

Doc No: FRM-LAB-009a

Rev.No/Date: 02 / 11.01.2019

Sayfa / Page : 1 / 22

**TEST RAPORU**  
TEST REPORT

TL-806

19-TST-0044-40

03-19

**Müşterinin Adı Adresi**  
Customer name/address

: HERA EĞLENCE VE MİMARİ AYDINLATMA SİSTEMLERİ A.Ş.  
Güllübağlar Mah. Kahramanlar Cad. No:3-1 34906 PENDİK-  
İSTANBUL/TÜRKİYE

**İstek Numarası**  
Order No

: 19-TST-0044

**Numunenin Adı ve Tarifi**  
Name and identity of test item

: SWORD RGBW RADIUS DIFFUSED(150cm)  
Sword RGBW Radius diffused(150cm)

**Numunenin kabul tarihi**  
The date of receipt of test item

: 13.03.2019

**Açıklamalar**  
Remarks

: DGC'ye , IEC 62471 standardı uyarınca fotobiyolojik ölçümler yapılmıştır.  
Photobiological measurement has been applied to EUT according to IEC 62471

**Deneyin Yapıldığı Tarih**  
Date of Test

: 13.03.2019-14.03.2019

**Raporun Sayfa Sayısı**  
Number of Pages of the Report

:22

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The test and/or measurement results, the uncertainties ( if applicable ) with confidence probability and test methods are given on the following pages which are part of this report.

Bu rapor, laboratuvara gönderilen numunelere uygulanan deney/deneyler sonucu hazırlanmıştır. Müşteriye ait diğer numuneleri kapsamaz.  
This report was prepared according to test results of specimens sent to laboratory. It doesn't contain other specimens belonging to customer.



**Deney Sorumlusu**  
Person in charge of test

Saltuk Buğra GÜNEŞ

**Onaylayan**  
Approval

Gürhan CANSIZ

Doc No: FRM-LAB-009a

Rev.No/Date: 02 / 11.01.2019

Sayfa / Page : 2 / 22

TL-806
19-TST-0044-40
03-19

**İÇİNDEKİLER**  
(CONTENTS)

	<b>Sayfa</b> Page
<b>1. Dokümantasyon (Documentation)</b>	
<b>1.1 DGC, Çevre Şartları ve Sembollerin Tanımları (Description of the EUT, Environmental Conditions and Symbol Definitions)</b>	3
<b>1.2 Deney Standartları (Test Standards)</b>	4
<b>1.3 Deney Ekipmanları (Test Equipments)</b>	4
<b>2. Deney Sonuçları ve Koşulları (Test Results and Conditions)</b>	5-17
<b>2.1 Beyaz Renk Fotobiyolojik Deney Sonuçları (Photobiological Test Results of the white color)</b>	18
<b>2.2 Kırmızı Renk Fotobiyolojik Deney Sonuçları (Photobiological Test Results of the red color)</b>	19
<b>2.3 Mavi Renk Fotobiyolojik Deney Sonuçları (Photobiological Test Results of the blue color)</b>	20
<b>2.4 Yeşil Renk Fotobiyolojik Deney Sonuçları (Photobiological Test Results of the green color)</b>	21
<b>3.1 DGC'nin Fotoğrafları (Photos of EUT)</b>	22



Doc No: FRM-LAB-009a

Rev.No/Date: 02 / 11.01.2019

Sayfa / Page : 3 / 22

TL-806
19-TST-0044-40
03-19

1.1

**DGC, Çevre Şartları ve Sembollerin Tanımları** (Description of the EUT, Environmental Conditions and Symbol Definitions)

**Markası / Brand**

: HERA

**Modeli / Model**

: RGBW Radius Diffused (150cm)

**Seri Numarası / Serial Number**

: Test Numunesi  
Test Sample

**Beyan Gücü / Rated Power**

: 35 W

**Beyan Gerilimi / Rated Voltage**

: 48 VDC

**Sembollerin Tanımı / Definitions of Symbols**

DGC= Deneden Geçen Cihaz  
EUT=Equipment Under Test



<b>TEST REPORT</b> <b>IEC 62471</b> <b>Photobiological safety of lamps and lamp systems</b>	
Report Reference No. ....:	19-TST-0044-40(03-19)
Date of issue .....	14.03.2019
Total number of pages .....	22
Tested / Reported by (printed name and signature) .....	Saltuk Buğra GÜNEŞ
Approved by (printed name and signature) .....	Gürhan CANSIZ
Testing Laboratory .....	TÜV AUSTRIA TURK
Address .....	Organize Sanayi Uygurlar Cad. No:1 Sincan-Ankara / Turkey
Applicant's name .....	HERA EĞLENCE VE MİMARİ AYDINLATMA SİSTEMLERİ A.Ş.
Address .....	Güllübağlar Mah. Kahramanlar Cad. No:3-1 34906 PENDİK- İSTANBUL/TÜRKİYE
<b>Test specification:</b>	
Standard .....	IEC 62471:2006 (First Edition)
Test procedure .....	CB
Non-standard test method .....	N/A
Test Report Form No. ....:	IEC62471A
TRF Originator .....	VDE Testing and Certification Institute
Master TRF .....	Dated 2009-05
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<b>This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.</b>	
Test item description .....	
Trade Mark .....	HERA
Manufacturer .....	HERA EĞLENCE VE MİMARİ AYDINLATMA SİSTEMLERİ A.Ş.
Model/Type reference .....	SWORD RGBW RADIUS DIFFUSED(150cm)
Ratings .....	35 W / 48 V DC

