source is a white light source		N/A
	Evaluation done based on highest luminance		N/A
	Evaluation done based on CCT value		N/A
7.4	Special cases (II): Arrays and clusters of primary light sources		N/A
	LED package is evaluated as : <input type="checkbox"/> RG0 unlimited <input type="checkbox"/> RG1 unlimited		N/A
	E_{thr} of LED package applies to array		N/A
8	RISK GROUP CLASSIFICATION		P
	Risk group achieved:		P
	- .. Risk Group 0 unlimited		N/A
	- .. Risk Group 1 unlimited	For JK 3030 3V (Warm white)	P
	- E_{thr} (lx) : Distance to reach RG1 (m) :	For JK 3030 3V (Cool white & Neutral white) Refer to the Supplementary information of each TABLE: Spectroradiometric measurement as following	P

IEC TR 62778			
Clause	Requirement + Test	Result - Remark	Verdict

TABLE:Spectroradiometric measurement				
Measurement performed on:		<input checked="" type="checkbox"/> LED package <input type="checkbox"/> LED module <input type="checkbox"/> Lamp <input type="checkbox"/> Luminaire		
Model number.....		JK3030AWT-00-0000-000A0BL465E		
Test voltage (V)		3 Vdc		
Test current (mA)		400 mA		
Test frequency (Hz).....		N/A		
Ambient, t(°C)		25°C		
Measurement distance		<input checked="" type="checkbox"/> 20 cm <input type="checkbox"/> ... cm		
Source size		<input checked="" type="checkbox"/> Non-small <input type="checkbox"/> Small :		
Field of view		<input type="checkbox"/> 100 mrad <input checked="" type="checkbox"/> 11 mrad <input type="checkbox"/> 1,7 mrad (for small sources)		
Item	Symb ol	Units	Result	Remark
Correlated colour temperature	CCT	K	6819	
x/y colour coordinates			0,3068/0,3305	
Blue light hazard radiance	L _B	W/(m ² •sr ¹)	1,78E+04	@11mrad
Blue light hazard irradiance	E _B	W/m ²	--	
Luminance	L	cd/m ²	1,34E+07	@11mrad
Illuminance	E	lx	1,18E+03	
DUT operating temperature	Tc	°C	32,2	Maximum Temp. Reached
Supplementary information: Per IEC/TR 62778:2014: E _{thr} = 756 lx D _{min} = 250 mm				

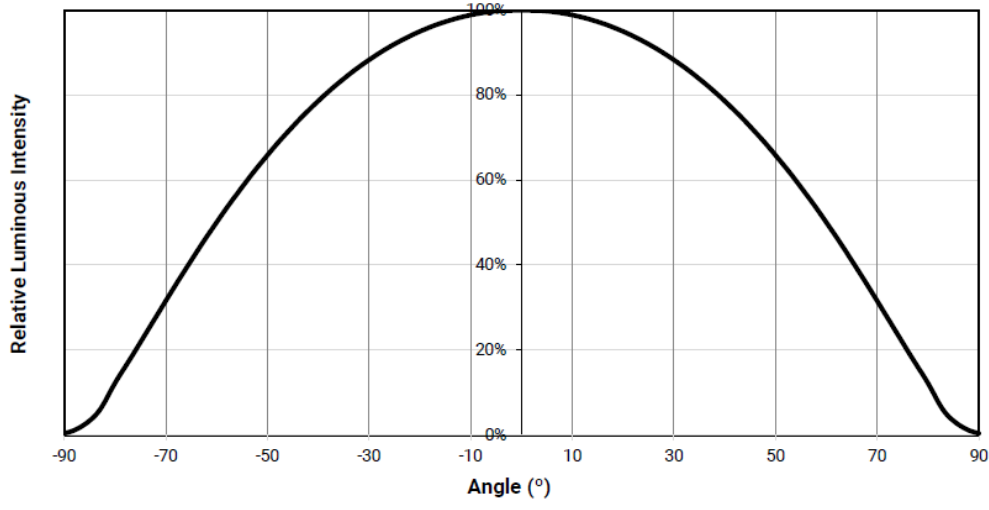
IEC TR 62778			
Clause	Requirement + Test	Result - Remark	Verdict

TABLE: Spectroradiometric measurement				
	Measurement performed on:	<input checked="" type="checkbox"/> LED package <input type="checkbox"/> LED module <input type="checkbox"/> Lamp <input type="checkbox"/> Luminaire		
	Model number	JK3030AWT-00-0000-000A0BL440E		
	Test voltage (V)	3 Vdc		—
	Test current (mA)	400 mA		—
	Test frequency (Hz).....	N/A		—
	Ambient, t(°C)	25°C		—
	Measurement distance	<input checked="" type="checkbox"/> 20 cm <input type="checkbox"/> ... cm		—
	Source size	<input checked="" type="checkbox"/> Non-small <input type="checkbox"/> Small :		—
	Field of view	<input type="checkbox"/> 100 mrad <input checked="" type="checkbox"/> 11 mrad <input type="checkbox"/> 1,7 mrad (for small sources)		—
Item	Symb ol	Units	Result	Remark
Correlated colour temperature	CCT	K	4317	
x/y colour coordinates			0,3686/0,3738	
Blue light hazard radiance	L _B	W/(m ² ·sr ¹)	1,38E+04	@11mrad
Blue light hazard irradiance	E _B	W/m ²	--	
Luminance	L	cd/m ²	1,62E+07	@11mrad
Illuminance	E	lx	1,27E+03	
DUT operating temperature	T _c	°C	32,2	Maximum Temp. Reached
Supplementary information: Per IEC/TR 62778:2014: E _{thr} = 1178 lx D _{min} = 208 mm				

