TÜV AUSTRIA TURK
Belgelendirme Eğitim ve Gözetim Hizmetleri Ltd. Şti.
Merkez: Barbaros Mah. Susuz Sok.
No:13/1 Ataşehir / İstanbul
Lab: 1. Organize Sanayi Uygurlar Cad. No:1
Sincan-Ankara / Turkey

IAS ACCREDITED Testing Laboratory

ÖLÇÜM RAPORU
MEASUREMENT REPORT

TL-806
19-TST-0095-173
08-19

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-0095
Numunenin Adı ve Tarifi *Name and identity of test item*	**:** Leoline® S12 915mm DMX RGBW Linear Spot Beam 14°
Numunenin kabul tarihi *The date of receipt of test item*	**: 31.07.2019**
Açıklamalar *Remarks*	**: DGC'ye , IES LM-79-08 standardı uyarınca fotometrik ölçümler yapılmıştır.** *Photometric measurement has been applied to EUT according to IESNA LM-79-08*
Deneyin Yapıldığı Tarih *Date of Test*	**: 31.07.2019**
Raporun Sayfa Sayısı *Number of Pages of the Report*	**:18**

Deney laboratuvarı olarak faaliyet gösteren TÜV AUSTRIA TURK, International Accreditation Service, Inc. (IAS) TL-806 ile TS EN ISO/IEC 17025 Nisan 2012 standardına göre akredite edilmiştir.
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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.

Mühür ve Tarih *Seal and Date*	**Deney Sorumlusu** *Person in charge of test*	**Onaylayan** *Approval*
TÜV AUSTRIA TURK TEST LABORATUVARI TÜV AUSTRIA TURK 19.08.2019	**Gürhan CANSIZ**	**Gürhan CANSIZ**

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MEASUREMENT REPORT

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

Markası / *Brand*	: HERA
Modeli / *Model*	: Leoline® S12 915mm DMX RGBW Linear Spot Beam 14°
Seri Numarası / *Serial Number*	: Test Numunesi *Test Sample*
Beyan Gücü / *Rated Power*	: 49,4 W
Beyan Gerilimi / *Rated Voltage*	: 48 VDC
Sembollerin Tanımı / *Definations of Symbols*	DGC= Deneyden Geçen Cihaz *EUT=Equipment Under Test*

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1.2 Deney Standartları *(Test Standards)*

Deneyler aşağıdaki standartlara göre yapılmıştır (The tests were performed according to following standarts):

Standart / *Standard*

■ *IESNA LM-79-08* Electrical and Photometric Measurements of Solid-State Lighting Products

1.3 Deney Ekipmanları *(Test Equipments)*

Kayıt No. *(ID – No.)*	**Tip** *(Type)*	**Kalibrasyon Tarihi** *(Calibration Date)*	**Sonraki Kalibrasyon Tarihi** *(NextbCalibration Date)*	**Kontrol** *(Check Point)*
LAB-011	Goniophotometer	09.01.2019	09.01.2020	☒
LAB-015	AC Power Supply	05.06.2018	05.06.2020	☒
LAB-027	Powermeter	09.01.2019	09.01.2020	☒
LAB-023	Standart Lamp	09.01.2019	09.01.2020	☒
LAB-012	İntegrating sphere	28.05.2018	28.05.2020	☒

1.3 Kompenent listesi *(Compenent list)*

Kompenent *(Componenets)*	**Üretici** *(Manufacturer)*	**Model** *(Model)*	**Teknik Bilgi** *(Technical Data)*	**Standart no.** *(Standart No.)*
LED	Cree Inc	XTEAWT 6500K White Led XPE2 Red XPEBRD Series Led XPE2 Green XPEBGR Series Led XPE2 Blue XPEBRY Series Led	Binned at 85 °C • Thermal resistance: 5 °C/W • Wide viewing angle: 110°-140° Unlimited floor life at ≤ 30 °C/85% RHMaximum drive current: 1 A	UL (E349212) RoHS REACh
PCB	PCB	C13093_R1.0	0.8mm FR4 4 Layers 35+35+35+35umCu/ BlackSolderMask/WhiteSilkScreen	IPC A 600 J Class II Revizyon J standardı (COC) IPC 6012 Class II UL FQC
LENS	LEDIL	CA11016_TINA2-RS-14	Dimensions Ø 16.1 mm Height 9.7 mm	ANSI/ESD S20.20:2014 EN 61340-5-1:2007

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2.1 RGBW Fotometrik Deney Sonuçları *(Photometric Test Results of the RGBW)*

Elektriksel Ölçümler
(Electrical Measurements)

Ölçülen Güç (W) *(Input Power)*	47,20 W
Ölçülen Gerilim (V) *(Input Voltage)*	46,76 VDC
Ölçülen Akım (A) *(Input Current)*	1,01 A
Güç Faktörü (PF) *(Power Factor)*	-
Ölçülen Frekans (Hz) *(Input Frequency)*	-
Ortam Sıcaklığı / Bağıl Nem *(Ambient Temperature / Relative Humidity)*	25,1 °C 46% Rh
Stabilizasyon Süresi *(Stabilization Time)*	60 dk ±5dk

Fotometrik Ölçüm Sonuçları
(Photometric Measurement Results)

Toplam Işık Akısı *(Total Luminuous Flux)* **(lm)**	1540,8
Maksimum Işık Şiddeti *(Max. Light Intensity)* **(cd)**	16545
Armatür Etkinliği *(Luminaire Efficacy)* **(lm/W)**	32,64