Doc No: FRM-LAB-009a

Rev.No/Date: 02 / 11.01.2019

Sayfa / Page : 5 / 22

TL-806

19-TST-0044-40

03-19

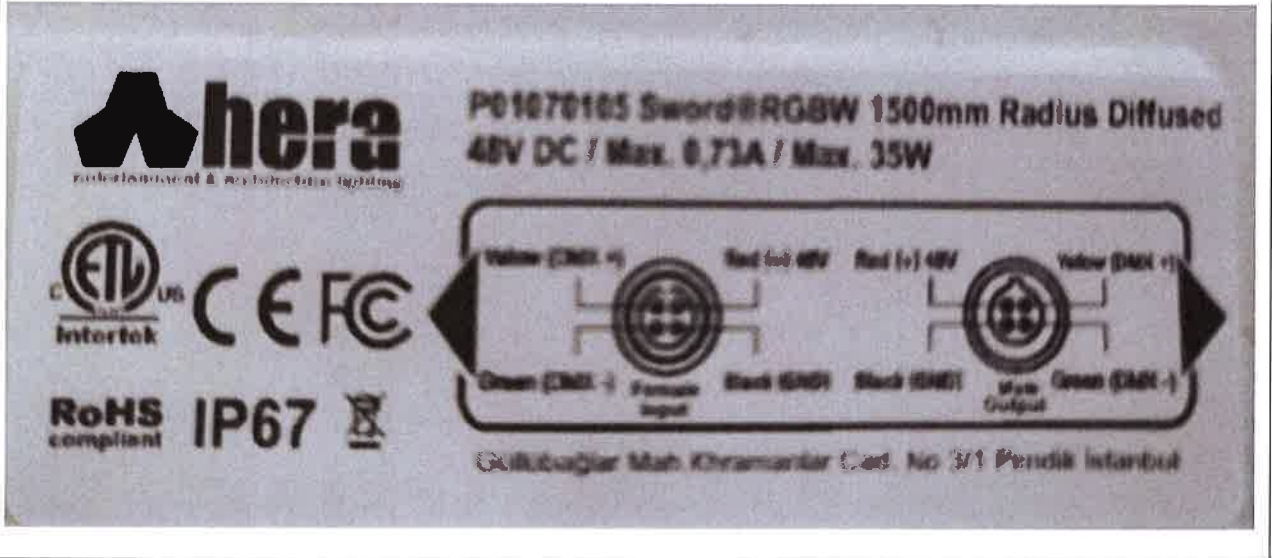
**2.Deney Sonuçları ve Koşulları (Test Results and Conditions)****Summary of testing:****Tests performed (name of test and test clause):**

The test sample was configured for continuous emission and powered by 48 V dc. The LED output power was measured under normal conditions noted in details of measurement procedure and measurement results Measurement results: RGBW Radius Diffused (150cm) See page 18 to 21.

The models complied with the requirements of Eempt Group LED Product according to EN 62471:2008.

**Testing location:**

TÜV AUSTRIA TURK

Organize Sanayi Uygurlar Cad. No:1  
Sincan-Ankara / Turkey**Summary of compliance with National Differences:****Copy of marking plate:**

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Doc No: FRM-LAB-009a

Rev.No/Date: 02 / 11.01.2019

Sayfa / Page : 6 / 22

TL-806
19-TST-0044-40
03-19

**Test item particulars** ..... : RGBW Radius Diffused (150cm)  
Tested lamp ..... :  continuous wave lamps       pulsed lamps  
Tested lamp system ..... : RGBW Radius Diffused (150cm)  
Lamp classification group ..... :  exempt       risk 1       risk 2       risk 3  
Lamp cap ..... : N/A  
Bulb ..... : LEDs  
Rated of the lamp ..... : 35 W, 48 V DC  
Furthermore marking on the lamp ..... : N/A  
Seasoning of lamps according IEC standard ..... : IEC 62471: 2006(First Edition)  
Used measurement instrument ..... : OST-300  
Temperature by measurement ..... : 25.3 °C  
Information for safety use ..... : Exempt group

**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 ..... : 13.03.2019  
Date (s) of performance of tests ..... : 14.03.2019

**General remarks:**

The test results presented in this report relate only to the object tested.  
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"(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 comma (point) is used as the decimal separator.  
List of test equipment must be kept on file and available for review.

**General product information:**

The products complied with the requirements of Exempt group LED Product according to EN 62471:2008.



Doc No: FRM-LAB-009a

Rev.No/Date: 02 / 11.01.2019

Sayfa / Page : 7 / 22

TL-806
19-TST-0044-40
03-19

IEC 62471			
Clause	Requirement + Test	Result – Remark	Verdict
<b>4</b>	<b>EXPOSURE LIMITS</b>		<b>P</b>
4.1	General		<b>P</b>
	The exposure limits in this standard is not less than 0,01 ms and not more than any 8-hour period and should be used as guides in the control of exposure		<b>P</b>
	Detailed spectral data of a light source are generally required only if the luminance of the source exceeds $10^4 \text{ cd}\cdot\text{m}^{-2}$	see clause 4.3	<b>P</b>
4.3	Hazard exposure limits		<b>P</b>
4.3.1	Actinic UV hazard exposure limit for the skin and eye		<b>P</b>
	The exposure limit for effective radiant exposure is $30 \text{ J}\cdot\text{m}^{-2}$ within any 8-hour period	$E_s = 1.1\text{e-}05\text{W}/\text{m}^2$ $T_{\text{max\_}E_s} > 8\text{h}$	<b>P</b>
	To protect against injury of the eye or skin from ultraviolet radiation exposure produced by a broad-band source, the effective integrated spectral irradiance, $E_s$ , of the light source shall not exceed the levels defined by:		<b>P</b>
	$E_s \cdot t = \sum_{200}^{400} \sum_t E_{\lambda}(\lambda, t) \cdot S_{UV}(\lambda) \cdot \Delta t \cdot \Delta \lambda \leq 30 \quad \text{J}\cdot\text{m}^{-2}$		<b>P</b>
	The permissible time for exposure to ultraviolet radiation incident upon the unprotected eye or skin shall be computed by:		<b>P</b>
	$t_{\text{max}} = \frac{30}{E_s} \quad \text{s}$		<b>P</b>
4.3.2	Near-UV hazard exposure limit for eye		<b>P</b>
	For the spectral region 315 nm to 400 nm (UV-A) the total radiant exposure to the eye shall not exceed $10000 \text{ J}\cdot\text{m}^{-2}$ for exposure times less than 1000 s. For exposure times greater than 1000 s (approximately 16 minutes) the UV-A irradiance for the unprotected eye, $E_{\text{UVA}}$ , shall not exceed $10 \text{ W}\cdot\text{m}^{-2}$ .		<b>P</b>
	The permissible time for exposure to ultraviolet radiation incident upon the unprotected eye for time less than 1000 s, shall be computed by:		<b>P</b>
	$t_{\text{max}} \leq \frac{10\,000}{E_{\text{UVA}}} \quad \text{s}$		<b>P</b>
4.3.3	Retinal blue light hazard exposure limit		<b>P</b>

Bu rapor, laboratuvarın yazılı izni olmadan kısmen kopyalanıp çoğaltılamaz. İmzasız ve mühürsüz raporlar geçersizdir.