IEC TR 62778			
Clause	Requirement + Test	Result - Remark	Verdict

TABLE: Spectroradiometric measurement				
	Measurement performed on:	<input checked="" type="checkbox"/> LED package <input type="checkbox"/> LED module <input type="checkbox"/> Lamp <input type="checkbox"/> Luminaire		
	Model number.....	JK3030AWT-00-0000-000A0BK430E		
	Test voltage (V)	3 Vdc		—
	Test current (mA)	400 mA		—
	Test frequency (Hz).....	N/A		—
	Ambient, t(°C)	25°C		—
	Measurement distance	<input checked="" type="checkbox"/> 20 cm <input type="checkbox"/> ... cm		—
	Source size	<input checked="" type="checkbox"/> Non-small <input type="checkbox"/> Small :		—
	Field of view	<input type="checkbox"/> 100 mrad <input checked="" type="checkbox"/> 11 mrad <input type="checkbox"/> 1,7 mrad (for small sources)		—
Item	Symbol	Units	Result	Remark
Correlated colour temperature	CCT	K	3268	
x/y colour coordinates			0,4214/0,4027	
Blue light hazard radiance	L _B	W/(m ² •sr ¹)	8,67E+03	@11mrad
Blue light hazard irradiance	E _B	W/m ²	--	
Luminance	L	cd/m ²	1,72E+07	@11mrad
Illuminance	E	lx	1,21E+03	
DUT operating temperature	T _c	°C	32,2	Maximum Temp. Reached
Supplementary information: N/A				

IEC TR 62778			
Clause	Requirement + Test	Result - Remark	Verdict

TABLE: Angular light distribution		P																																								
<p>Refer to Data sheet of the product (CLJ-DS7 Rev 1)</p>  <p>The graph displays the angular light distribution. The vertical axis is labeled 'Relative Luminous Intensity' and ranges from 0% to 100% in 20% increments. The horizontal axis is labeled 'Angle (°)' and ranges from -90 to 90 in 20-degree increments. The curve is symmetric about 0 degrees, where it reaches its maximum value of 100%. The intensity drops to approximately 50% at ±30 degrees and to approximately 10% at ±70 degrees, reaching 0% at ±90 degrees.</p> <table border="1"> <caption>Approximate data points from the graph</caption> <thead> <tr> <th>Angle (°)</th> <th>Relative Luminous Intensity (%)</th> </tr> </thead> <tbody> <tr><td>-90</td><td>0</td></tr> <tr><td>-80</td><td>5</td></tr> <tr><td>-70</td><td>25</td></tr> <tr><td>-60</td><td>50</td></tr> <tr><td>-50</td><td>70</td></tr> <tr><td>-40</td><td>85</td></tr> <tr><td>-30</td><td>95</td></tr> <tr><td>-20</td><td>100</td></tr> <tr><td>-10</td><td>100</td></tr> <tr><td>0</td><td>100</td></tr> <tr><td>10</td><td>100</td></tr> <tr><td>20</td><td>95</td></tr> <tr><td>30</td><td>85</td></tr> <tr><td>40</td><td>70</td></tr> <tr><td>50</td><td>50</td></tr> <tr><td>60</td><td>25</td></tr> <tr><td>70</td><td>5</td></tr> <tr><td>80</td><td>0</td></tr> <tr><td>90</td><td>0</td></tr> </tbody> </table>			Angle (°)	Relative Luminous Intensity (%)	-90	0	-80	5	-70	25	-60	50	-50	70	-40	85	-30	95	-20	100	-10	100	0	100	10	100	20	95	30	85	40	70	50	50	60	25	70	5	80	0	90	0
Angle (°)	Relative Luminous Intensity (%)																																									
-90	0																																									
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-60	50																																									
-50	70																																									
-40	85																																									
-30	95																																									
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60	25																																									
70	5																																									
80	0																																									
90	0																																									

List of test equipment used:

A completed list of used test equipment shall be provided in the Test Reports when a Manufacturer Testing Laboratory according to CTF stage 1 or CTF stage 2 procedure has been used.

Note: This page may be removed when CTF stage 1 CTF stage 2 are not used. See also clause 4.8 in OD 2020 for more details.

Clause	Measurement / testing	Testing / measuring equipment / material used, (Equipment ID)	Range used	Last Calibration date	Calibration due date
7	Irradiance measurements Radiance measurements	IDR 300 Monochromator (SH 344)	200-3000nm	/	/
7	Radiance measurements	S009 Telescope (SH 345)	300-1400nm	/	/
7	Radiance measurements	SRS 12 Radiance Standard (SH 348)	300-1400nm	2017/4/25	2018/4/25
7	Irradiance measurements	CL6 Spectral irradiance standard (SH 350)	300-3000nm	2017/4/25	2018/4/25
7	Irradiance measurements	CL7 Spectral irradiance standard (SH 351)	200-400nm	2017/4/25	2018/4/25
7	Irradiance measurements	Photometric detector head (SH 359)	380nm-800nm	2017/4/25	2018/4/25
7	Irradiance measurements Radiance measurements	Wattmeter (SH070)	500V,40A	2017/10/09	2018/10/09

