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-0095-186
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 RGB Linear Medium Beam 30°
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*	**: 02.08.2019**
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.
TÜV AUSTRIA TURK is accredited by International Accreditation Service, Inc. (IAS) under registration number TL-806 for TS EN ISO/IEC 17025 April 2012 as a test laboratory.

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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 TÜRK TEST LABORATUVARI TÜV AUSTRIA TURK **19.08.2019**	**Gürhan CANSIZ**	**Gürhan CANSIZ**

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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 RGB Linear Medium Beam 30°
Seri Numarası / *Serial Number*	: Test Numunesi *Test Sample*
Beyan Gücü / *Rated Power*	: 46.5 W
Beyan Gerilimi / *Rated Voltage*	: 48 VDC
Sembollerin Tanımı / *Defination of Symbols*	DGC= Deneyden Geçen Cihaz *EUT=Equipment Under Test*

TÜV AUSTRIA TURK TEST LABORATORY TÜV AUSTRIA TURK

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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	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% RH	UL (E349212) RoHS REACh
PCB	PCB	C13095_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	CA11017_TINA2-M-30	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 RGB Fotometrik Deney Sonuçları *(Photometric Test Results of the RGB)*

Elektriksel Ölçümler
(Electrical Measurements)

Ölçülen Güç (W) *(Input Power)*	46,34 W
Ölçülen Gerilim (V) *(Input Voltage)*	46,83 VDC
Ölçülen Akım (A) *(Input Current)*	0,99 A
Güç Faktörü (PF) *(Power Factor)*	-
Ölçülen Frekans (Hz) *(Input Frequency)*	-
Ortam Sıcaklığı / Bağıl Nem *(Ambient Temperature / Relative Humidity)*	25,1 °C 48% Rh
Stabilizasyon Süresi *(Stabilization Time)*	60 dk ±5dk

Fotometrik Ölçüm Sonuçları
(Photometric Measurement Results)

Toplam Işık Akısı *(Total Luminuous Flux)* **(lm)**	1085,8
Maksimum Işık Şiddeti *(Max. Light Intensity)* **(cd)**	3802
Armatür Etkinliği *(Luminaire Efficacy)* **(lm/W)**	23,43

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MEASUREMENT REPORT

TL-806
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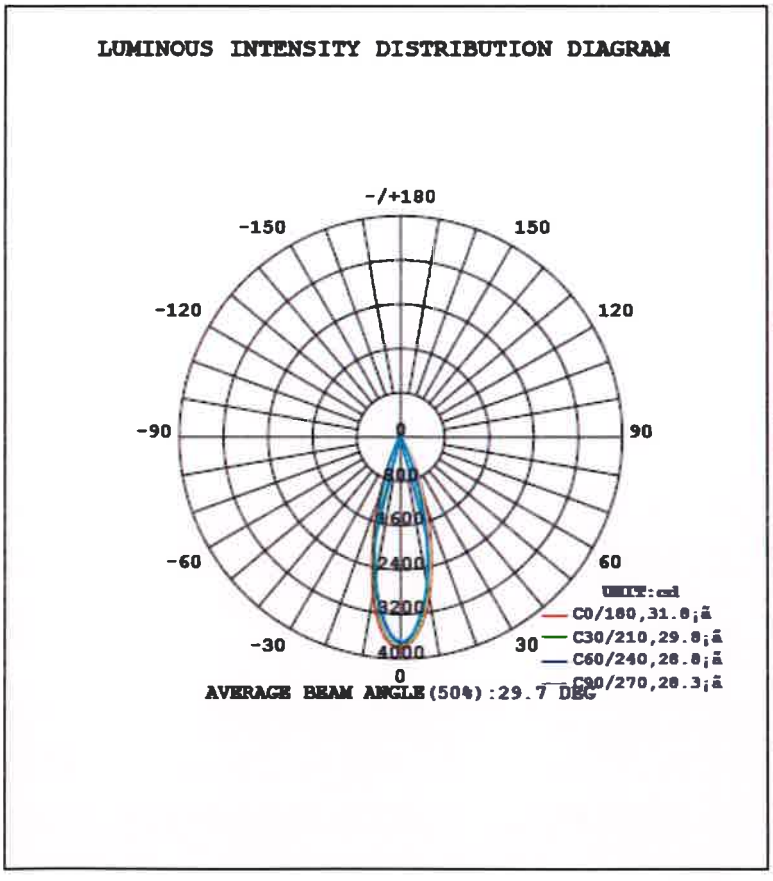
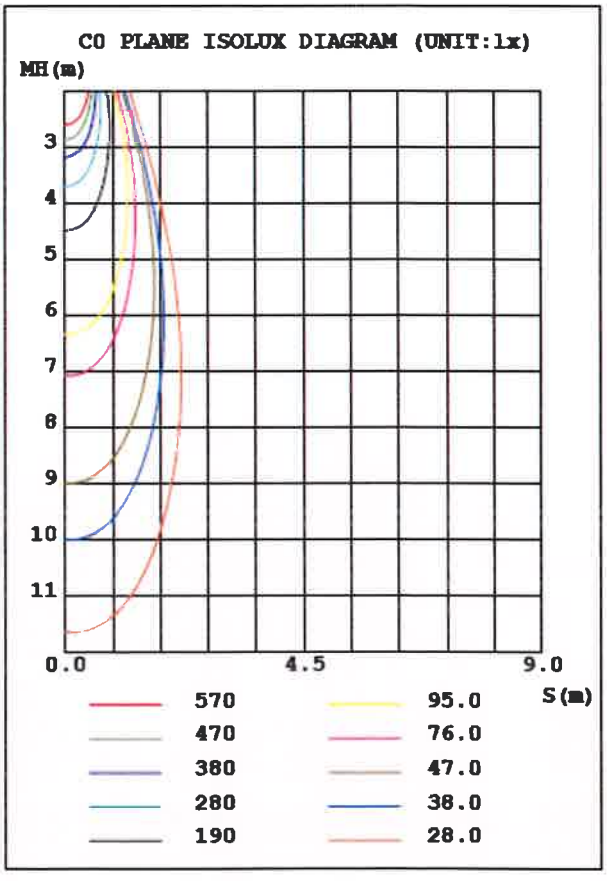
2.1 RGB Fotometrik Deney Sonuçları *(Photometric Test Results of the RGB)*