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Doc No: FRM-LAB-009a

Rev.No/Date: 02 / 11.01.2019

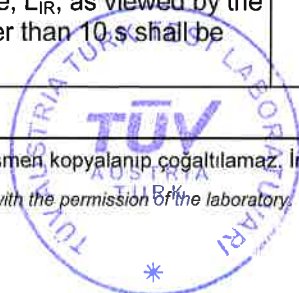
Sayfa / Page : 8 / 22

TL-806
19-TST-0044-40
03-19

IEC 62471			
Clause	Requirement + Test	Result – Remark	Verdict
	To protect against retinal photochemical injury from chronic blue-light exposure, the integrated spectral radiance of the light source weighted against the blue-light hazard function, $B(\lambda)$ , i.e., the blue-light weighted radiance, $L_B$ , shall not exceed the levels defined by:		P
	$L_B \cdot t = \sum_{300}^{700} \sum_t L_\lambda(\lambda, t) \cdot B(\lambda) \cdot \Delta\lambda \leq 10^6 \quad \text{J} \cdot \text{m}^{-2} \cdot \text{sr}^{-1}$	for $t \leq 10^4$ s $t_{\max} = \frac{10^6}{L_B}$	P
	$L_B = \sum_{300}^{700} L_\lambda \cdot B(\lambda) \cdot \Delta\lambda \leq 100 \quad \text{W} \cdot \text{m}^{-2} \cdot \text{sr}^{-1}$	for $t > 10^4$ s	P
4.3.4	Retinal blue light hazard exposure limit - small source		P
	Thus the spectral irradiance at the eye $E_\lambda$ , weighted against the blue-light hazard function $B(\lambda)$ shall not exceed the levels defined by:	see table 4.2	P
	$E_B \cdot t = \sum_{300}^{700} \sum_t E_\lambda(\lambda, t) \cdot B(\lambda) \cdot \Delta\lambda \leq 100 \quad \text{J} \cdot \text{m}^{-2}$	for $t \leq 100$ s 2.60e-01 W/m2 Tmax is not needed	P
	$E_B = \sum_{300}^{700} E_\lambda \cdot B(\lambda) \cdot \Delta\lambda \leq 1 \quad \text{W} \cdot \text{m}^{-2}$	for $t > 100$ s 2.60e-01 W/m2 Tmax is not needed	P
4.3.5	Retinal thermal hazard exposure limit		P
	To protect against retinal thermal injury, the integrated spectral radiance of the light source, $L_\lambda$ , weighted by the burn hazard weighting function $R(\lambda)$ (from Figure 4.2 and Table 4.2), i.e., the burn hazard weighted radiance, shall not exceed the levels defined by:	5.5e+01 W/m2/Sr Tmax_LR > 10s	P
	$L_R = \sum_{380}^{1400} L_\lambda \cdot R(\lambda) \cdot \Delta\lambda \leq \frac{50\,000}{\alpha \cdot t^{0,25}} \quad \text{W} \cdot \text{m}^{-2} \cdot \text{sr}^{-1}$	(10 $\mu$ s $\leq$ t $\leq$ 10 s)	P
4.3.6	Retinal thermal hazard exposure limit – weak visual stimulus		P
	For an infrared heat lamp or any near-infrared source where a weak visual stimulus is inadequate to activate the aversion response, the near infrared (780 nm to 1400 nm) radiance, $L_{IR}$ , as viewed by the eye for exposure times greater than 10 s shall be limited to:	3.0e-02 W/m2/Sr (Tmax is not needed)	P

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Doc No: FRM-LAB-009a

Rev.No/Date: 02 / 11.01.2019

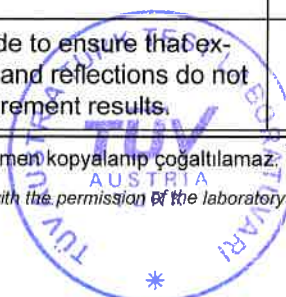
Sayfa / Page : 9 / 22

TL-806
19-TST-0044-40
03-19

IEC 62471			
Clause	Requirement + Test	Result – Remark	Verdict
	$L_{IR} = \sum_{780}^{1400} L_{\lambda} \cdot R(\lambda) \cdot \Delta\lambda \leq \frac{6000}{\alpha} \quad W \cdot m^{-2} \cdot sr^{-1}$	t > 10 s	P
4.3.7	Infrared radiation hazard exposure limits for the eye		P
	The avoid thermal injury of the cornea and possible delayed effects upon the lens of the eye (cataractogenesis), ocular exposure to infrared radiation, $E_{IR}$ , over the wavelength range 780 nm to 3000 nm, for times less than 1000 s, shall not exceed:		P
	$E_{IR} = \sum_{780}^{3000} E_{\lambda} \cdot \Delta\lambda \leq 18000 \cdot t^{-0.75} \quad W \cdot m^{-2}$	t ≤ 1000 s	P
	For times greater than 1000 s the limit becomes:		P
	$E_{IR} = \sum_{780}^{3000} E_{\lambda} \cdot \Delta\lambda \leq 100 \quad W \cdot m^{-2}$	t > 1000 s 4.7e-03 W/m2 Tmax_Eir > 1000s	P
4.3.8	Thermal hazard exposure limit for the skin		P
	Visible and infrared radiant exposure (380 nm to 3000 nm) of the skin shall be limited to:		P
	$E_H \cdot t = \sum_{380}^{3000} \sum_t E_{\lambda}(\lambda, t) \cdot \Delta t \cdot \Delta\lambda \leq 20000 \cdot t^{0.25} \quad J \cdot m^{-2}$	1.2e+00 W/m2 Tmax_Eh > 10s	P
<b>5</b>	<b>MEASUREMENT OF LAMPS AND LAMP SYSTEMS</b>		P
5.1	Measurement conditions		P
	Measurement conditions shall be reported as part of the evaluation against the exposure limits and the assignment of risk classification.		P
5.1.1	Lamp ageing (seasoning)		P
	Seasoning of lamps shall be done as stated in the appropriate IEC lamp standard.		P
5.1.2	Test environment		P
	For specific test conditions, see the appropriate IEC lamp standard or in absence of such standards, the appropriate national standards or manufacturer's recommendations.		P
5.1.3	Extraneous radiation		P
	Careful checks should be made to ensure that extraneous sources of radiation and reflections do not add significantly to the measurement results.		P

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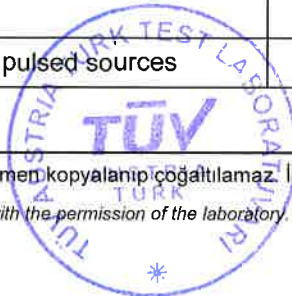
Doc No: FRM-LAB-009a