Appendix 1: Photo Documentation



Overview

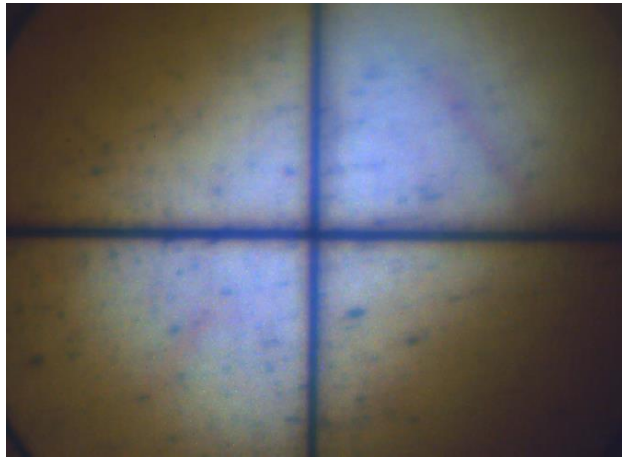
Appendix 2: Model List

Nominal CCT	Minimum CRI	Flux Group	Minimum Flux (lm) @ 25 °C	Typical Flux (lm) @ 25 °C	Typical Flux (lm) @ 85 °C*	Order Code
6500 K	70	D4	32.0	35.5	31.0	JB3030AWT-00-0000-000A0BD465E
	80	D3	30.0	33.5	29.0	JB3030AWT-00-0000-000A0HD365E
	90	C5	26.0	30.0	25.7	JB3030AWT-00-0000-000A0UC565E
5700 K	70	D4	32.0	35.5	31.0	JB3030AWT-00-0000-000A0BD457E
	80	D3	30.0	33.5	29.0	JB3030AWT-00-0000-000A0HD357E
	90	C5	26.0	30.0	25.7	JB3030AWT-00-0000-000A0UC557E
5000 K	70	D4	32.0	35.5	31.0	JB3030AWT-00-0000-000A0BD450E
	80	D3	30.0	33.5	29.0	JB3030AWT-00-0000-000A0HD350E
	90	C5	26.0	30.0	25.7	JB3030AWT-00-0000-000A0UC550E
4500 K	70	D4	32.0	35.5	31.0	JB3030AWT-00-0000-000A0BD445E
	80	D3	30.0	33.5	29.0	JB3030AWT-00-0000-000A0HD345E
	90	C5	26.0	30.0	25.7	JB3030AWT-00-0000-000A0UC545E
4000 K	70	D4	32.0	35.5	31.0	JB3030AWT-00-0000-000A0BD440E
	80	D3	30.0	33.5	29.0	JB3030AWT-00-0000-000A0HD340E
	90	C5	26.0	30.0	25.7	JB3030AWT-00-0000-000A0UC540E
3500 K	70	D3	30.0	34.5	30.0	JB3030AWT-00-0000-000A0BD335E
	80	D2	28.0	33.0	28.5	JB3030AWT-00-0000-000A0HD235E
	90	C4	24.0	28.0	24.0	JB3030AWT-00-0000-000A0UC435E
3000 K	70	D3	30.0	33.5	29.5	JB3030AWT-00-0000-000A0BD330E
	80	D2	28.0	32.0	27.5	JB3030AWT-00-0000-000A0HD230E
	90	C4	24.0	26.0	22.5	JB3030AWT-00-0000-000A0UC430E
2700 K	70	D2	28.0	30.5	26.5	JB3030AWT-00-0000-000A0BD227E
	80	C5	26.0	24.0	20.7	JB3030AWT-00-0000-000A0HC527E
	90	C3	22.0	24.7	20.7	JB3030AWT-00-0000-000A0UC327E