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MEASUREMENT REPORT

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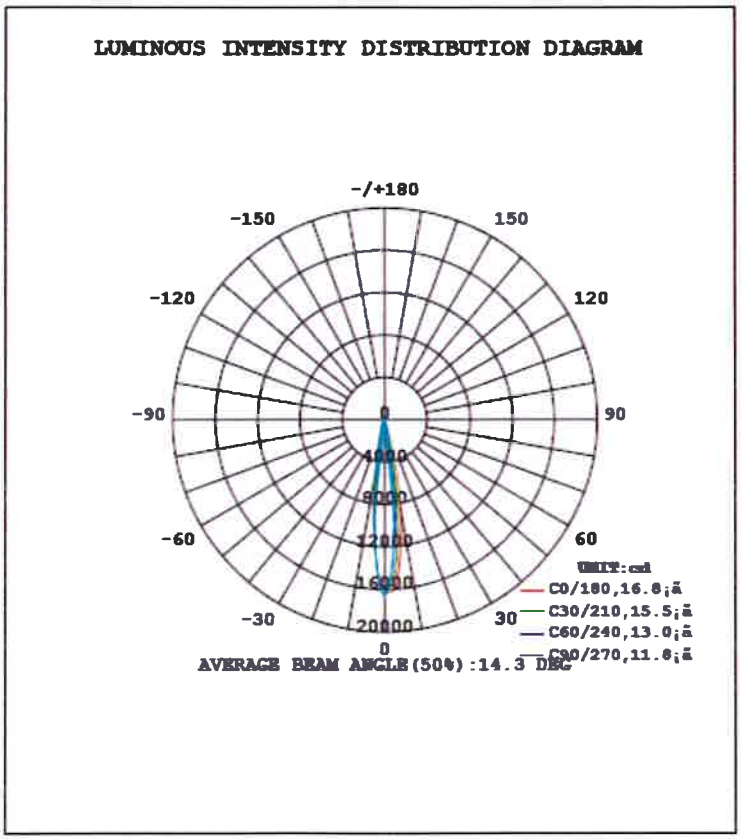
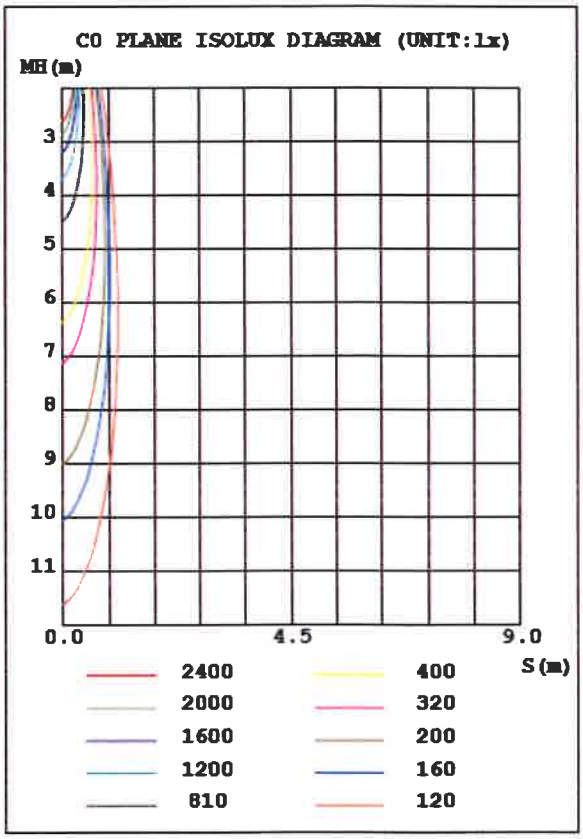
2.1 RGBW Fotometrik Deney Sonuçları *(Photometric Test Results of the RGBW)*





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2.1 RGBW Fotometrik Deney Sonuçları *(Photometric Test Results of the RGBW)*

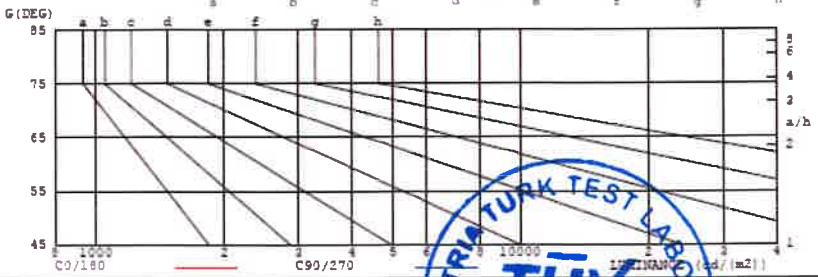
ZONAL FLUX DIAGRAM
AND LUMINANCE LIMITATION CURVES

ZONAL FLUX DIAGRAM:

γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	Φ zone	Φ total	%lum,lamp
5	1096	1062	999.9	1242	1442	1242	999.9	1062	0- 5	326.8	326.8	21.2,21.2
10	471.9	398.9	333.8	499.7	775.6	499.7	333.8	395.9	5- 10	527.8	854.6	55.5,55.5
15	168.8	143.8	117.5	169.4	253.4	169.4	117.5	142.8	10- 15	328.0	1182	76.8,76.8
20	65.96	61.57	45.39	64.29	76.48	64.29	45.39	61.57	15- 20	165.4	1348	87.5,87.5
25	25.97	27.21	17.41	26.64	26.60	26.64	17.41	27.21	20- 25	82.38	1430	92.8,92.8
30	10.38	11.99	7.613	11.20	10.47	11.20	7.613	11.99	25- 30	40.65	1471	95.5,95.5
35	4.876	5.907	4.027	5.251	5.578	5.251	4.027	5.907	30- 35	21.34	1492	96.9,96.9
40	2.946	3.251	2.463	3.014	3.093	3.014	2.463	3.251	35- 40	12.71	1505	97.7,97.7
45	2.077	2.124	1.571	2.022	2.002	2.022	1.571	2.124	40- 45	8.717	1514	98.2,98.2
50	1.574	1.611	1.102	1.729	1.462	1.729	1.102	1.611	45- 50	6.896	1521	98.7,98.7
55	1.201	1.528	0.7960	1.439	1.194	1.439	0.7960	1.528	50- 55	6.162	1527	99.1,99.1
60	0.9225	1.134	0.6294	1.058	0.9312	1.058	0.6294	1.134	55- 60	5.050	1532	99.4,99.4
65	0.7808	0.7550	0.3705	0.6787	0.7428	0.6787	0.3705	0.7550	60- 65	3.889	1536	99.7,99.7
70	0.5368	0.4145	0.2139	0.3782	0.5188	0.3782	0.2139	0.4145	65- 70	2.522	1538	99.8,99.8
75	0.2229	0.1966	0.1027	0.1869	0.3481	0.1869	0.1027	0.1966	70- 75	1.409	1540	99.9,99.9
80	0.1012	0.0623	0.0250	0.0652	0.1290	0.0652	0.0250	0.0623	75- 80	0.6545	1540	100,100
85	0.0097	0	0	0.0000	0.0197	0.0000	0	0	80- 85	0.1365	1541	100,100
90	0	0	0	0	0	0	0	0	85- 90	0.0012	1541	100,100
95	0	0	0	0	0	0	0	0	90- 95	0	1541	100,100
100	0	0	0	0	0	0	0	0	95-100	0	1541	100,100
105	0	0	0	0	0	0	0	0	100-105	0	1541	100,100
110	0	0	0	0	0	0	0	0	105-110	0	1541	100,100
115	0	0	0	0	0	0	0	0	110-115	0	1541	100,100
120	0	0	0	0	0	0	0	0	115-120	0	1541	100,100
125	0	0	0	0	0	0	0	0	120-125	0	1541	100,100
130	0	0	0	0	0	0	0	0	125-130	0	1541	100,100
135	0	0	0	0	0	0	0	0	130-135	0	1541	100,100
140	0	0	0	0	0	0	0	0	135-140	0	1541	100,100
145	0	0	0	0	0	0	0	0	140-145	0	1541	100,100
150	0	0	0	0	0	0	0	0	145-150	0	1541	100,100
155	0	0	0	0	0	0	0	0	150-155	0	1541	100,100
160	0.0102	0.0176	0.0083	0.0052	0	0.0052	0.0083	0.0176	155-160	0.0034	1541	100,100
165	0.0382	0.0561	0.0548	0.0324	0.0008	0.0324	0.0548	0.0561	160-165	0.0297	1541	100,100
170	0.0584	0.0784	0.0929	0.0873	0.0100	0.0573	0.0929	0.0784	165-170	0.0675	1541	100,100
175	0.0572	0.0694	0.0699	0.0576	0.0143	0.0576	0.0699	0.0694	170-175	0.0492	1541	100,100
180	0.0292	0.0274	0.0287	0.0408	0.0401	0.0408	0.0287	0.0274	175-180	0.0182	1541	100,100
DEG	LUMINOUS INTENSITY::Å10cd									UNIT:lm		