Rev.No/Date: 02 / 11.01.2019

Sayfa / Page : 10 / 22

TL-806
19-TST-0044-40
03-19

IEC 62471			
Clause	Requirement + Test	Result – Remark	Verdict
5.1.4	Lamp operation		P
	Operation of the test lamp shall be provided in accordance with:		P
	– the appropriate IEC lamp standard, or		N/A
	– the manufacturer' s recommendation		P
5.1.5	Lamp system operation		P
	The power source for operation of the test lamp shall be provided in accordance with:		P
	– the appropriate IEC standard, or		N/A
	– the manufacturer' s recommendation		P
5.2	Measurement procedure		P
5.2.1	Irradiance measurements		P
	Minimum aperture diameter 7mm.		P
	Maximum aperture diameter 50 mm.		P
	The measurement shall be made in that position of the beam giving the maximum reading.		P
	The measurement instrument is adequate calibrated.		P
5.2.2	Radiance measurements		P
5.2.2.1	Standard method		P
	The measurements made with an optical system.		P
	The instrument shall be calibrated to read in absolute radiant power per unit receiving area and per unit solid angle to acceptance averaged over the field of view of the instrument.		P
5.2.2.2	Alternative method		N/A
	Alternatively to an imaging radiance set-up, an irradiance measurement set-up with a circular field stop placed at the source can be used to perform radiance measurements.		N/A
5.2.3	Measurement of source size		P
	The determination of $\alpha$ , the angle subtended by a source, requires the determination of the 50% emission points of the source.		P
5.2.4	Pulse width measurement for pulsed sources		N/A



Doc No: FRM-LAB-009a

Rev.No/Date: 02 / 11.01.2019

Sayfa / Page : 11 / 22

TL-806
19-TST-0044-40
03-19

IEC 62471			
Clause	Requirement + Test	Result – Remark	Verdict
	The determination of $\Delta t$ , the nominal pulse duration of a source, requires the determination of the time during which the emission is > 50% of its peak value.		N/A
5.3	Analysis methods		P
5.3.1	Weighting curve interpolations		P
	To standardize interpolated values, use linear interpolation on the log of given values to obtain intermediate points at the wavelength intervals desired.	see table 4.1	P
5.3.2	Calculations		P
	The calculation of source hazard values shall be performed by weighting the spectral scan by the appropriate function and calculating the total weighted energy.		P
5.3.3	Measurement uncertainty		P
	The quality of all measurement results must be quantified by an analysis of the uncertainty.	see Annex C in the norm	P
<b>6</b>	<b>LAMP CLASSIFICATION</b>		
	For the purposes of this standard it was decided that the values shall be reported as follows:	see table 6.1	P
	– for lamps intended for general lighting service, the hazard values shall be reported as either irradiance or radiance values at a distance which produces an illuminance of 500 lux, but not at a distance less than 200 mm		N/A
	– for all other light sources, including pulsed lamp sources, the hazard values shall be reported at a distance of 200 mm	221.4 lx	P
6.1	Continuous wave lamps		
6.1.1	Except Group		P
	In the except group are lamps, which does not pose any photobiological hazard. The requirement is met by any lamp that does not pose:		P
	– an actinic ultraviolet hazard ( $E_S$ ) within 8-hours exposure (30000 s), nor		P
	– a near-UV hazard ( $E_{UVA}$ ) within 1000 s, (about 16 min), nor		P

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Doc No: FRM-LAB-009a

Rev.No/Date: 02 / 11.01.2019

Sayfa / Page : 12 / 22

TL-806
19-TST-0044-40
03-19

IEC 62471			
Clause	Requirement + Test	Result – Remark	Verdict
	– a retinal blue-light hazard ( $L_B$ ) within 10000 s (about 2,8 h), nor		P
	– a retinal thermal hazard ( $L_R$ ) within 10 s, nor		P
	– an infrared radiation hazard for the eye ( $E_{IR}$ ) within 1000 s		P
6.1.2	Risk Group 1 (Low-Risk)		N/A
	In this group are lamps, which exceeds the limits for the except group but that does not pose:		N/A
	– an actinic ultraviolet hazard ( $E_S$ ) within 10000 s, nor		N/A
	– a near ultraviolet hazard ( $E_{UVA}$ ) within 300 s, nor		N/A
	– a retinal blue-light hazard ( $L_B$ ) within 100 s, nor		N/A
	– a retinal thermal hazard ( $L_R$ ) within 10 s, nor		N/A
	– an infrared radiation hazard for the eye ( $E_{IR}$ ) within 100 s		N/A
	Lamps that emit infrared radiation without a strong visual stimulus and do not pose a near-infrared retinal hazard ( $L_{IR}$ ), within 100 s are in Risk Group 1.		N/A
6.1.3	Risk Group 2 (Moderate-Risk)		N/A
	This requirement is met by any lamp that exceeds the limits for Risk Group 1, but that does not pose:		N/A
	– an actinic ultraviolet hazard ( $E_S$ ) within 1000 s exposure, nor		N/A
	– a near ultraviolet hazard ( $E_{UVA}$ ) within 100 s, nor		N/A
	– a retinal blue-light hazard ( $L_B$ ) within 0,25 s (aversion response), nor		N/A
	– a retinal thermal hazard ( $L_R$ ) within 0,25 s (aversion response), nor		N/A
	– an infrared radiation hazard for the eye ( $E_{IR}$ ) within 10 s		N/A
	Lamps that emit infrared radiation without a strong visual stimulus and do not pose a near-infrared retinal hazard ( $L_{IR}$ ), within 10 s are in Risk Group 2.		N/A
6.1.4	Risk Group 3 (High-Risk)		N/A
	Lamps which exceed the limits for Risk Group 2 are in Group 3.		N/A
6.2	Pulsed lamps		N/A

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Doc No: FRM-LAB-009a

Rev.No/Date: 02 / 11.01.2019

Sayfa / Page : 13 / 22

TL-806

19-TST-0044-40

03-19

IEC 62471			
Clause	Requirement + Test	Result – Remark	Verdict
	Pulse lamp criteria shall apply to a single pulse and to any group of pulses within 0,25 s.		N/A
	A pulsed lamp shall be evaluated at the highest nominal energy loading as specified by the manufacturer.		N/A
	The risk group determination of the lamp being tested shall be made as follows:		N/A
	– a lamp that exceeds the exposure limit shall be classified as belonging to Risk Group 3 (High-Risk)		N/A
	– for single pulsed lamps, a lamp whose weighted radiant exposure or weighted radiance does is below the EL shall be classified as belonging to the Exempt Group		N/A
	– for repetitively pulsed lamps, a lamp whose weighted radiant exposure or weighted radiance dose is below the EL, shall be evaluated using the continuous wave risk criteria discussed in clause 6.1, using time averaged values of the pulsed emission		N/A