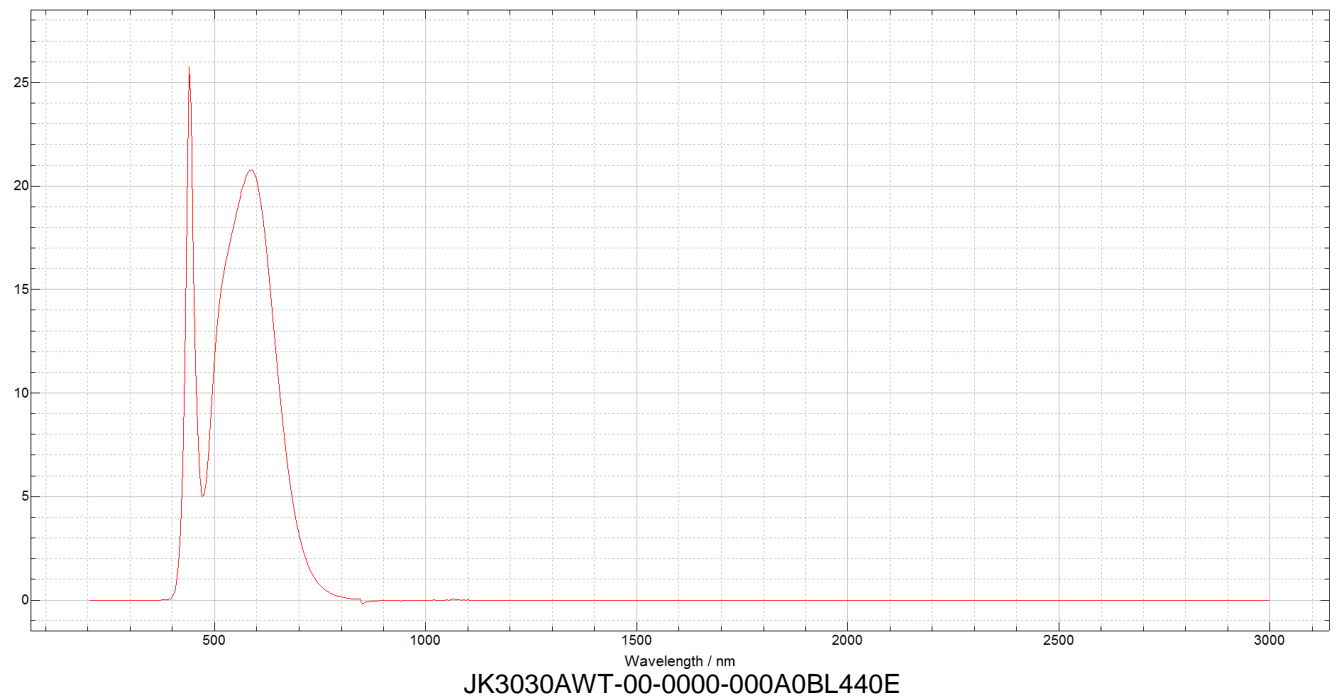
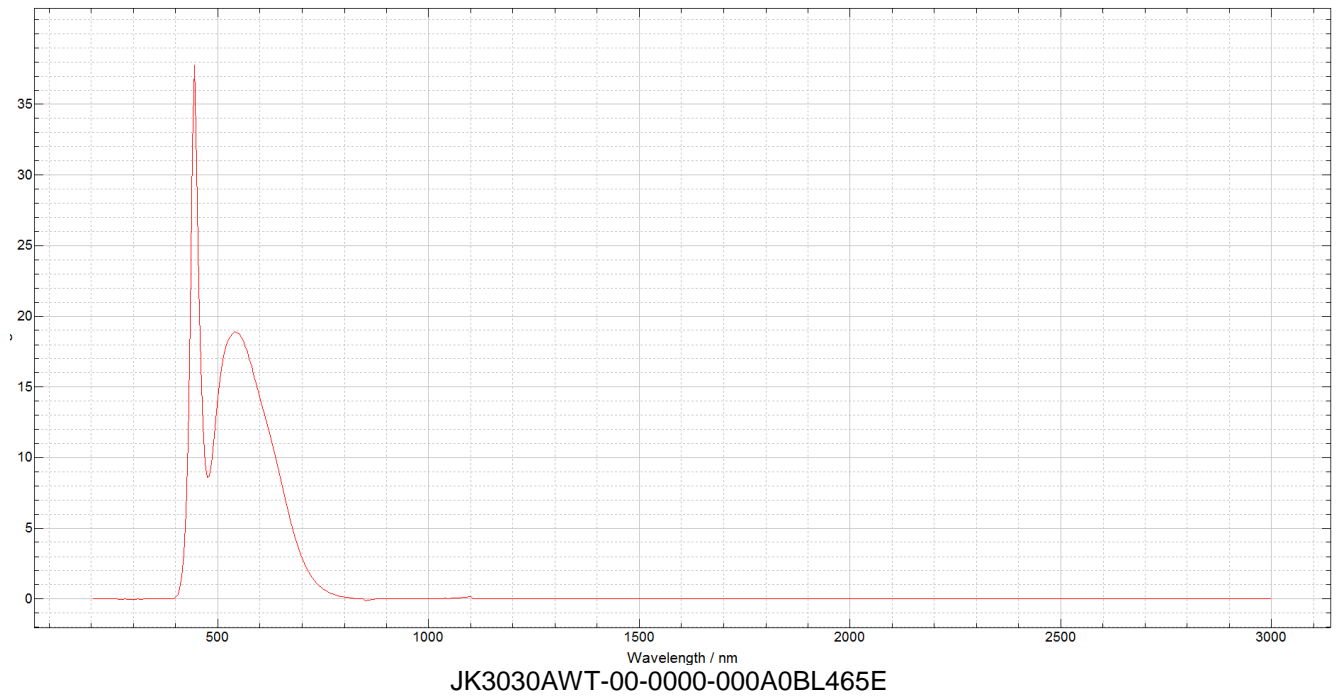
Nominal CCT	Minimum CRI	Flux Group	Minimum Flux (lm) @ 25 °C	Typical Flux (lm) @ 25 °C	Typical Flux (lm) @ 85 °C*	Order Code
6500 K	70	L4	142	156	132	JK3030AWT-00-0000-000A0BL465E
	80	L2	135	146	125	JK3030AWT-00-0000-000A0HL265E
	90	J4	114	125	108	JK3030AWT-00-0000-000A0UJ465E
5700 K	70	L4	142	156	132	JK3030AWT-00-0000-000A0BL457E
	80	L2	135	146	125	JK3030AWT-00-0000-000A0HL257E
	90	J4	114	125	108	JK3030AWT-00-0000-000A0UJ457E
5000 K	70	L4	142	156	132	JK3030AWT-00-0000-000A0BL450E
	80	L2	135	146	125	JK3030AWT-00-0000-000A0HL250E
	90	J4	114	125	108	JK3030AWT-00-0000-000A0UJ450E
4500 K	70	L4	142	156	132	JK3030AWT-00-0000-000A0BL445E
	80	L2	135	146	125	JK3030AWT-00-0000-000A0HL245E
	90	J4	114	125	108	JK3030AWT-00-0000-000A0UJ445E
4000 K	70	L4	142	156	132	JK3030AWT-00-0000-000A0BL440E
	80	L2	135	146	125	JK3030AWT-00-0000-000A0HL240E
	90	J4	114	125	108	JK3030AWT-00-0000-000A0UJ440E
3500 K	70	L2	135	150	129	JK3030AWT-00-0000-000A0BL235E
	80	K4	128	142	123	JK3030AWT-00-0000-000A0HK435E
	90	J2	107	121	103	JK3030AWT-00-0000-000A0UJ235E
3000 K	70	K4	128	147	125	JK3030AWT-00-0000-000A0BK430E
	80	K2	121	139	120	JK3030AWT-00-0000-000A0HK230E
	90	H4	100	119	101	JK3030AWT-00-0000-000A0UH430E
2700 K	70	K4	128	141	121	JK3030AWT-00-0000-000A0BK427E
	80	K2	121	133	117	JK3030AWT-00-0000-000A0HK227E
	90	H4	100	114	97	JK3030AWT-00-0000-000A0UH427E