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

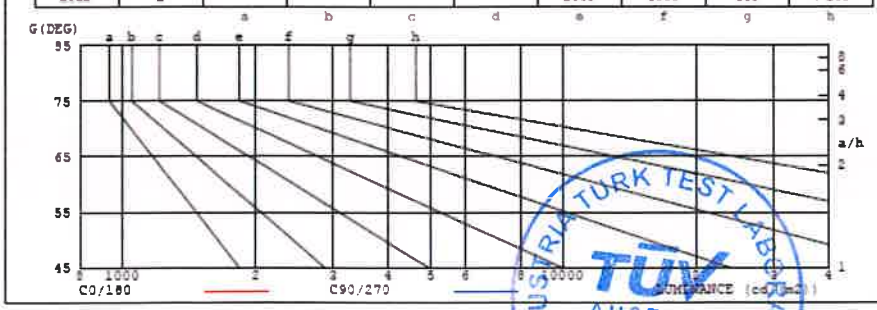
ZONAL FLUX DIAGRAM
AND LUMINANCE LIMITATION CURVES

ZONAL FLUX DIAGRAM:

γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	Φ zone	Φ total	ηlum,lamp
5	3610	3424	3290	3308	3541	3435	3364	3412	0- 5	84.92	84.92	7.82,7.82
10	2906	2654	2527	2572	2934	2761	2676	2712	5- 10	217.9	302.8	27.9,27.9
15	1991	1703	1582	1650	2125	1877	1764	1785	10- 15	264.5	567.2	52.2,52.2
20	1142	876.0	767.6	861.7	1284	982.8	895.0	925.2	15- 20	220.2	787.5	72.5,72.5
25	526.1	360.9	313.2	386.8	622.9	410.5	383.9	404.6	20- 25	134.4	922.0	84.9,84.9
30	224.7	147.0	126.0	172.7	291.5	173.0	167.5	173.7	25- 30	69.41	991.4	91.3,91.3
35	108.2	68.67	66.22	82.02	120.3	82.26	80.37	81.92	30- 35	26.52	1028	94.7,94.7
40	58.26	37.51	24.68	42.19	57.98	43.40	41.26	43.02	35- 40	20.41	1048	96.5,96.5
45	30.29	22.66	19.90	25.51	34.19	25.06	22.76	24.15	40- 45	12.33	1061	97.7,97.7
50	22.00	15.27	12.75	16.29	22.41	15.64	12.88	14.88	45- 50	8.166	1069	98.4,98.4
55	14.72	10.98	8.676	11.25	15.06	10.77	8.582	10.07	50- 55	5.802	1075	99,99
60	10.82	7.791	6.162	8.047	10.82	7.626	5.725	6.897	55- 60	4.389	1079	99.4,99.4
65	7.569	4.806	3.853	5.362	7.802	4.696	3.254	4.095	60- 65	3.179	1082	99.7,99.7
70	4.329	2.582	1.933	2.822	4.715	2.499	1.632	2.239	65- 70	1.980	1084	99.9,99.9
75	2.036	1.215	0.8076	1.262	2.246	1.169	0.7476	1.089	70- 75	1.028	1085	100,100
80	0.6420	0.3024	0.1801	0.3498	0.7875	0.3159	0.1721	0.2641	75- 80	0.4168	1086	100,100
85	0	0	0	0	0.0050	0	0	0	80- 85	0.0616	1086	100,100
90	0	0	0	0	0	0	0	0	85- 90	0.0000	1086	100,100
95	0	0	0	0	0	0	0	0	90- 95	0	1086	100,100
100	0	0	0	0	0	0	0	0	95-100	0	1086	100,100
105	0	0	0	0	0	0	0	0	100-105	0	1086	100,100
110	0	0	0	0	0	0	0	0	105-110	0	1086	100,100
115	0	0	0	0	0	0	0	0	110-115	0	1086	100,100
120	0	0	0	0	0	0	0	0	115-120	0	1086	100,100
125	0	0	0	0	0	0	0	0	120-125	0	1086	100,100
130	0	0	0	0	0	0	0	0	125-130	0	1086	100,100
135	0	0	0	0	0	0	0	0	130-135	0	1086	100,100
140	0	0	0	0	0	0	0	0	135-140	0	1086	100,100
145	0	0	0	0	0	0	0	0	140-145	0	1086	100,100
150	0	0	0	0	0	0	0	0	145-150	0	1086	100,100
155	0	0	0	0	0	0	0	0	150-155	0	1086	100,100
160	0	0.0256	0.0467	0	0	0	0	0	155-160	0.0003	1086	100,100
165	0.0592	0.0995	0.1162	0.0485	0	0	0	0	160-165	0.0027	1086	100,100
170	0.0991	0.1376	0.1492	0.0934	0	0	0	0	165-170	0.0060	1086	100,100
175	0.1028	0.1376	0.1207	0.1003	0.0082	0.0026	0	0	170-175	0.0042	1086	100,100
180	0.1078	0.1127	0.0822	0.0745	0.1075	0.1170	0.0755	0.0700	175-180	0.0016	1086	100,100
DEG	LUMINOUS INTENSITY:cd									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	0	0
80	37	10
75	79	31
70	127	57
65	179	91
60	216	122
55	257	151
50	342	198
45	429	281