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Doc No: FRM-LAB-009a

Rev.No/Date: 02 / 11.01.2019

Sayfa / Page : 14 / 22

TL-806
19-TST-0044-40
03-19

Table 4.1		Spectral weighting function for assessing ultraviolet hazards for skin and eye		P
Wavelength <sup>1</sup> $\lambda$ , nm	UV hazard function $S_{uv}(\lambda)$	Wavelength $\lambda$ , nm	UV hazard function $S_{uv}(\lambda)$	
200	0,030	313*	0,006	
205	0,051	315	0,003	
210	0,075	316	0,0024	
215	0,095	317	0,0020	
220	0,120	318	0,0016	
225	0,150	319	0,0012	
230	0,190	320	0,0010	
235	0,240	322	0,00067	
240	0,300	323	0,00054	
245	0,360	325	0,00050	
250	0,430	328	0,00044	
254*	0,500	330	0,00041	
255	0,520	333*	0,00037	
260	0,650	335	0,00034	
265	0,810	340	0,00028	
270	1,000	345	0,00024	
275	0,960	350	0,00020	
280*	0,880	355	0,00016	
285	0,770	360	0,00013	
290	0,640	365*	0,00011	
295	0,540	370	0,000093	
297*	0,460	375	0,000077	
300	0,300	380	0,000064	
303*	0,120	385	0,000053	
305	0,060	390	0,000044	
308	0,026	395	0,000036	
310	0,015	400	0,000030	

<sup>1</sup> Wavelengths chosen are representative: other values should be obtained by logarithmic interpolation at intermediate wavelengths.  
\* Emission lines of a mercury discharge spectrum.

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Doc No: FRM-LAB-009a

Rev.No/Date: 02 / 11.01.2019

Sayfa / Page : 15 / 22

TL-806
19-TST-0044-40
03-19

Table 4.2 Spectral weighting functions for assessing retinal hazards from broadband optical sources		P
Wavelength nm	Blue-light hazard function B ( $\lambda$ )	Burn hazard function R ( $\lambda$ )
300	0,01	
305	0,01	
310	0,01	
315	0,01	
320	0,01	
325	0,01	
330	0,01	
335	0,01	
340	0,01	
345	0,01	
350	0,01	
355	0,01	
360	0,01	
365	0,01	
370	0,01	
375	0,01	
380	0,01	0,1
385	0,013	0,13
390	0,025	0,25
395	0,05	0,5
400	0,10	1,0
405	0,20	2,0
410	0,40	4,0
415	0,80	8,0
420	0,90	9,0
425	0,95	9,5
430	0,98	9,8
435	1,00	10,0
440	1,00	10,0
445	0,97	9,7
450	0,94	9,4
455	0,90	9,0
460	0,80	8,0
465	0,70	7,0
470	0,62	6,2
475	0,55	5,5
480	0,45	4,5
485	0,40	4,0
490	0,22	2,2
495	0,16	1,6
500-600	$10^{\frac{[(450-\lambda)/50]}$	1,0
600-700	0,001	1,0
700-1050		$10^{\frac{[(700-\lambda)/500]}$
1050-1150		0,2
1150-1200		$0,2 \cdot 10^{\frac{0,02(1150-\lambda)}{100}}$
1200-1400		0,02

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Doc No: FRM-LAB-009a

Rev.No/Date: 02 / 11.01.2019

Sayfa / Page : 16 / 22

TL-806
19-TST-0044-40
03-19

IEC 62471			
Clause	Requirement + Test	Result – Remark	Verdict

Table 5.4 Summary of the ELs for the surface of the skin or cornea (irradiance based values)					P
Hazard Name	Relevant equation	Wavelength range nm	Exposure duration sec	Limiting aperture rad (deg)	EL in terms of constant irradiance $W \cdot m^{-2}$
Actinic UV skin & eye	$E_S = \sum E_\lambda \cdot S(\lambda) \cdot \Delta\lambda$	200 – 400	< 30000	1,4 (80)	30/t
Eye UV-A	$E_{UVA} = \sum E_\lambda \cdot \Delta\lambda$	315 – 400	$\leq 1000$ >1000	1,4 (80)	10000/t 10
Blue-light small source	$E_B = \sum E_\lambda \cdot B(\lambda) \cdot \Delta\lambda$	300 – 700	$\leq 100$ >100	< 0,011	100/t 1,0
Eye IR	$E_{IR} = \sum E_\lambda \cdot \Delta\lambda$	780 – 3000	$\leq 1000$ >1000	1,4 (80)	18000/t <sup>0,75</sup> 100
Skin thermal	$E_H = \sum E_\lambda \cdot \Delta\lambda$	380 – 3000	< 10	2π sr	20000/t <sup>0,75</sup>

Table 5.5 Summary of the ELs for the retina (radiance based values)					P
Hazard Name	Relevant equation	Wavelength range nm	Exposure duration sec	Field of view radians	EL in terms of constant radiance $W \cdot m^{-2} \cdot sr^{-1}$
Blue light	$L_B = \sum L_\lambda \cdot B(\lambda) \cdot \Delta\lambda$	300 – 700	0,25 – 10	$0,011 \cdot \sqrt{(t/10)}$	$10^6/t$
			10-100	0,011	$10^6/t$
			100-10000	$0,0011 \cdot \sqrt{t}$	$10^6/t$
			$\geq 10000$	0,1	100
Retinal thermal	$L_R = \sum L_\lambda \cdot R(\lambda) \cdot \Delta\lambda$	380 – 1400	< 0,25	0,0017	$50000/(\alpha \cdot t^{0,25})$
			0,25 – 10	$0,011 \cdot \sqrt{(t/10)}$	$50000/(\alpha \cdot t^{0,25})$
Retinal thermal (weak visual stimulus)	$L_{IR} = \sum L_\lambda \cdot R(\lambda) \cdot \Delta\lambda$	780 – 1400	> 10	0,011	6000/α



Bu rapor, laboratuvarın yazılı izni olmadan kısmen kopyalanıp çoğaltılamaz. İmzasız ve mühürsüz raporlar geçersizdir.