LUMINANCE LIMITATION CURVES

GLARE	CLASS	ILLUMINANCE (lx)							
1.15	A	2000	1000	500	<=300				
1.50	B		2000	1000	500	<=300			
1.85	C			2000	1000	500	<=300		
2.20	D				2000	1000	500	<=300	
2.55	E					2000	1000	500	<=300



LUMINANCE cd/(m2)		
G(DEG)	C0/180	C90/270
85	11	0
80	53	20
75	125	40
70	157	62
65	178	88
60	185	126
55	209	139
50	245	171
45	294	222

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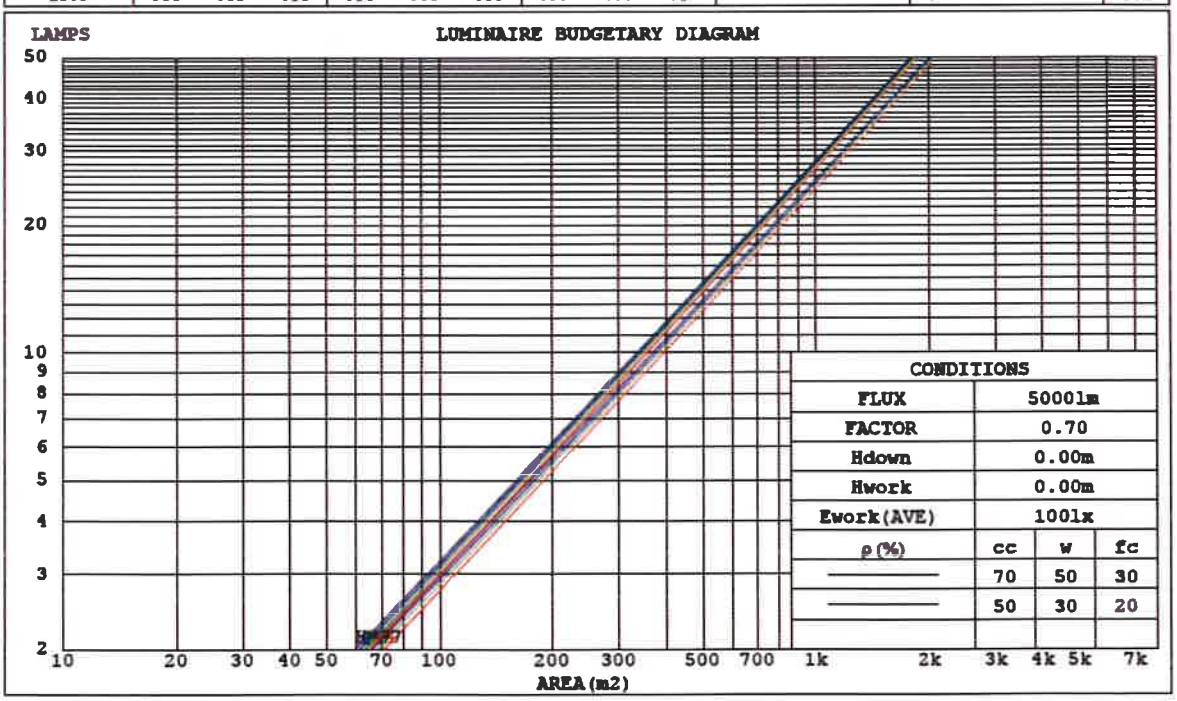
2.1 RGBW Fotometrik Deney Sonuçları *(Photometric Test Results of the RGBW)*