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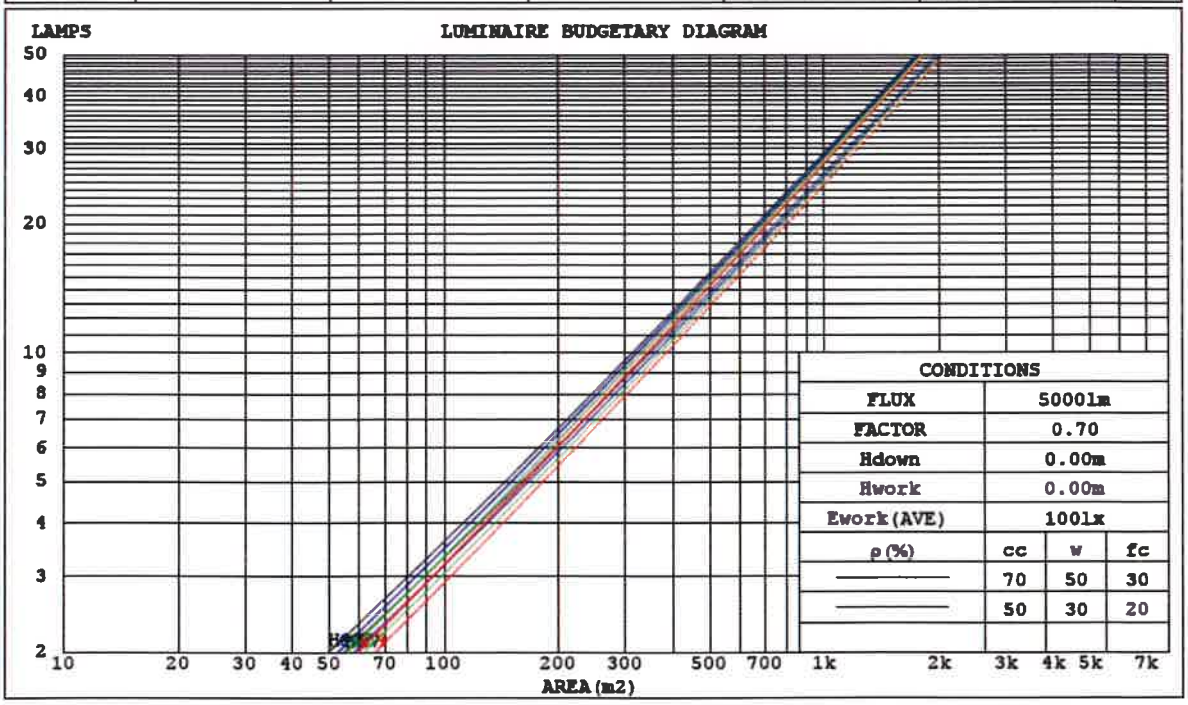
2.1 RGB Fotometrik Deney Sonuçları *(Photometric Test Results of the RGB)*

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 Utilization(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	1.12	1.10	1.08	1.10	1.08	1.07	1.06	1.05	1.03	1.03	1.01	1.00	.99	.98	.98	.96
2.0	1.07	1.03	1.01	1.05	1.02	.99	1.02	.99	.97	.99	.97	.95	.96	.95	.93	.92
3.0	1.01	.97	.94	1.00	.96	.94	.98	.95	.92	.95	.93	.91	.93	.91	.89	.88
4.0	.97	.93	.89	.96	.92	.89	.94	.90	.88	.92	.89	.87	.90	.88	.86	.84
5.0	.93	.88	.86	.92	.88	.86	.90	.87	.84	.89	.86	.83	.87	.85	.82	.81
6.0	.89	.84	.81	.88	.84	.81	.87	.83	.80	.86	.82	.80	.85	.82	.79	.78
7.0	.86	.81	.78	.85	.81	.78	.84	.80	.77	.83	.80	.77	.82	.79	.77	.76
8.0	.83	.78	.75	.82	.78	.75	.81	.77	.75	.80	.77	.74	.79	.76	.74	.73
9.0	.80	.75	.72	.79	.75	.72	.79	.75	.72	.78	.74	.72	.77	.74	.72	.71
10.0	.77	.73	.70	.77	.73	.70	.76	.72	.70	.75	.72	.69	.75	.72	.69	.68



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

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	.147	.084	.026	.140	.080	.025	.128	.073	.023	.117	.067	.022	.106	.061	.020	
2.0	.138	.075	.023	.132	.073	.022	.122	.068	.021	.112	.063	.020	.103	.059	.018	
3.0	.129	.069	.021	.124	.067	.020	.116	.063	.019	.108	.059	.018	.100	.056	.017	
4.0	.121	.063	.019	.117	.061	.018	.110	.058	.017	.103	.055	.017	.097	.053	.016	
5.0	.115	.058	.017	.111	.057	.017	.105	.055	.016	.099	.052	.016	.094	.050	.015	
6.0	.109	.054	.016	.106	.053	.015	.100	.051	.015	.095	.050	.015	.091	.048	.014	
7.0	.103	.051	.014	.101	.050	.014	.096	.049	.014	.092	.047	.014	.087	.045	.013	
8.0	.099	.048	.014	.096	.047	.013	.092	.046	.013	.088	.045	.013	.085	.043	.013	
9.0	.094	.046	.013	.092	.045	.013	.089	.044	.012	.085	.043	.012	.082	.042	.012	
10.0	.090	.043	.012	.089	.043	.012	.085	.042	.012	.082	.041	.012	.079	.040	.011	

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	.190	.190	.190	.163	.163	.163	.111	.111	.111	.064	.064	.064	.020	.020	.020	
1.0	.169	.158	.147	.145	.135	.127	.099	.093	.088	.057	.054	.051	.018	.017	.016	
2.0	.152	.133	.117	.130	.114	.101	.089	.079	.070	.051	.046	.041	.016	.015	.013	
3.0	.137	.113	.094	.118	.098	.082	.081	.068	.057	.047	.040	.034	.015	.013	.011	
4.0	.125	.098	.077	.108	.085	.067	.074	.059	.047	.043	.035	.028	.014	.011	.009	
5.0	.115	.086	.064	.099	.074	.056	.068	.052	.040	.040	.031	.023	.013	.010	.008	
6.0	.107	.076	.054	.092	.066	.047	.063	.046	.033	.037	.027	.020	.012	.009	.007	
7.0	.099	.068	.046	.085	.059	.040	.059	.041	.029	.034	.024	.017	.011	.008	.006	
8.0	.093	.061	.040	.080	.053	.035	.055	.037	.025	.032	.022	.015	.010	.007	.005	
9.0	.088	.056	.035	.075	.049	.030	.052	.034	.021	.030	.020	.013	.010	.007	.004	
10.0	.083	.051	.030	.071	.045	.026	.049	.031	.019	.029	.019	.011	.009	.006	.004	