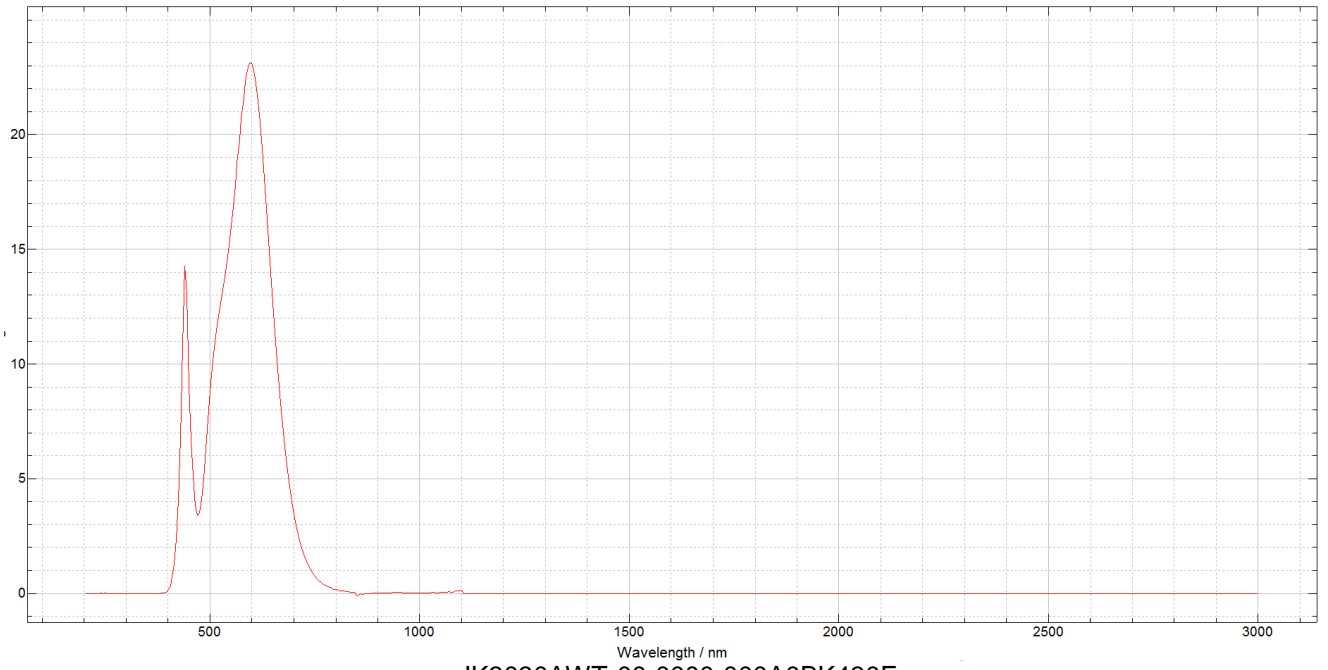
Nominal CCT	Minimum CRI	Flux Group	Minimum Flux (lm) @ 25 °C	Typical Flux (lm) @ 25 °C	Typical Flux (lm) @ 85 °C*	Order Code
6500 K	70	L4	142	152	131	JK3030AWT-00-0000-000B0BL465E
	80	L2	135	146	124	JK3030AWT-00-0000-000B0HL265E
	90	J4	114	124	107	JK3030AWT-00-0000-000B0UJ465E
5700 K	70	L4	142	152	131	JK3030AWT-00-0000-000B0BL457E
	80	L2	135	146	124	JK3030AWT-00-0000-000B0HL257E
	90	J4	114	124	107	JK3030AWT-00-0000-000B0UJ457E
5000 K	70	L4	142	152	131	JK3030AWT-00-0000-000B0BL450E
	80	L2	135	146	124	JK3030AWT-00-0000-000B0HL250E
	90	J4	114	124	107	JK3030AWT-00-0000-000B0UJ450E
4500 K	70	L4	142	152	131	JK3030AWT-00-0000-000B0BL445E
	80	L2	135	146	124	JK3030AWT-00-0000-000B0HL245E
	90	J4	114	124	107	JK3030AWT-00-0000-000B0UJ445E
4000 K	70	L4	142	152	131	JK3030AWT-00-0000-000B0BL440E
	80	L2	135	146	124	JK3030AWT-00-0000-000B0HL240E
	90	J4	114	124	107	JK3030AWT-00-0000-000B0UJ440E
3500 K	70	L2	135	147	126	JK3030AWT-00-0000-000B0BL235E
	80	K4	128	140	120	JK3030AWT-00-0000-000B0HK435E
	90	J2	107	120	102	JK3030AWT-00-0000-000B0UJ235E
3000 K	70	K4	128	145	125	JK3030AWT-00-0000-000B0BK430E
	80	K2	121	138	117	JK3030AWT-00-0000-000B0HK230E
	90	H4	100	118	100	JK3030AWT-00-0000-000B0UH430E
2700 K	70	K4	128	138	118	JK3030AWT-00-0000-000B0BK427E
	80	K2	121	132	112	JK3030AWT-00-0000-000B0HK227E
	90	H4	100	113	96	JK3030AWT-00-0000-000B0UH427E