CU AND LUMINAIRE BUDGETARY ESTIMATE DIAGRAM

ρcc	80%			70%			50%			30%			10%			0
ρw	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	0
ρfc	20%			20%			20%			20%			20%			0
RCR	RCR:Room Cavity Ratio			Coefficients of Utilisation(CU)												
0.0	1.19	1.19	1.19	1.16	1.16	1.16	1.11	1.11	1.11	1.06	1.06	1.06	1.02	1.02	1.02	.00
1.0	1.14	1.12	1.10	1.11	1.10	1.08	1.07	1.06	1.05	1.04	1.03	1.02	1.00	.00	.99	.98
2.0	1.09	1.06	1.04	1.07	1.05	1.03	1.04	1.02	1.01	1.01	.00	.99	.99	.98	.97	.95
3.0	1.05	1.02	.99	1.04	1.01	.99	1.01	.99	.97	.99	.97	.96	.97	.95	.94	.93
4.0	1.02	.98	.96	1.01	.98	.95	.99	.96	.94	.97	.95	.93	.95	.94	.92	.91
5.0	.99	.95	.93	.98	.95	.92	.96	.94	.92	.95	.93	.91	.94	.92	.90	.89
6.0	.96	.93	.90	.96	.92	.90	.94	.91	.89	.93	.91	.89	.92	.90	.88	.87
7.0	.94	.90	.88	.94	.90	.88	.92	.90	.87	.91	.89	.87	.91	.88	.87	.86
8.0	.92	.89	.86	.92	.88	.86	.91	.88	.86	.90	.87	.85	.89	.87	.85	.84
9.0	.90	.87	.84	.90	.87	.84	.89	.86	.84	.88	.86	.84	.88	.85	.84	.83
10.0	.88	.85	.83	.88	.85	.83	.88	.85	.83	.87	.84	.82	.86	.84	.82	.82



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2.1 RGBW Fotometrik Deney Sonuçları *(Photometric Test Results of the RGBW)*

WEC AND CCEC

ρcc	80%			70%			50%			30%			10%			0
ρw	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	0
ρfc	20%			20%			20%			20%			20%			0
RCR	RCR:Room Cavity Ratio			Wall Exitance Coeffcients(WEC)												
0.0																
1.0	.125	.071	.022	.118	.067	.021	.106	.061	.019	.094	.054	.017	.084	.049	.016	
2.0	.114	.063	.019	.109	.060	.018	.099	.055	.017	.089	.050	.016	.081	.046	.014	
3.0	.105	.056	.017	.101	.054	.016	.093	.050	.015	.085	.046	.014	.078	.043	.013	
4.0	.098	.051	.015	.094	.049	.015	.087	.046	.014	.080	.043	.013	.074	.040	.012	
5.0	.091	.046	.013	.088	.045	.013	.082	.043	.013	.076	.040	.012	.071	.038	.011	
6.0	.085	.043	.012	.083	.042	.012	.078	.040	.012	.073	.038	.011	.068	.036	.011	
7.0	.080	.040	.011	.078	.039	.011	.074	.037	.011	.070	.036	.010	.066	.034	.010	
8.0	.076	.037	.010	.074	.036	.010	.070	.035	.010	.067	.034	.010	.063	.032	.009	
9.0	.072	.035	.010	.070	.034	.010	.067	.033	.009	.064	.032	.009	.061	.031	.009	
10.0	.069	.033	.009	.067	.032	.009	.064	.031	.009	.061	.030	.009	.059	.030	.008	

ρcc	80%			70%			50%			30%			10%			0
ρw	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	0
ρfc	20%			20%			20%			20%			20%			0
RCR	RCR:Room Cavity Ratio			Ceiling Cavity Exitance Coefficients(CCEC)												
0.0	.191	.191	.191	.163	.163	.163	.111	.111	.111	.064	.064	.064	.020	.020	.020	
1.0	.168	.158	.149	.143	.135	.128	.098	.093	.089	.056	.054	.052	.018	.017	.017	
2.0	.149	.133	.120	.127	.114	.103	.087	.079	.072	.050	.046	.042	.016	.015	.014	
3.0	.133	.113	.098	.114	.098	.085	.078	.068	.059	.045	.040	.035	.015	.013	.011	
4.0	.120	.098	.081	.103	.084	.070	.071	.059	.050	.041	.034	.029	.013	.011	.010	
5.0	.108	.085	.068	.093	.074	.059	.064	.051	.042	.037	.030	.025	.012	.010	.008	
6.0	.099	.075	.058	.085	.065	.050	.059	.045	.036	.034	.027	.021	.011	.009	.007	
7.0	.091	.066	.049	.078	.058	.043	.054	.040	.031	.031	.024	.018	.010	.008	.006	
8.0	.084	.059	.043	.072	.052	.037	.050	.036	.026	.029	.021	.016	.009	.007	.005	
9.0	.078	.054	.037	.067	.047	.033	.046	.033	.023	.027	.019	.014	.009	.006	.005	
10.0	.073	.049	.033	.063	.042	.029	.043	.030	.020	.025	.018	.012	.008	.006	.004	

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2.1 RGBW Fotometrik Deney Sonuçları *(Photometric Test Results of the RGBW)*

Uncorrected UGR Table

ceiling/cavity		0.7	0.7	0.5	0.5	0.3	0.7	0.7	0.5	0.5	0.3
walls		0.5	0.3	0.5	0.3	0.3	0.5	0.3	0.5	0.3	0.3
working plane		0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Room dimensions		Viewed crosswise					Viewed endwise				
x = 2H	y = 2H	-1.3	-0.7	-1.1	-0.6	-0.4	-3.2	-2.6	-3.0	-2.5	-2.4
	3H	-0.7	-0.1	-0.4	0.0	0.2	-3.0	-2.5	-2.7	-2.3	-2.1
	4H	-0.5	0.0	-0.3	0.2	0.4	-3.0	-2.5	-2.7	-2.3	-2.1
	6H	-0.5	-0.0	-0.2	0.2	0.5	-3.0	-2.6	-2.8	-2.3	-2.1
	8H	-0.5	-0.1	-0.2	0.2	0.4	-3.1	-2.6	-2.8	-2.4	-2.1
	12H	-0.6	-0.1	-0.3	0.1	0.4	-3.1	-2.7	-2.8	-2.4	-2.2
4H	2H	-0.9	-0.4	-0.7	-0.2	-0.0	-2.5	-2.0	-2.3	-1.8	-1.6
	3H	-0.3	0.2	0.0	0.4	0.7	-2.3	-1.8	-2.0	-1.5	-1.3
	4H	-0.1	0.3	0.2	0.6	0.9	-2.2	-1.8	-1.9	-1.5	-1.3
	6H	-0.1	0.3	0.3	0.6	0.9	-2.3	-1.9	-1.9	-1.6	-1.3
	8H	-0.1	0.2	0.2	0.5	0.9	-2.4	-2.0	-2.0	-1.7	-1.3
	12H	-0.2	0.1	0.2	0.5	0.9	-2.4	-2.1	-2.0	-1.7	-1.4
8H	4H	-0.2	0.2	0.2	0.5	0.9	-2.2	-1.9	-1.9	-1.5	-1.2
	6H	-0.2	0.1	0.2	0.5	0.9	-2.3	-2.0	-1.9	-1.6	-1.2
	8H	-0.2	0.0	0.2	0.4	0.9	-2.4	-2.1	-1.9	-1.7	-1.3
	12H	-0.3	-0.1	0.2	0.4	0.8	-2.4	-2.2	-2.0	-1.8	-1.3
12H	4H	-0.2	0.1	0.2	0.4	0.8	-2.3	-2.0	-1.9	-1.6	-1.2
	6H	-0.2	0.0	0.2	0.4	0.9	-2.4	-2.1	-1.9	-1.7	-1.2
	8H	-0.3	-0.1	0.2	0.4	0.8	-2.4	-2.2	-1.9	-1.8	-1.3
Variations with the observer position at spacings:											
S = 1.0H		+ 0.5 / - 0.7					+ 0.9 / - 1.1				
1.5H		+ 0.7 / - 0.8					+ 0.8 / - 1.0				
2.0H		+ 0.7 / - 1.5					+ 1.1 / - 1.9				