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

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	1.6	2.3	1.8	2.5	2.6	-0.8	-0.1	-0.6	0.0	0.2
	3H	1.8	2.5	2.1	2.7	2.9	-0.8	-0.1	-0.6	0.1	0.3
	4H	1.9	2.5	2.1	2.7	2.9	-0.8	-0.2	-0.6	0.0	0.2
	6H	1.8	2.4	2.1	2.6	2.9	-0.9	-0.3	-0.6	-0.1	0.2
	8H	1.8	2.3	2.1	2.6	2.8	-1.0	-0.4	-0.7	-0.1	0.1
	12H	1.7	2.3	2.0	2.5	2.8	-1.0	-0.4	-0.7	-0.2	0.1
4H	2H	1.5	2.2	1.8	2.4	2.6	-0.8	-0.1	-0.5	0.1	0.3
	3H	1.8	2.4	2.1	2.6	2.9	-0.7	-0.1	-0.4	0.1	0.4
	4H	1.8	2.3	2.2	2.6	2.9	-0.7	-0.2	-0.4	0.1	0.4
	6H	1.8	2.2	2.1	2.6	2.9	-0.8	-0.3	-0.4	-0.0	0.3
	8H	1.7	2.1	2.1	2.5	2.9	-0.9	-0.4	-0.5	-0.1	0.3
	12H	1.7	2.1	2.1	2.4	2.8	-0.9	-0.5	-0.5	-0.2	0.2
8H	4H	1.7	2.1	2.1	2.5	2.8	-0.8	-0.4	-0.4	-0.0	0.3
	6H	1.6	2.0	2.1	2.4	2.8	-0.9	-0.5	-0.5	-0.2	0.3
	8H	1.6	1.9	2.0	2.3	2.7	-1.0	-0.6	-0.5	-0.2	0.2
	12H	1.5	1.8	2.0	2.2	2.7	-1.0	-0.8	-0.5	-0.3	0.2
12H	4H	1.6	2.0	2.1	2.4	2.8	-0.9	-0.5	-0.4	-0.1	0.3
	6H	1.6	1.9	2.0	2.3	2.7	-1.0	-0.6	-0.5	-0.2	0.2
	8H	1.5	1.8	2.0	2.2	2.7	-1.0	-0.7	-0.5	-0.3	0.2
Variations with the observer position at spacings:											
S = 1.0H		+ 2.4 / - 2.3					+ 1.9 / - 2.8				
1.5H		+ 3.9 / - 2.1					+ 3.0 / - 2.0				
2.0H		+ 2.4 / - 1.9					+ 2.3 / - 1.8				

CIE Pub.117 Corrected 1086 lm Total Lamp Luminous Flux.(Blog(F/F0) = 0.3)

TÜV AUSTRIA TURK TEST LABORATORY
TÜV AUSTRIA TURK

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

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	89	83	80	89	83	80	88	83	80	76
0.80	97	91	88	96	91	87	95	90	87	84
1.00	101	95	92	100	95	92	98	95	91	87
1.25	104	99	96	103	99	96	101	98	95	91
1.50	107	102	99	106	102	99	103	100	98	93
2.00	109	106	102	108	104	102	105	102	100	95
2.50	111	107	104	109	106	104	106	104	102	96
3.00	112	109	106	110	108	105	107	105	103	97
4.00	114	112	110	112	110	108	109	107	105	98
5.00	115	113	112	113	112	110	109	108	107	99
ROOM INDEX	UF(total)									Direct
According to DIN EN 13032-2 2004				Suspended					SHRNOM = 1.25	

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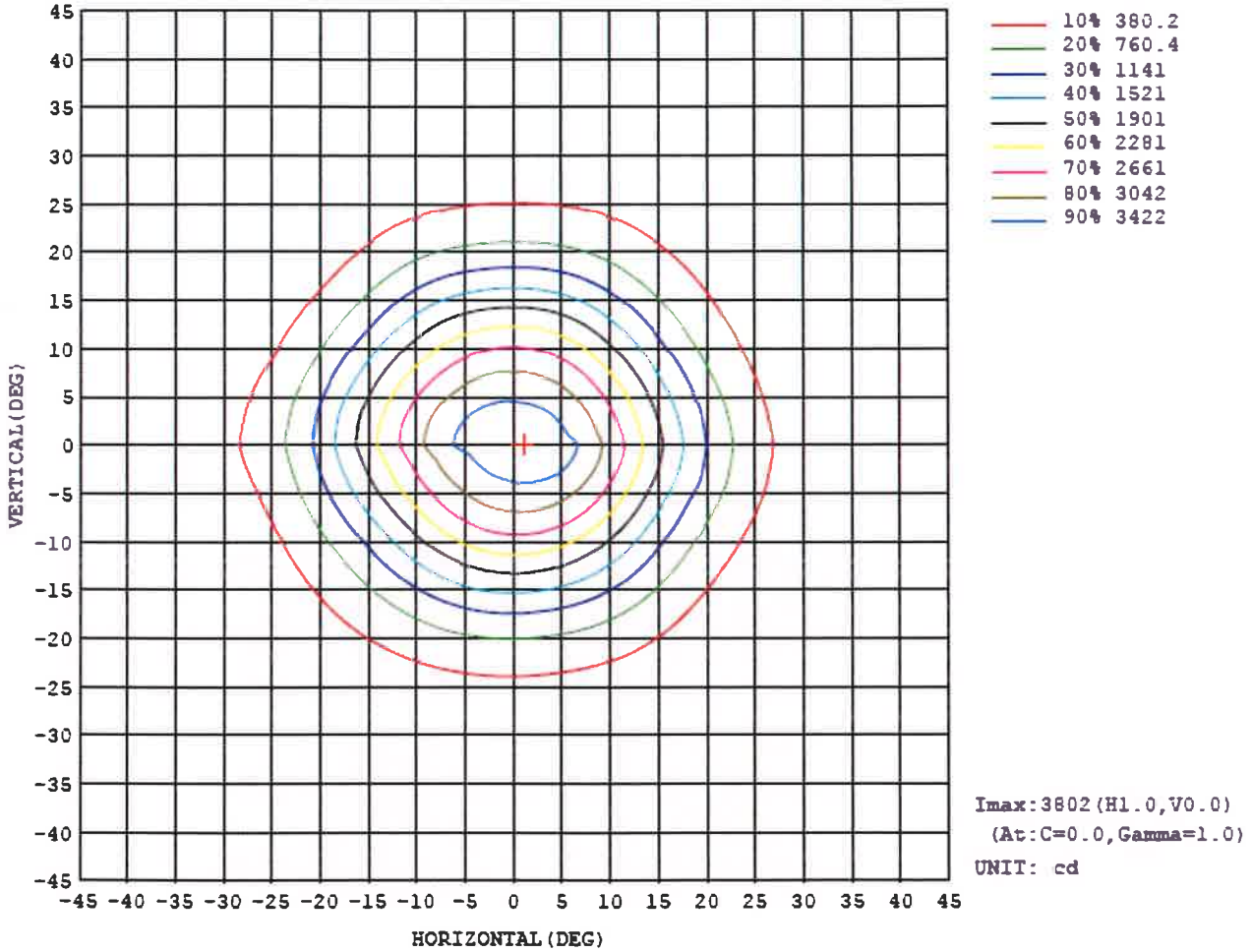
No:13/1 Ataşehir / İstanbul
Lab: 1. Organize Sanayi Uygurlar Cad. No:1
Sincan-Ankara / Turkey