Appendix 3: Low Current LED source Appearance



Appendix 4: Relative Spectrum Of Tested Sample(s)



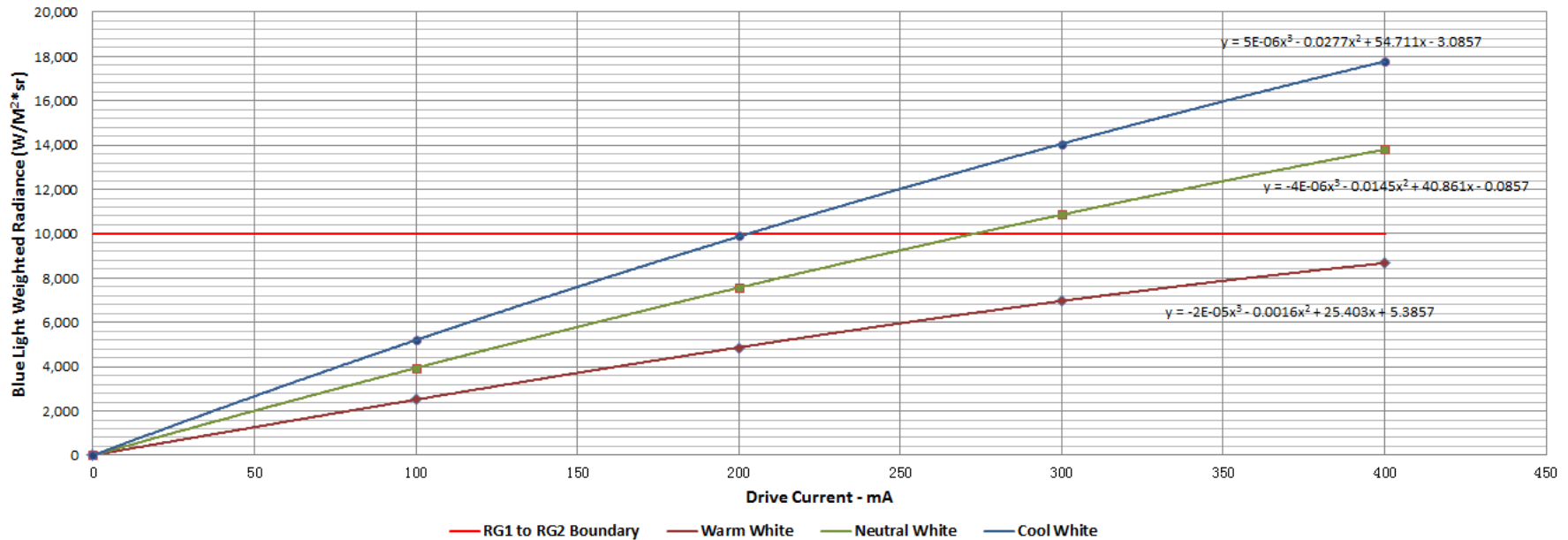


JK3030AWT-00-0000-000A0BK430E

Appendix 5: Blue Light Hazard-Forward Current Relationship (Non-mandatory Information)

The diagram below shows the different blue light hazards against different forward currents. It is additional information for reference only.

Cree J Series JK3030 3V - Photo-biological Risk Rankings by Current & Color Temperature



CCT Group:	Product ID:	Measured CCT:	Drive Currents (mA)					Regression Formula:	Fit to RG2 Line:	Current @ RG-1 to RG-2 Boundary, mA:
			0	100	200	300	400			
Warm White	JK3030AWT-00-0000-000A0BK430E	3268K	0	2532	4835	6981	8665	$y = -2E-05x^3 - 0.0016x^2 + 25.403x + 5.3857$	--	--
Neutral White	JK3030AWT-00-0000-000A0BL440E	4317K	0	3937	7564	10857	13798	$y = -4E-06x^3 - 0.0145x^2 + 40.861x - 0.0857$	10000	273
Cool White	JK3030AWT-00-0000-000A0BL465E	6819K	0	5184	9891	14043	17778	$y = 5E-06x^3 - 0.0277x^2 + 54.711x - 3.0857$	10000	203

Appendix 6: Table 6.1 Based On IEC 62471:2006

DUT: JK3030AWT-00-0000-000A0BL465E, Evaluation Distance: 200mm, Tested Current:400 mA, Angular subtense of the apparent source α : 13 mrad