CIE Pub.117 Corrected 1541 lm Total Lamp Luminous Flux. (8log(F/F0) = 1.5)

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2.1 RGBW Fotometrik Deney Sonuçları *(Photometric Test Results of the RGBW)*

UTILIZATION FACTORS TABLE

REFLECTANCE										
Ceiling	0.8	0.8	0.8	0.7	0.7	0.7	0.5	0.5	0.5	0
Walls	0.7	0.5	0.3	0.7	0.5	0.3	0.7	0.5	0.3	0
Working plane	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0
ROOM INDEX	UTILIZATION FACTORS (PERCENT) k(RI) x RCR = 5									
k = 0.60	90	84	81	90	84	81	89	84	81	77
0.80	97	92	88	97	91	88	96	91	88	85
1.00	101	96	93	100	95	92	99	95	92	88
1.25	105	100	97	104	99	96	102	98	96	92
1.50	107	103	100	106	102	99	104	101	98	94
2.00	109	106	103	108	105	102	105	103	100	96
2.50	111	107	105	109	106	104	106	104	102	96
3.00	112	109	107	111	108	106	107	105	103	97
4.00	114	112	110	112	110	108	109	107	106	99
5.00	116	113	112	113	112	110	110	108	107	100
ROOM INDEX	UF(total)									Direct
According to DIN EN 13032-2 2004				Suspended					SEHNOM = 1.25	

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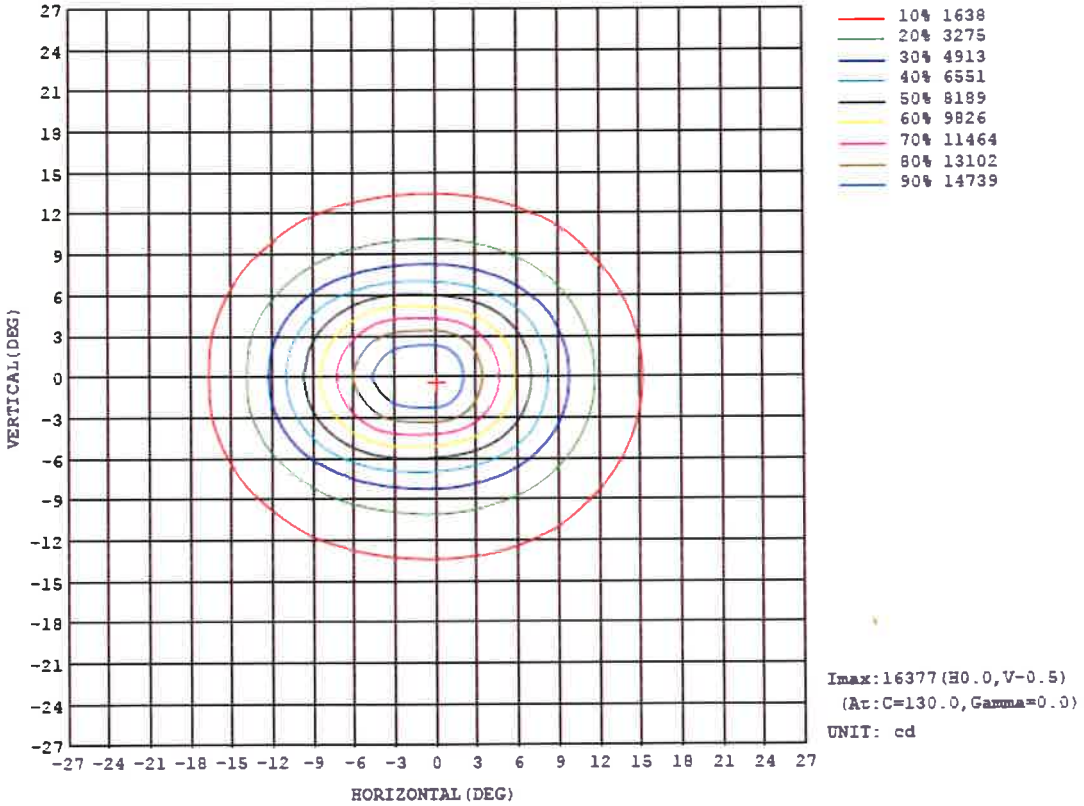
2.1 RGBW Fotometrik Deney Sonuçları *(Photometric Test Results of the RGBW)*

ISOCANDELA DIAGRAM



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Lab: 1. Organize Sanayi Uygurlar Cad. No:1
Sincan-Ankara / Turkey

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ÖLÇÜM RAPORU
MEASUREMENT REPORT