ÖLÇÜM RAPORU
MEASUREMENT REPORT

TL-806
19-TST-0095-186
08-19

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

ISOCANDELA DIAGRAM



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MEASUREMENT REPORT

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19-TST-0095-186
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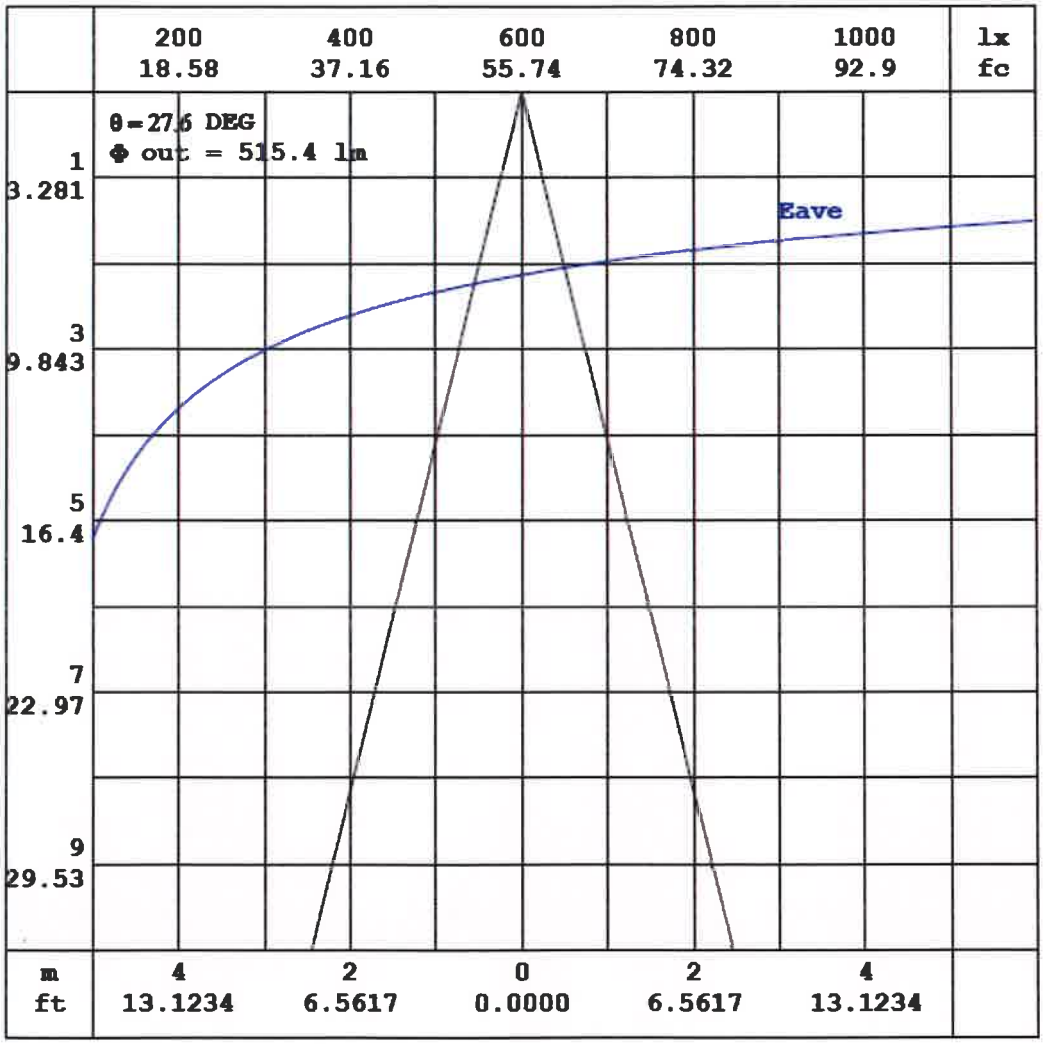
2.1 RGB Fotometrik Deney Sonuçları *(Photometric Test Results of the RGB)*