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TL-806
19-TST-0044-40
03-19

<b>IEC 62471</b>	
Requirement + Test	Result – Remark
Verdict	

Risk	Action spectrum	Symbol	Units	Emission Measurement						P
				Exempt		Low risk		Mod risk		
				Limit	Result	Limit	Result	Limit	Result	
Actinic UV	$S_{UV}(\lambda)$	$E_s$	$W \cdot m^{-2}$	0,001	1.1e-05	0,003	0,03			
Near UV		$E_{UVA}$	$W \cdot m^{-2}$	10	2.1e-05	33	100			
Blue light	$B(\lambda)$	$L_B$	$W \cdot m^{-2} \cdot sr^{-1}$	100	1.37e+00	10000	4000000			
Blue light, small source	$B(\lambda)$	$E_B$	$W \cdot m^{-2}$	1,0*	2.60e-01	1,0	400			
Retinal thermal	$R(\lambda)$	$L_R$	$W \cdot m^{-2} \cdot sr^{-1}$	28000/α	5.5e+01	28000/α	71000/α			
Retinal thermal, weak visual stimulus**	$R(\lambda)$	$L_{IR}$	$W \cdot m^{-2} \cdot sr^{-1}$	6000/α	3.0e-02	6000/α	6000/α			
IR radiation, eye		$E_{IR}$	$W \cdot m^{-2}$	100	4.7e-03	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



Doc No: FRM-LAB-009a

Rev.No/Date: 02 / 11.01.2019

Sayfa / Page : 18 / 22

TL-806

19-TST-0044-40

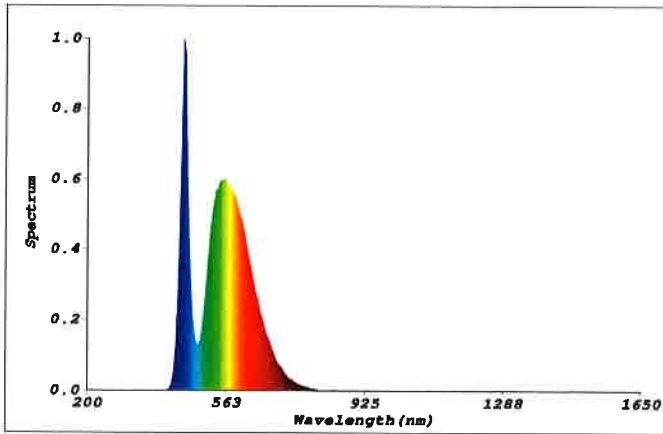
03-19

**2.1 Beyaz Renk Fotobiyolojik Deney Sonuçları (Photobiological Test Results of the white color)****Radiation Photobiological Safety Report**

**Model** : 150 cm lineer aydınlatma armaturu white  
**Number** :  
**Manufacturer:** hera eglence  
**Tester** : SALTUK BUGRA (Assessor:  
**Date** : 2019-03-14

**Instrument** : OST-300(EVERFINE)  
**Temperature** : 25.3deg  
**RH** : 65.0%  
**Remarks** : ---EN 62471:2008

B(L) &amp; R(L)



LB RFOV (mrad)	Measured (W/m2/sr)	Limit (W/m2/sr)
100(Exempt Risk Group)	1.37e+00	1.0e+02
11(Risk Group 1)	4.30e+00	1.0e+04
1.7(Risk Group 2)	4.33e+00	4.0e+06
LR RFOV (mrad)	Measured (W/m2/sr)	Limit (W/m2/sr)
11(Exempt Risk Group)	5.5e+01	2.8e+05
11(Risk Group 1)	5.5e+01	2.8e+05
1.7(Risk Group 2)	5.6e+01	7.1e+05

**Color Parameters:****Chromaticity Coordinate:** $x=0.3363$   $y=0.3528$   $u'=0.2050$   $v'=0.4840$   $Tc=5347K$ **Dominant WL:** $Ld=560.6nm$  **Peak WL:** $Lp=450.0nm$  **Purity:** $=6.8%$  **Red Ratio:** $R=15.0%$ **Render Index:** $Ra=73.5$  **FWHM:** $=25.0nm$ **R1 =71****R2 =78****R3 =81****R4 =73****R5 =71****R6 =69****R7 =84****R8 =61****R9 =-19****R10=46****R11=68****R12=38****R13=72****R14=89****R15=67****Photo Parameters(CX Condition:Single Test, IP = 3886):****Distance = 200.0mm****Alpha = 0.1000rad****E = 221.4lx****Es = 1.1e-05W/m2 Tmax\_Es > 8h****Eb = 2.60e-01 W/m2 Tmax is not needed****Euva = 2.1e-05 W/m2 Tmax\_Euva > 1000s****Eir = 4.7e-03 W/m2 Tmax\_Eir > 1000s****Eh = 1.2e+00 W/m2 Tmax\_Eh > 10s****LB = 1.37e+00 W/m2/Sr Tmax\_LB > 10000s****LR = 5.5e+01 W/m2/Sr Tmax\_LR > 10s****Lir = 3.0e-02 W/m2/Sr (Tmax is not needed)****LB(5mrad):4.32e+00 W/m2/Sr****LR(5mrad):5.6e+01 W/m2/Sr****Result:****Lamp Type: Exempt Group**

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Doc No: FRM-LAB-009a

Rev.No/Date: 02 / 11.01.2019

Sayfa / Page : 19 / 22

TL-806

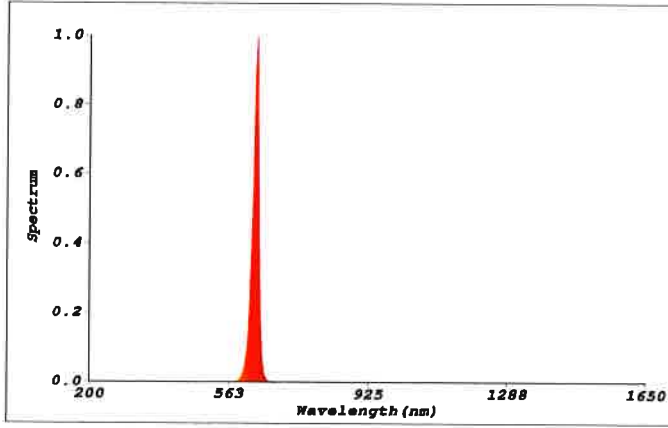
19-TST-0044-40

03-19

**2.2 Kırmızı Renk Fotobiyolojik Deney Sonuçları (Photobiological Test Results of the red color)****Radiation Photobiological Safety Report**

**Model** : 150 cm lineer aydınlatma armatürü red  
**Number** :  
**Manufacturer:** hera eglence  
**Tester** : SALTUK BUGRA (Assessor:  
**Date** : 2019-03-14