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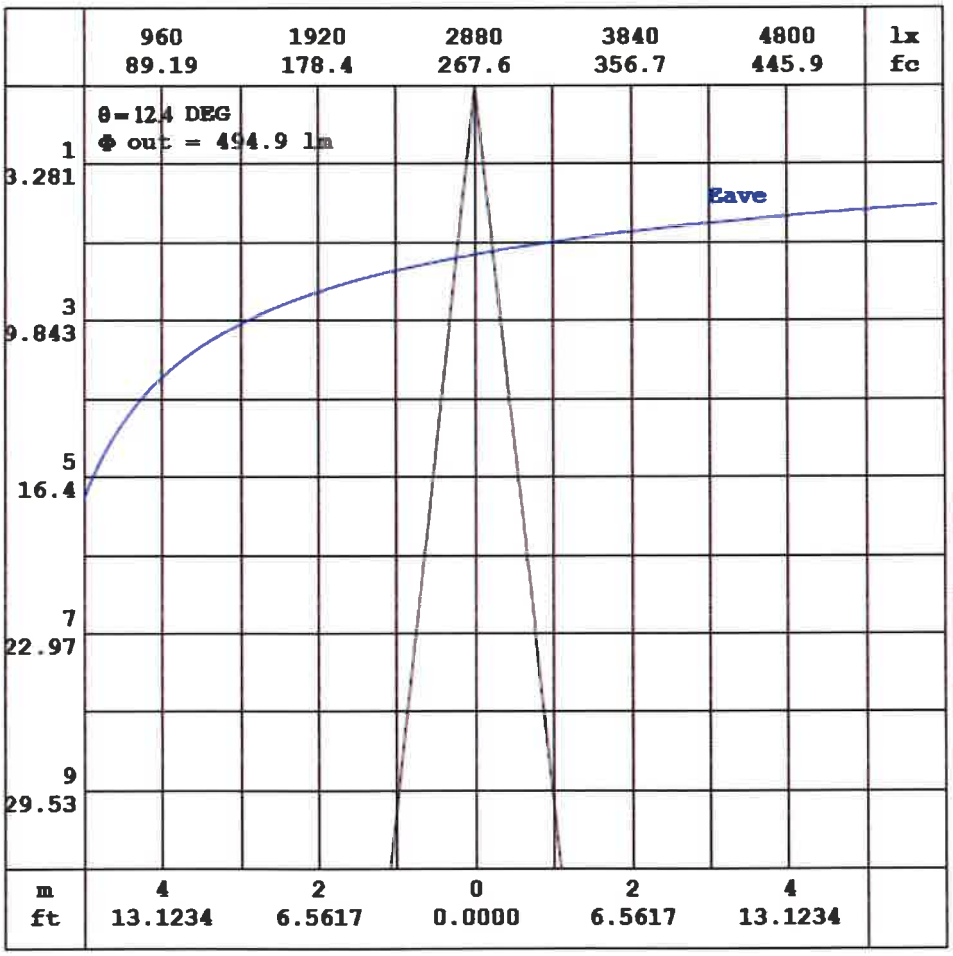
2.1 RGBW Fotometrik Deney Sonuçları *(Photometric Test Results of the RGBW)*

AAI CURVES



Note:The Curves indicate the illuminated area and the average illumination when the luminaire is at different distance.

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MEASUREMENT REPORT

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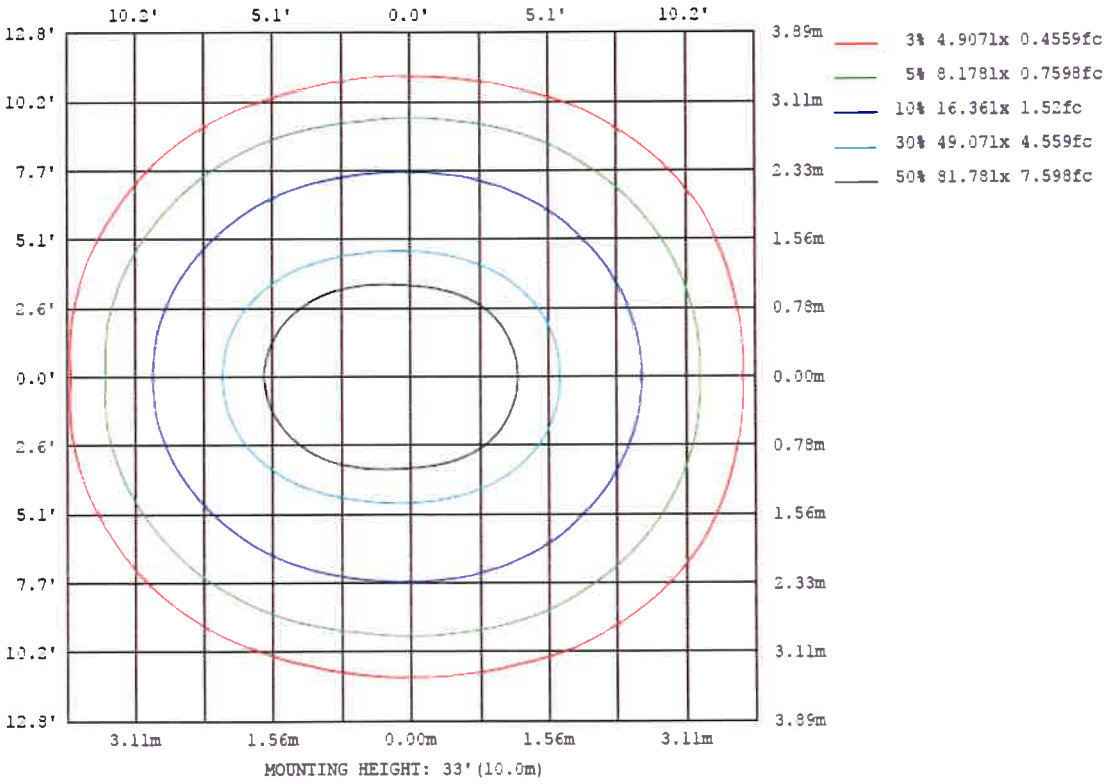
2.1 RGBW Fotometrik Deney Sonuçları *(Photometric Test Results of the RGBW)*