AAI CURVES



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

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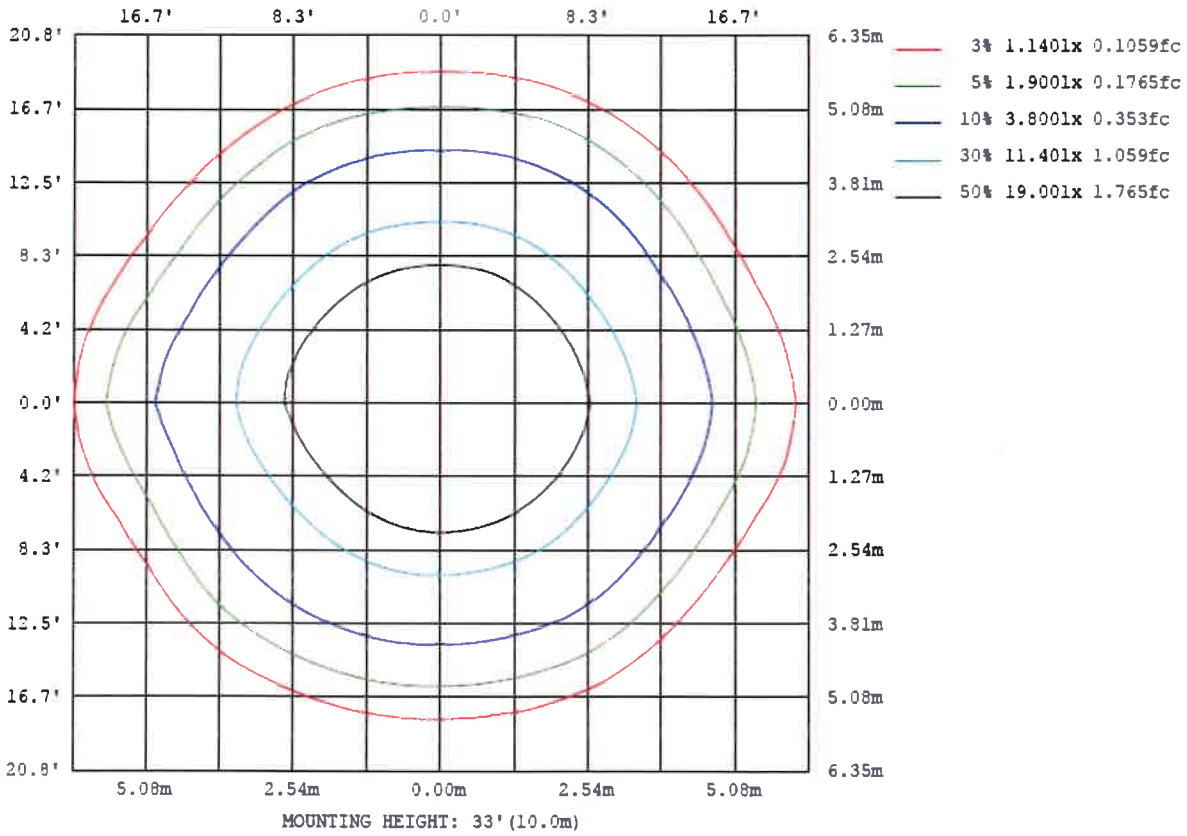
2.1 RGB Fotometrik Deney Sonuçları *(Photometric Test Results of the RGB)*

ISOLUX DIAGRAM



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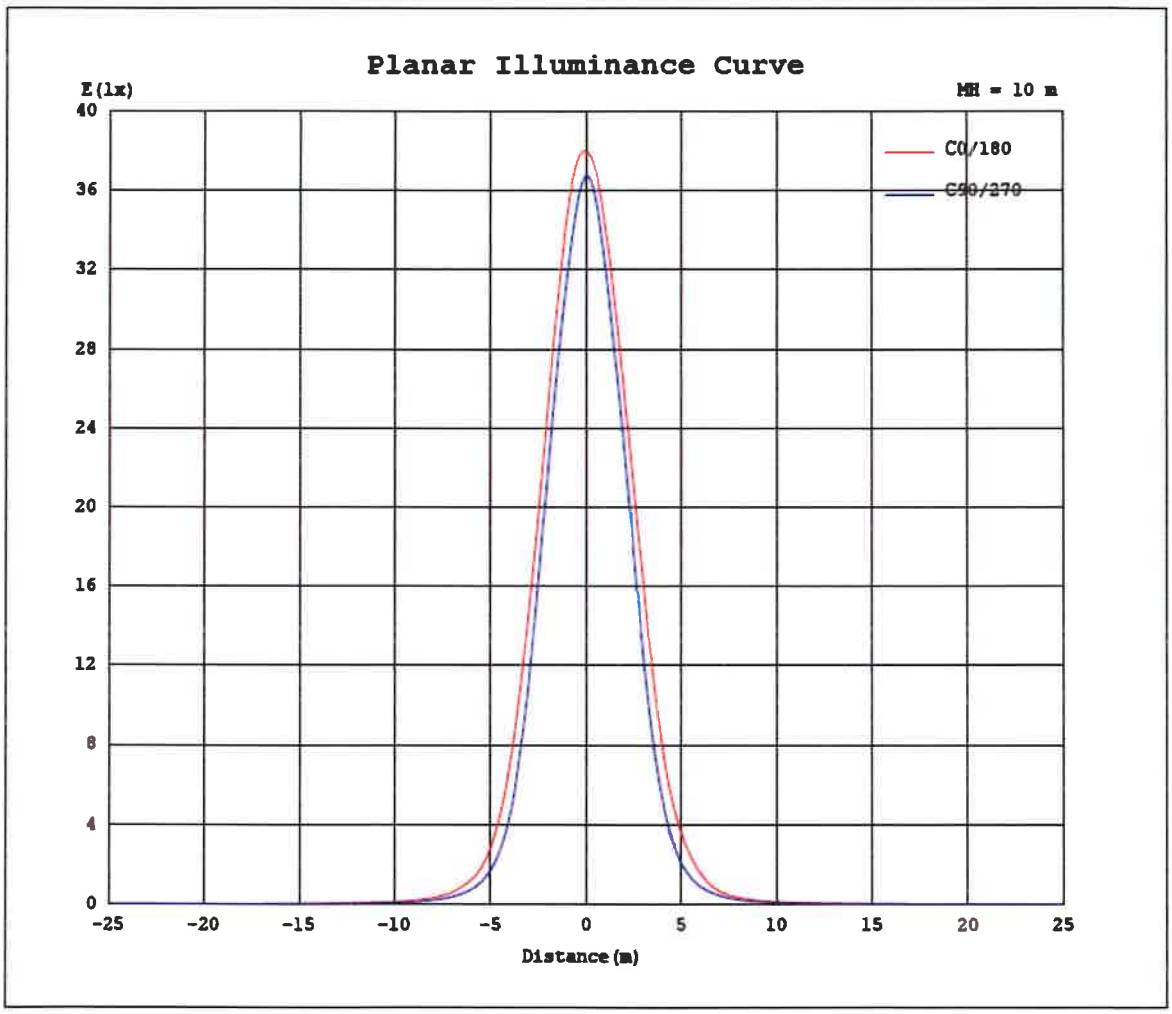
ÖLÇÜM RAPORU
MEASUREMENT REPORT