**Instrument** : OST-300(EVERFINE)  
**Temperature** : 25.3deg  
**RH** : 65.0%  
**Remarks** : ---EN 62471:2008  
B(L) & R(L)



LB RFOV (mrad)	Measured (W/m2/sr)	Limit (W/m2/sr)
100(Exempt Risk Group)	4.14e-02	1.0e+02
11(Risk Group 1)	1.22e-01	1.0e+04
1.7(Risk Group 2)	1.22e-01	4.0e+06
LR RFOV (mrad)	Measured (W/m2/sr)	Limit (W/m2/sr)
11(Exempt Risk Group)	1.2e+02	2.8e+05
11(Risk Group 1)	1.2e+02	2.8e+05
1.7(Risk Group 2)	1.2e+02	7.1e+05

**Color Parameters:****Chromaticity Coordinate:** $x=0.6990$   $y=0.3009$   $u'=0.5364$   $v'=0.5195$   $Tc=1001K$ **Dominant WL:** $Ld=624.0nm$  **Peak WL:** $Lp=635.0nm$  **Purity:** $100.0%$  **Red Ratio:** $R=97.4%$ **Render Index:** $Ra=12.7$  **FWHM:** $25.0nm$ 

$R1=4$   $R2=77$   $R3=30$   $R4=-30$   $R5=-1$   $R6=88$   $R7=5$   
 $R8=-72$   $R9=-230$   $R10=70$   $R11=-18$   $R12=79$   $R13=28$   $R14=59$   $R15=-36$

**Photo Parameters(CX Condition:Single Test, IP = 3867):****Distance** = 200.0mm**Alpha** = 0.1000rad**E** = 100.5lx**Es** = 2.4e-05W/m2 **Tmax\_Es** > 8h**Eb** = 3.89e-04 W/m2 **Tmax** is not needed**Euva** = 1.1e-05 W/m2 **Tmax\_Euva** > 1000s**Eir** = 7.5e-05 W/m2 **Tmax\_Eir** > 1000s**Eh** = 3.8e-01 W/m2 **Tmax\_Eh** > 10s**LB** = 4.14e-02 W/m2/Sr **Tmax\_LB** > 10000s**LR** = 1.2e+02 W/m2/Sr **Tmax\_LR** > 10s**Lr** = 5.2e-03 W/m2/Sr (**Tmax** is not needed)**LB(5mrad):**1.22e-01 W/m2/Sr**LR(5mrad):**1.2e+02 W/m2/Sr**Result:****Lamp Type:** Exempt Group

Doc No: FRM-LAB-009a

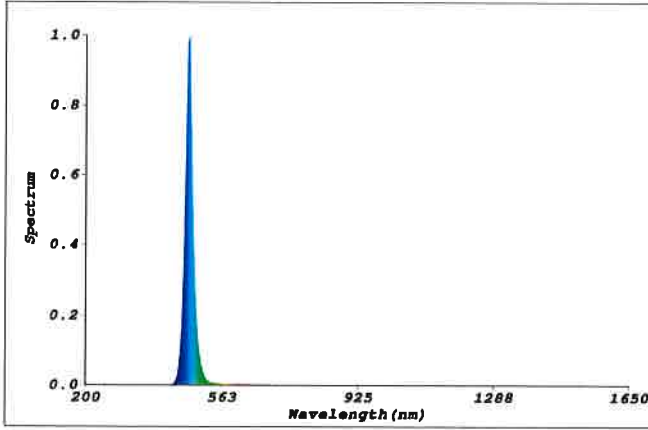
Rev.No/Date: 02 / 11.01.2019

Sayfa / Page : 20 / 22

TL-806

19-TST-0044-40

03-19

**2.3 Mavi Renk Fotobiyolojik Deney Sonuçları (Photobiological Test Results of the blue color)****Radiation Photobiological Safety Report****Model** : 150 cm lineer aydınlatma armaturu blue**Number** :**Manufacturer:** hera eglence**Tester** : SALTUK BUGRA (Assessor:**Date** : 2019-03-14**Instrument** : OST-300(EVERFINE)**Temperature** : 25.3deg**RH** : 65.0%**Remarks** : ---EN 62471:2008**B(L) & R(L)**

LB RFOV (mrad)	Measured (W/m2/sr)	Limit (W/m2/sr)
100(Exempt Risk Group)	2.78e+01	1.0e+02
11(Risk Group 1)	7.84e+01	1.0e+04
1.7(Risk Group 2)	7.85e+01	4.0e+06
LR RFOV (mrad)	Measured (W/m2/sr)	Limit (W/m2/sr)
11(Exempt Risk Group)	7.9e+02	2.8e+05
11(Risk Group 1)	7.9e+02	2.8e+05
1.7(Risk Group 2)	7.9e+02	7.1e+05

**Color Parameters:****Chromaticity Coordinate:**  $x=0.1193$   $y=0.1116$   $u'=0.1164$   $v'=0.2449$   $Tc=100000K$ **Dominant WL:**  $Ld=476.3nm$  **Peak WL:**  $Lp=475.0nm$  **Purity:** 93.9% **Red Ratio:**  $R=1.2\%$ **Render Index:**  $Ra=-36.5$  **FWHM:** 25.0nm**R1** =-2 **R2** =-28 **R3** =-111 **R4** =-66 **R5** =15 **R6** =-38 **R7** =-36**R8** =-27 **R9** =-240 **R10** =-191 **R11** =-88 **R12** =-70 **R13** =-20 **R14** =-19 **R15** =4**Photo Parameters(CX Condition:Single Test, IP = 3824):****Distance** = 200.0mm**Alpha** = 0.1000rad**E** = 88.1lx**Es** = 2.1e-04W/m2 **Tmax\_Es** > 8h**Eb** = 4.13e-01 W/m2 **Tmax** is not needed**Euva** = 0.0e+00 W/m2 **Tmax\_Euva** > 1000s**Eir** = 1.3e-04 W/m2 **Tmax\_Eir** > 1000s**Eh** = 8.0e-01 W/m2 **Tmax\_Eh** > 10s**LB** = 2.78e+01 W/m2/Sr **Tmax\_LB** > 10000s**LR** = 7.9e+02 W/m2/Sr **Tmax\_LR** > 10s**Lr** = 2.8e-03 W/m2/Sr (**Tmax** is not needed)**LB(5mrad):** 7.86e+01 W/m2/Sr**LR(5mrad):** 7.9e+02 W/m2/Sr**Result:****Lamp Type:** Exempt Group