ISOLUX DIAGRAM



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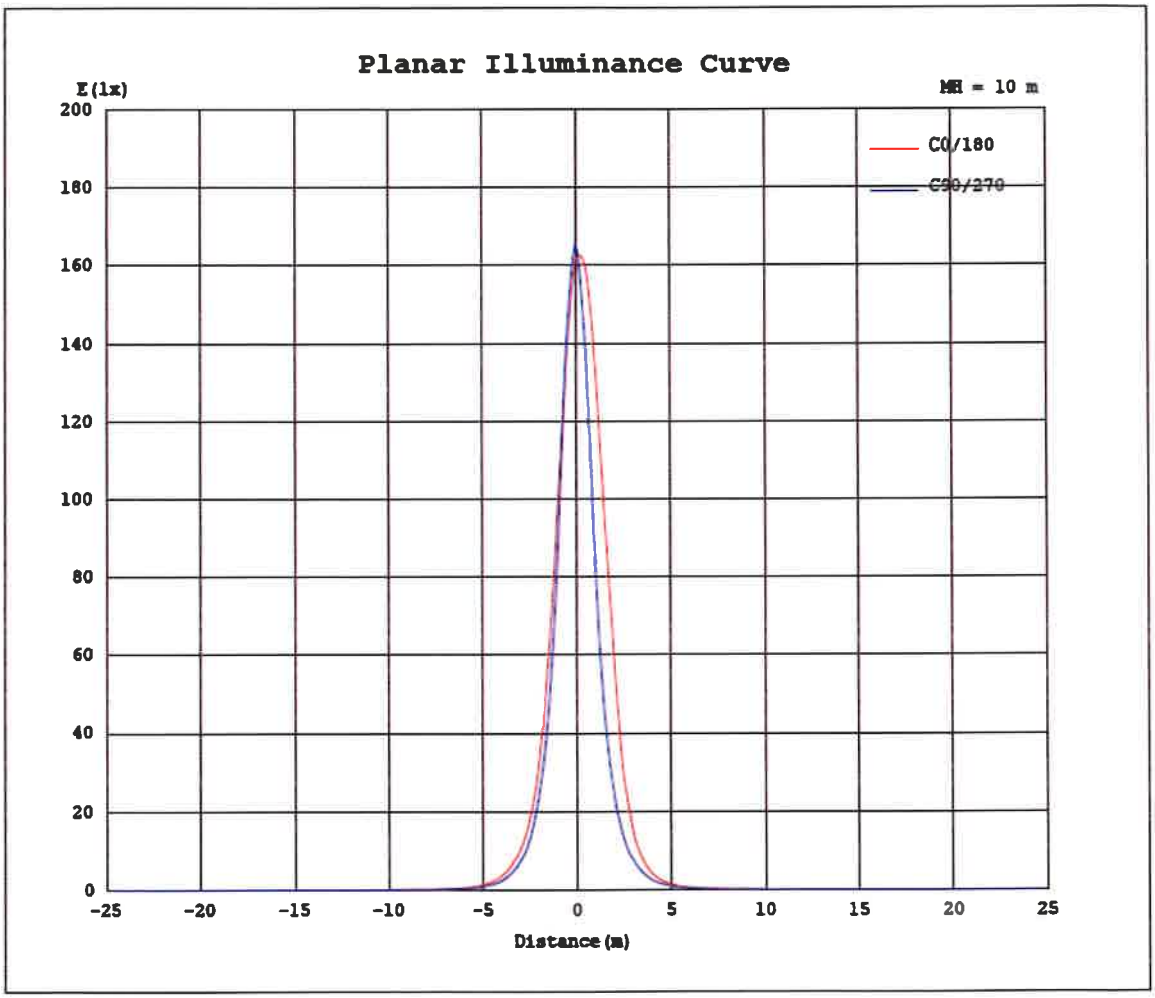
2.1 RGBW Fotometrik Deney Sonuçları *(Photometric Test Results of the RGBW)*



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2.2 RGBW Spektrokolorimetrik Deney Sonuçları *(spectrocolorimetric Test Results of the RGBW)*

Elektriksel Ölçümler
(Electrical Measurements)

Ölçülen Güç (W) *(Input Power)*	47,20 W
Ölçülen Gerilim (V) *(Input Voltage)*	46,76 VDC
Ölçülen Akım (A) *(Input Current)*	1,01 A
Güç Faktörü (PF) *(Power Factor)*	-
Ölçülen Frekans (Hz) *(Input Frequency)*	-
Ortam Sıcaklığı / Bağıl Nem *(Ambient Temperature / Relative Humidity)*	25.1 °C 46% Rh
Stabilizasyon Süresi *(Stabilization Time)*	60 dk ±5dk

Spektrokolorimetrik Ölçüm Sonuçları
(Spectrocolorimetric Measurement Results)

Chrom x	0,3116
Chrom y	0,3273
Duv	0,0028
Chrom u'	0,1977
Chrom v'	0,4672
Peak	444 nm
Dominant	488 nm
CCT	6579 K
Nominal CCT	-
Ra(CRI)	71
R9	-25
S/P Ratio	2,0
Preburning time	1 hr
Test Configuration	4π