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



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

Elektriksel Ölçümler
(Electrical Measurements)

Ölçülen Güç (W) *(Input Power)*	46,34 W
Ölçülen Gerilim (V) *(Input Voltage)*	46,83 VDC
Ölçülen Akım (A) *(Input Current)*	0,99 A
Güç Faktörü (PF) *(Power Factor)*	-
Ölçülen Frekans (Hz) *(Input Frequency)*	-
Ortam Sıcaklığı / Bağıl Nem *(Ambient Temperature / Relative Humidity)*	25 °C 48% Rh
Stabilizasyon Süresi *(Stabilization Time)*	60 dk ±5dk

Spektrokolorimetrik Ölçüm Sonuçları
(Spectrocolorimetric Measurement Results)

Chrom x	0,2707
Chrom y	0,1657
Duv	0,0000
Chrom u'	0,2435
Chrom v'	0,3353
Peak	448 nm
Dominant	0 nm
CCT	-
Nominal CCT	-
Ra(CRI)	-
R9	-
S/P Ratio	3,7
Preburning time	1 hr
Test Configuration	4π

TÜV AUSTRIA TURK TEST LABORATORY

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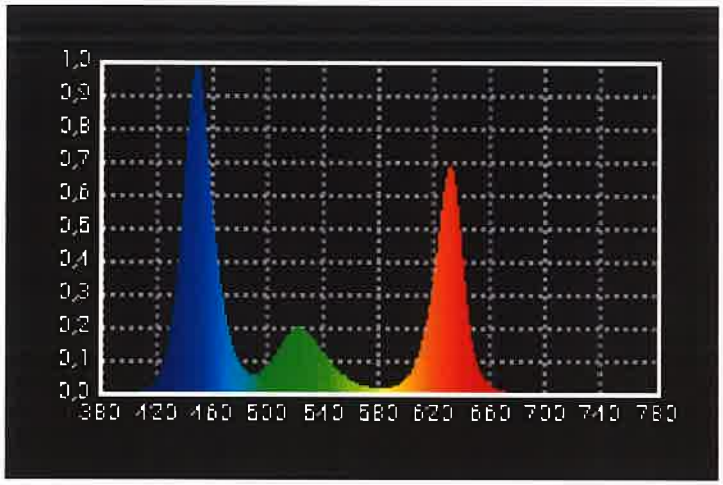
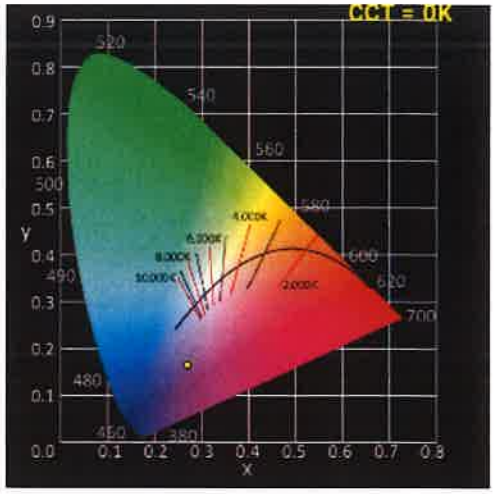
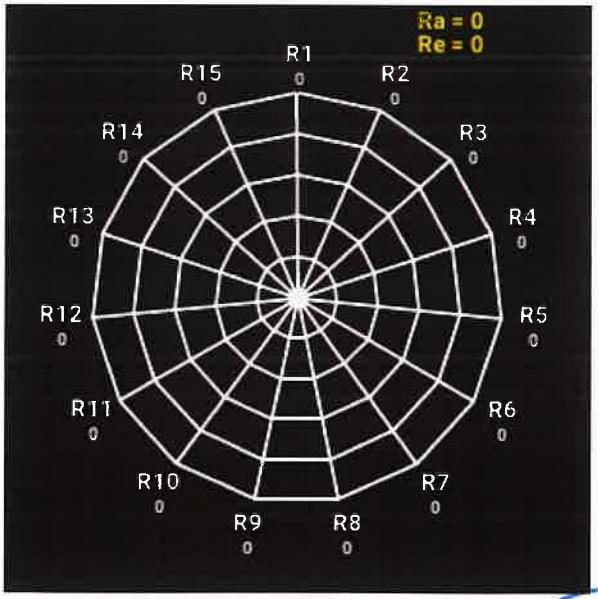
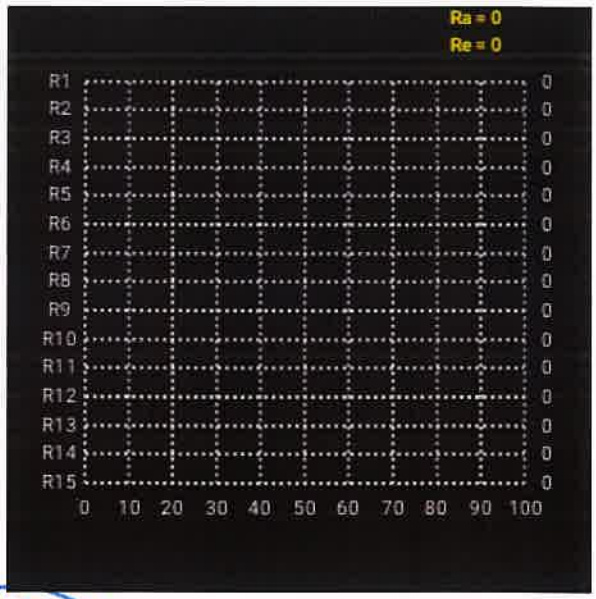
2.2 RGB Spektrokolorimetrik Deney Sonuçları *(spectrocolorimetric Test Results of the RGB)*