IEC 62471									
Clause	Requirement + Test				Result – Remark				Verdict
Table 6.1	Emission limits for risk groups of continuous wave lamps								P
Risk	Action spectrum	Symbol	Units	Emission Measurement					
				Exempt		Low risk		Mod risk	
				Limit	Result	Limit	Result	Limit	Result
Actinic UV	$S_{UV}(\lambda)$	E_s	$W \cdot m^{-2}$	0,001	0,0000	0,003		0,03	
Near UV		E_{UVA}	$W \cdot m^{-2}$	10	0,0000	33		100	
Blue light	$B(\lambda)$	L_B	$W \cdot m^{-2} \cdot sr^{-1}$	100	1,34E+02	10000	1,78E+04	4000000	5,35E+04
Blue light, small source	$B(\lambda)$	E_B	$W \cdot m^{-2}$	1,0*	--	1,0		400	
Retinal thermal	$R(\lambda)$	L_R	$W \cdot m^{-2} \cdot sr^{-1}$	28000/ α	2,03E+05	28000/ α		71000/ α	
Retinal thermal, weak visual stimulus**	$R(\lambda)$	L_{IR}	$W \cdot m^{-2} \cdot sr^{-1}$	6000/ α	--	6000/ α		6000/ α	
IR radiation, eye		E_{IR}	$W \cdot m^{-2}$	100	0,01	570		3200	
* Small source defined as one with $\alpha < 0,011$ radian. Averaging field of view at 10000 s is 0,1 radian.									
** Involves evaluation of non-GLS source									

DUT: JK3030AWT-00-0000-000A0BL440E, Evaluation Distance: 200mm, Tested Current:400 mA, Angular subtense of the apparent source α : 13 mrad

IEC 62471									
Clause	Requirement + Test				Result – Remark				Verdict
Table 6.1	Emission limits for risk groups of continuous wave lamps								P
Risk	Action spectrum	Symbol	Units	Emission Measurement					
				Exempt		Low risk		Mod risk	
				Limit	Result	Limit	Result	Limit	Result
Actinic UV	$S_{UV}(\lambda)$	E_s	$W \cdot m^{-2}$	0,001	0,0000	0,003		0,03	
Near UV		E_{UVA}	$W \cdot m^{-2}$	10	0,0000	33		100	
Blue light	$B(\lambda)$	L_B	$W \cdot m^{-2} \cdot sr^{-1}$	100	1,07E+02	10000	1,38E+04	4000000	4,13E+04
Blue light, small source	$B(\lambda)$	E_B	$W \cdot m^{-2}$	1,0*	--	1,0		400	
Retinal thermal	$R(\lambda)$	L_R	$W \cdot m^{-2} \cdot sr^{-1}$	28000/ α	1,71E+05	28000/ α		71000/ α	
Retinal thermal, weak visual stimulus**	$R(\lambda)$	L_{IR}	$W \cdot m^{-2} \cdot sr^{-1}$	6000/ α	--	6000/ α		6000/ α	
IR radiation, eye		E_{IR}	$W \cdot m^{-2}$	100	0,02	570		3200	
* Small source defined as one with $\alpha < 0,011$ radian. Averaging field of view at 10000 s is 0,1 radian.									
** Involves evaluation of non-GLS source									

DUT: JK3030AWT-00-0000-000A0BK430E, Evaluation Distance: 200mm, Tested Current:400 mA, Angular subtense of the apparent source α : 13 mrad

IEC 62471			
Clause	Requirement + Test	Result – Remark	Verdict

Table 6.1 Emission limits for risk groups of continuous wave lamps									P
Risk	Action spectrum	Symbol	Units	Emission Measurement					
				Exempt		Low risk		Mod risk	
				Limit	Result	Limit	Result	Limit	Result
Actinic UV	$S_{UV}(\lambda)$	E_s	$W \cdot m^{-2}$	0,001	0,0000	0,003		0,03	
Near UV		E_{UVA}	$W \cdot m^{-2}$	10	0,0000	33		100	
Blue light	$B(\lambda)$	L_B	$W \cdot m^{-2} \cdot sr^{-1}$	100	5,68E+01	10000		4000000	
Blue light, small source	$B(\lambda)$	E_B	$W \cdot m^{-2}$	1,0*	--	1,0		400	
Retinal thermal	$R(\lambda)$	L_R	$W \cdot m^{-2} \cdot sr^{-1}$	28000/ α	1,25E+05	28000/ α		71000/ α	
Retinal thermal, weak visual stimulus**	$R(\lambda)$	L_{IR}	$W \cdot m^{-2} \cdot sr^{-1}$	6000/ α	--	6000/ α		6000/ α	
IR radiation, eye		E_{IR}	$W \cdot m^{-2}$	100	0,01	570		3200	
* Small source defined as one with $\alpha < 0,011$ radian. Averaging field of view at 10000 s is 0,1 radian.									
** Involves evaluation of non-GLS source									

Appendix 7: Table 6.1 Based On EN62471:2008, Attachment To IEC 62471 European Group Differences And National Differences

DUT: JK3030AWT-00-0000-000A0BL465E, Evaluation Distance: 200mm, Tested Current:400 mA, Angular subtense of the apparent source α : 13 mrad