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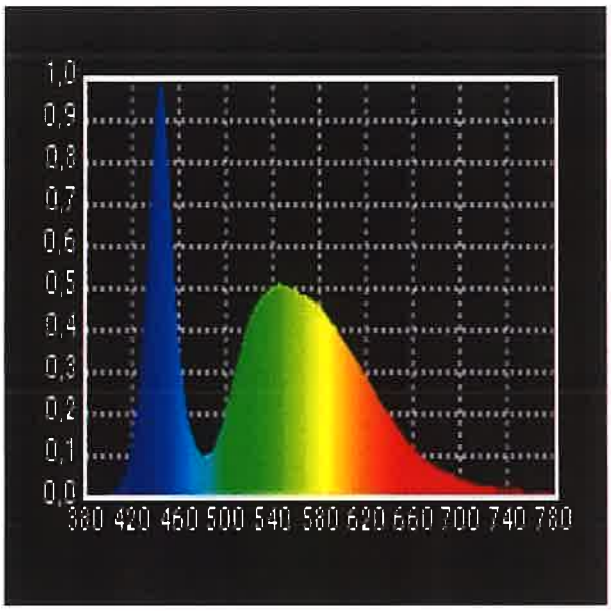
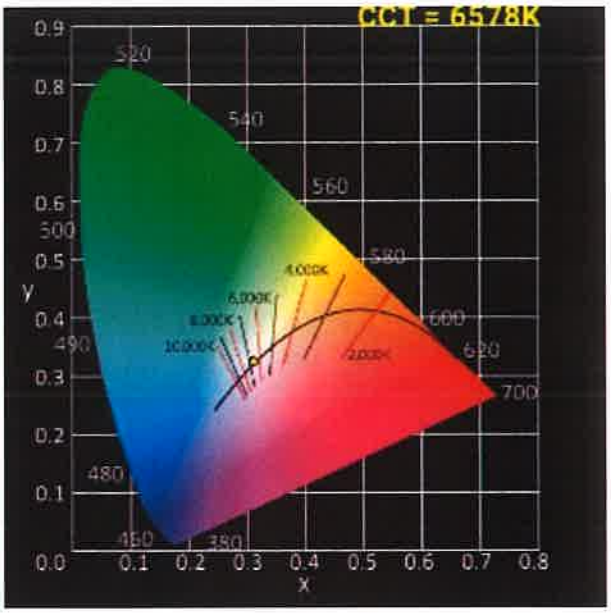
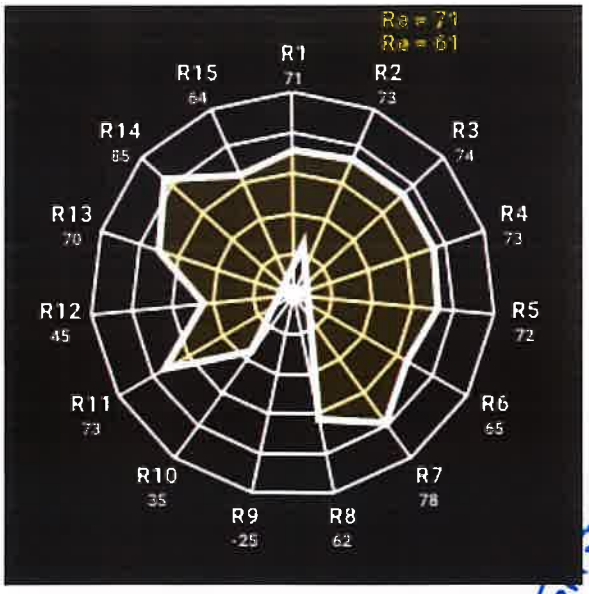
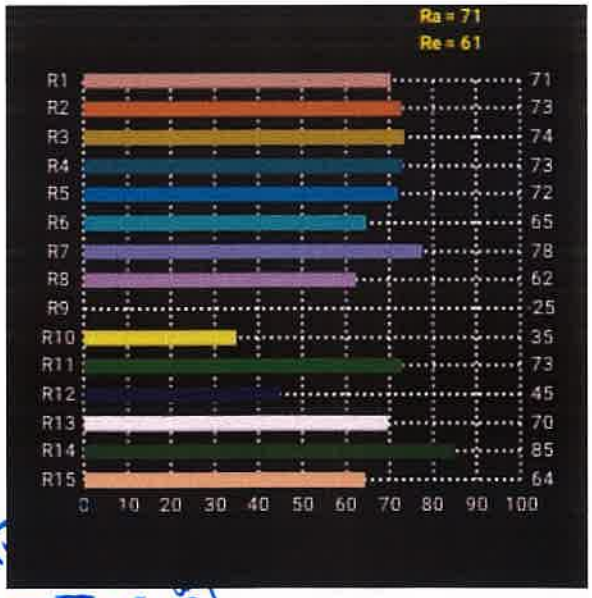
2.2 RGBW Spektrokolorimetrik Deney Sonuçları *(spectrocolorimetric Test Results of the RGBW)*

Spectral Power Distribution









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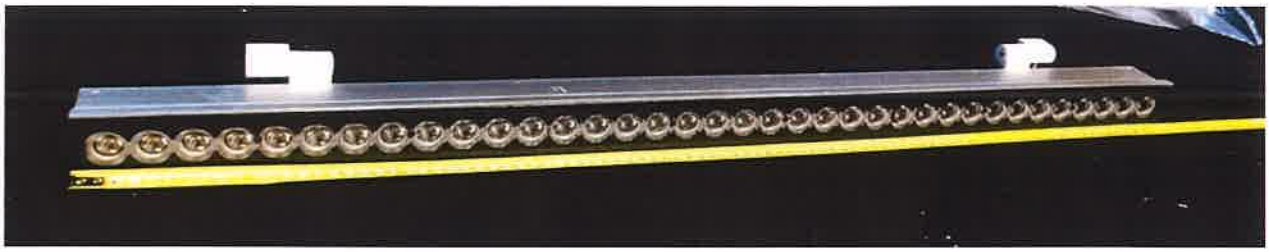
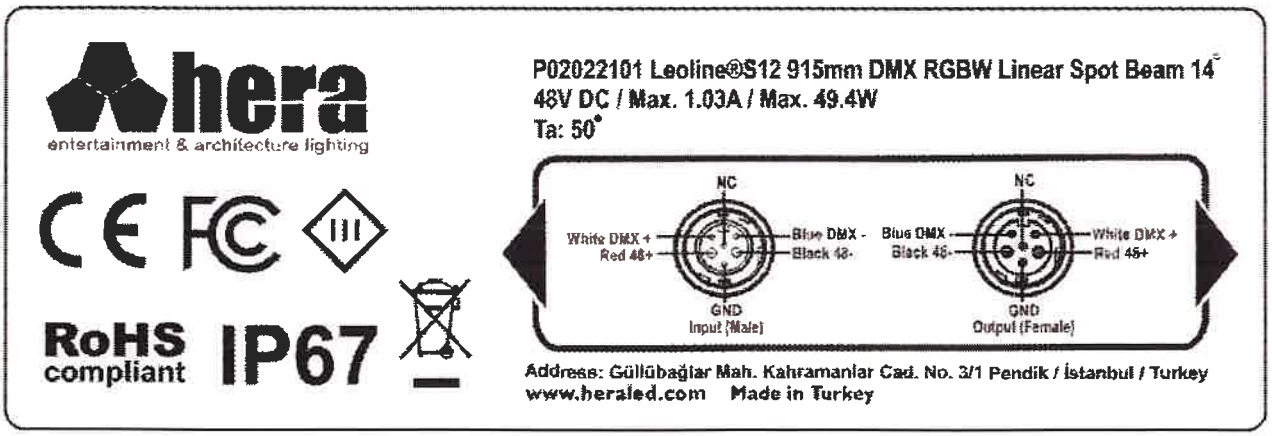
3.1 DGC'nin Fotoğrafları *(Photos of EUT)*





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