Spectral Power Distribution









TÜV AUSTRIA TURK TEST LABORATUVARI
TÜV AUSTRIA TURK

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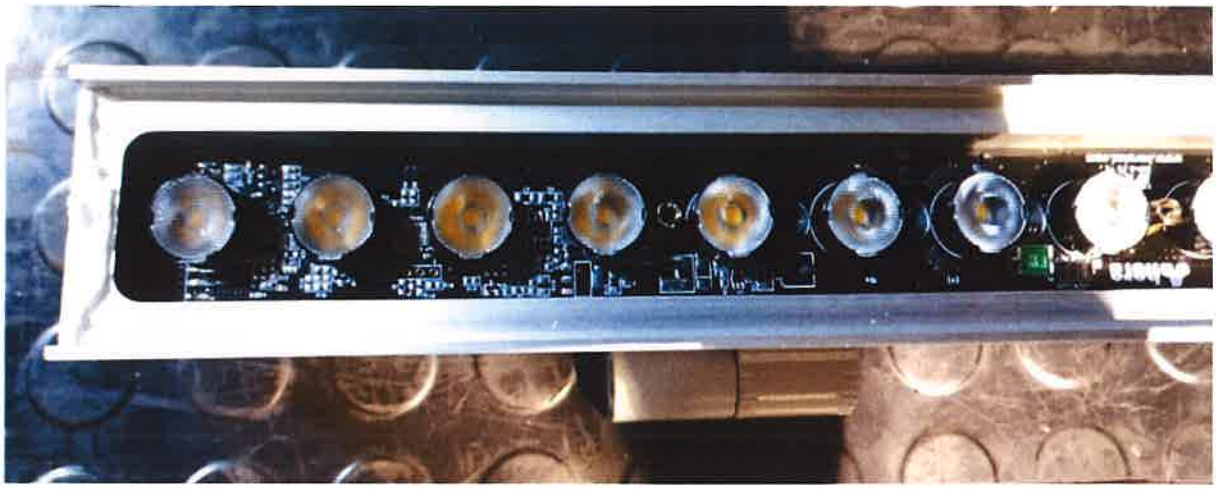
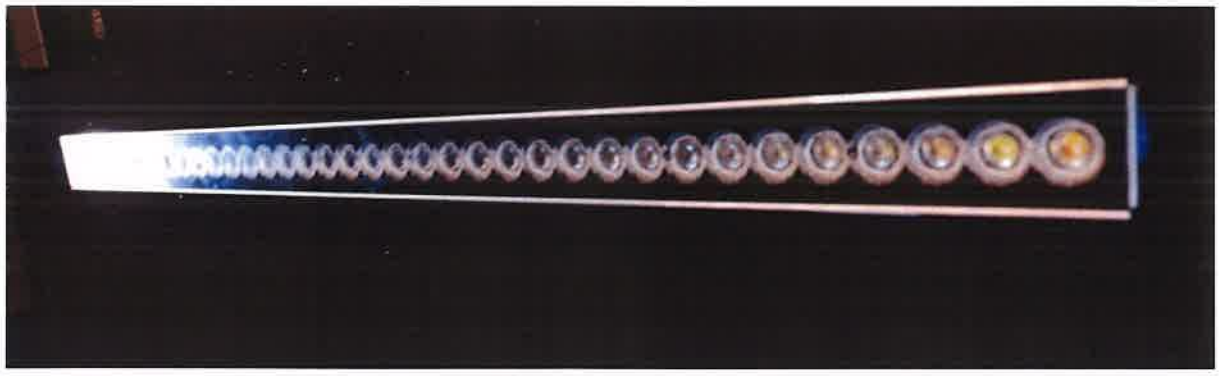
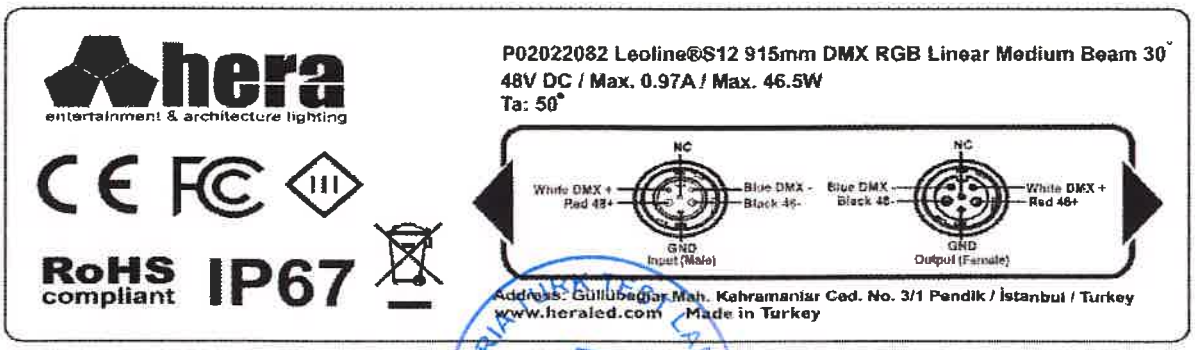
3.1 DGC'nin Fotoğrafları *(Photos of EUT)*







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