EN 62471										
Clause	Requirement + Test			Result – Remark				Verdict		
Table 6.1	Emission limits for risk groups of continuous wave lamps (based on EU Directive 2006/25/EC)								P	
Risk	Action spectrum	Symbol	Units	Emission Measurement						
				Exempt		Low risk		Mod risk		
				Limit	Result	Limit	Result	Limit	Result	
Actinic UV	$S_{UV}(\lambda)$	E_s	$W \cdot m^{-2}$	0,001	0,0000	--	--	--	--	
Near UV		E_{UVA}	$W \cdot m^{-2}$	0,33	0,0000	--	--	--	--	
Blue light	$B(\lambda)$	L_B	$W \cdot m^{-2} \cdot sr^{-1}$	100	1,34E+02	10000	1,78E+04	4000000	5,35E+04	
Blue light, small source	$B(\lambda)$	E_B	$W \cdot m^{-2}$	0,01*	--	1,0		400		
Retinal thermal	$R(\lambda)$	L_R	$W \cdot m^{-2} \cdot sr^{-1}$	28000/ α	2,03E+05	28000/ α		71000/ α		
Retinal thermal, weak visual stimulus**	$R(\lambda)$	L_{IR}	$W \cdot m^{-2} \cdot sr^{-1}$	545000 0,0017 $\leq \alpha \leq$ 0,011	--					
				6000/ α 0,011 $\leq \alpha \leq$ 0,1	--					
IR radiation, eye		E_{IR}	$W \cdot m^{-2}$	100	0,01	570		3200		
<p>* Small source defined as one with $\alpha < 0,011$ radian. Averaging field of view at 10000 s is 0,1 radian.</p> <p>** Involves evaluation of non-GLS source</p> <p>NOTE The action functions: see Table 4.1 and Table 4.2 The applicable aperture diameters: see 4.2.1 The limitations for the angular subtenses: see 4.2.2 The related measurement condition 5.2.3 and the range of acceptance angles: see Table 5.5.</p>										

DUT: JK3030AWT-00-0000-000A0BL440E, Evaluation Distance: 200mm, Tested Current:400 mA, Angular subtense of the apparent source α : 13 mrad

EN 62471										
Clause	Requirement + Test			Result – Remark				Verdict		
Table 6.1	Emission limits for risk groups of continuous wave lamps (based on EU Directive 2006/25/EC)								P	
Risk	Action spectrum	Symbol	Units	Emission Measurement						
				Exempt		Low risk		Mod risk		
				Limit	Result	Limit	Result	Limit	Result	
Actinic UV	$S_{UV}(\lambda)$	E_s	$W \cdot m^{-2}$	0,001	0,0000	--	--	--	--	
Near UV		E_{UVA}	$W \cdot m^{-2}$	0,33	0,0000	--	--	--	--	
Blue light	$B(\lambda)$	L_B	$W \cdot m^{-2} \cdot sr^{-1}$	100	1,07E+02	10000	1,38E+04	4000000	4,13E+04	
Blue light, small source	$B(\lambda)$	E_B	$W \cdot m^{-2}$	0,01*	--	1,0		400		
Retinal thermal	$R(\lambda)$	L_R	$W \cdot m^{-2} \cdot sr^{-1}$	28000/ α	1,71E+05	28000/ α		71000/ α		
Retinal thermal, weak visual stimulus**	$R(\lambda)$	L_{IR}	$W \cdot m^{-2} \cdot sr^{-1}$	545000 0,0017 ≤ α ≤ 0,011	--					
				6000/ α 0,011 ≤ α ≤ 0,1	--					
IR radiation, eye		E_{IR}	$W \cdot m^{-2}$	100	0,02	570		3200		
<p>* Small source defined as one with $\alpha < 0,011$ radian. Averaging field of view at 10000 s is 0,1 radian.</p> <p>** Involves evaluation of non-GLS source</p> <p>NOTE The action functions: see Table 4.1 and Table 4.2 The applicable aperture diameters: see 4.2.1 The limitations for the angular subtenses: see 4.2.2 The related measurement condition 5.2.3 and the range of acceptance angles: see Table 5.5.</p>										

DUT: JK3030AWT-00-0000-000A0BK430E, Evaluation Distance: 200mm, Tested Current:400 mA, Angular subtense of the apparent source α : 13 mrad

EN 62471										
Clause	Requirement + Test			Result – Remark				Verdict		
Table 6.1	Emission limits for risk groups of continuous wave lamps (based on EU Directive 2006/25/EC)								P	
Risk	Action spectrum	Symbol	Units	Emission Measurement						
				Exempt		Low risk		Mod risk		
				Limit	Result	Limit	Result	Limit	Result	
Actinic UV	$S_{UV}(\lambda)$	E_s	$W \cdot m^{-2}$	0,001	0,0000	--	--	--	--	
Near UV		E_{UVA}	$W \cdot m^{-2}$	0,33	0,0000	--	--	--	--	
Blue light	$B(\lambda)$	L_B	$W \cdot m^{-2} \cdot sr^{-1}$	100	5,68E+01	10000		4000000		
Blue light, small source	$B(\lambda)$	E_B	$W \cdot m^{-2}$	0,01*	--	1,0		400		
Retinal thermal	$R(\lambda)$	L_R	$W \cdot m^{-2} \cdot sr^{-1}$	28000/ α	1,25E+05	28000/ α		71000/ α		
Retinal thermal, weak visual stimulus**	$R(\lambda)$	L_{IR}	$W \cdot m^{-2} \cdot sr^{-1}$	545000 0,0017 ≤ α ≤ 0,011	--					
				6000/ α 0,011 ≤ α ≤ 0,1	--					
IR radiation, eye		E_{IR}	$W \cdot m^{-2}$	100	0,01	570		3200		
<p>* Small source defined as one with $\alpha < 0,011$ radian. Averaging field of view at 10000 s is 0,1 radian.</p> <p>** Involves evaluation of non-GLS source</p> <p>NOTE The action functions: see Table 4.1 and Table 4.2 The applicable aperture diameters: see 4.2.1 The limitations for the angular subtenses: see 4.2.2 The related measurement condition 5.2.3 and the range of acceptance angles: see Table 5.5.</p>										