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Doc No: FRM-LAB-009a

Rev.No/Date: 02 / 11.01.2019

Sayfa / Page : 21 / 22

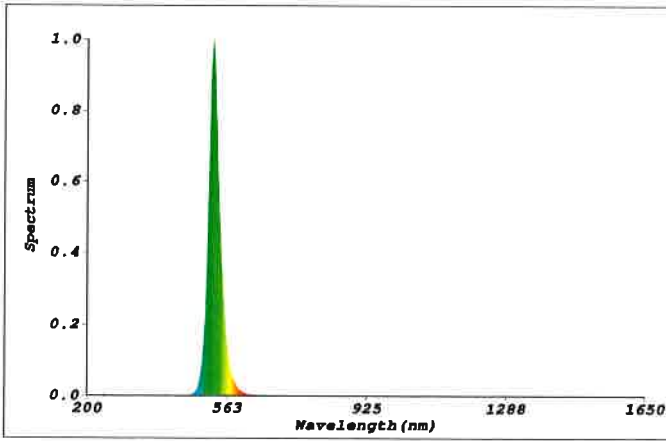
TL-806

19-TST-0044-40

03-19

**2.4 Yeşil Renk Fotobiolojik Deney Sonuçları** (Photobiological Test Results of the green color)**Radiation Photobiological Safety Report****Model** : 150 cm lineer aydınlatma armaturu green**Number** :**Manufacturer:** hera eglence**Tester** : SALTUK BUGRA (Assessor:**Date** : 2019-03-14**Instrument** : OST-300(EVERFINE)**Temperature** : 25.3deg**RH** : 65.0%**Remarks** : --EN 62471:2008

B(L) &amp; R(L)



LB RFOV (mrad)	Measured (W/m2/sr)	Limit (W/m2/sr)
100(Exempt Risk Group)	8.45e-01	1.0e+02
11(Risk Group 1)	2.53e+00	1.0e+04
1.7(Risk Group 2)	2.54e+00	4.0e+06
LR RFOV (mrad)	Measured (W/m2/sr)	Limit (W/m2/sr)
11(Exempt Risk Group)	7.8e+01	2.8e+05
11(Risk Group 1)	7.8e+01	2.8e+05
1.7(Risk Group 2)	7.8e+01	7.1e+05

**Color Parameters:****Chromaticity Coordinate:** x=0.2045 y=0.7351/u'=0.0717 v'=0.5797 Tc=7238K**Dominant WL:** Ld=534.4nm **Peak WL:** Lp=525.0nm **Purity:** 89.1% **Red Ratio:** R=0.4%**Render Index:** Ra=-29.5 **FWHM:** 35.0nm

R1 =-36

R2 =-13

R3 =-31

R4 =-70

R5 =-11

R6 =-20

R7 =-15

R8 =-40

R9 =-366

R10=-118

R11=-102

R12=-41

R13=-41

R14=33

R15=-36

**Photo Parameters(CX Condition:Single Test, IP = 3835):****Distance** = 200.0mm**Alpha** = 0.1000rad**E** = 341.9lx**Es** = 2.3e-04W/m2 **Tmax\_Es** > 8h**Eb** = 1.73e-02 W/m2 **Tmax** is not needed**Euva** = 1.7e-05 W/m2 **Tmax\_Euva** > 1000s**Eir** = 2.0e-04 W/m2 **Tmax\_Eir** > 1000s**Eh** = 5.2e-01 W/m2 **Tmax\_Eh** > 10s**LB** = 8.45e-01 W/m2/Sr **Tmax\_LB** > 10000s**LR** = 7.8e+01 W/m2/Sr **Tmax\_LR** > 10s**Lir** = 1.1e-02 W/m2/Sr (**Tmax** is not needed)**LB(5mrad):** 2.54e+00 W/m2/Sr**LR(5mrad):** 7.8e+01 W/m2/Sr**Result:****Lamp Type:** Exempt Group

Doc No: FRM-LAB-009a

Rev.No/Date: 02 / 11.01.2019

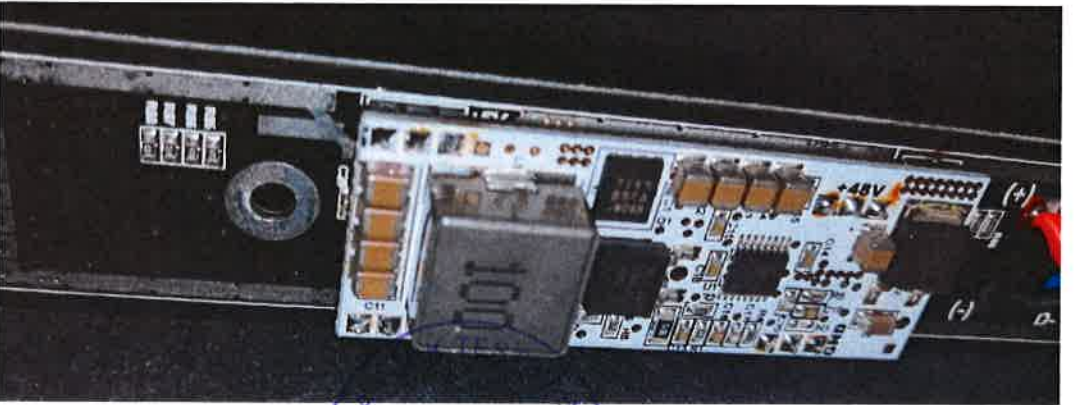
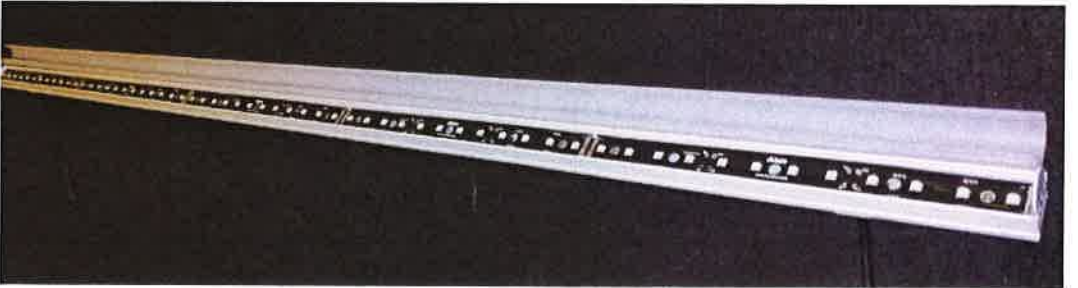
Sayfa / Page : 22 / 22

TL-806

19-TST-0044-40

03-19

**3.1 DGC'nin Fotoğrafları (Photos of EUT)**



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