

Doc No: FRM-LAB-009a

Rev.No/Date: 02 / 11.01.2019

Sayfa / Page : 1 / 16

Müşterinin Adı Adresi <i>Customer name/address</i>	: Hera Eğlence ve Mimari Aydınlatma Sistemleri A.Ş Güllübağlar Mah. Kahramanlar Cad. No:3-1 34906 Pendik / İstanbul
İstek Numarası <i>Order No</i>	: 21-IS-0497-IR-003
Numunenin Adı ve Tarifi <i>Name and identity of test item</i>	: Chronopix RGB DOME - P0102508501501050101
Numunenin kabul tarihi <i>The date of receipt of test item</i>	: 17.03.2021
Açıklamalar <i>Remarks</i>	: DGC'ye , IES LM-79-08 standardı uyarınca fotometrik ölçümler yapılmıştır. <i>Photometric measurement has been applied to EUT according to IESNA LM-79-08</i>
Deneyin Yapıldığı Tarih <i>Date of Test</i>	: 18.03.2021
Raporun Sayfa Sayısı <i>Number of Pages of the Report</i>	: 16

Deney ve /veya ölçüm sonuçları, genişletilmiş ölçüm belirsizlikleri (olması halinde) ve deney metotları bu sertifikanın tamamlayıcı kısmı olan takip eden sayfalarda verilmiştir.
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, numunelere uygulanan deney/deneyler sonucu hazırlanmıştır. Müşteriye ait diğer numuneleri kapsamaz.
This report was prepared according to test results of specimens. It doesn't contain other specimens belonging to customer.

Seal and Date
26.03.2021

Prepared by
Ömer H. KARAKÖSE

Approved by
Mutlu DEMİR



4

Doc No: FRM-LAB-009a

Rev.No/Date: 02 / 11.01.2019

Sayfa / Page : 2 / 16

İÇİNDEKİLER
(CONTENTS)

	Sayfa Page
1. Dokümantasyon (Documentation)	
1.1 DGC, Çevre Şartları ve Sembollerin Tanımları (Description of the EUT, Environmental Conditions and Symbol Definitions)	3
1.2 Deney Standartları (Test Standards)	4
1.3 Deney Ekipmanları (Test Equipments)	4
2.1 Fotometrik Deney Sonuçları (Photometric Test Results)	5
2.2 Spektrokolorimetrik Deney Sonuçları (spectrocolorimetric Test Results)	9
3.1 DGC'nin Fotoğrafları (Photos of EUT)	16



Doc No: FRM-LAB-009a

Rev.No/Date: 02 / 11.01.2019

Sayfa / Page : 3 / 16

1.1

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

Markası / Brand	: HERA
Modeli / Model	: Chronopix RGB DOME P0102508501501050101
Seri Numarası / Serial Number	: 14098-00001
Beyan Gücü / Rated Power	: 2,4 W
Beyan Gerilimi / Rated Voltage	: 48 V DC
Sembollerin Tanımı / Definitions of Symbols	DGC= Deneyden Geçen Cihaz EUT=Equipment Under Test



Doc No: FRM-LAB-009a

Rev.No/Date: 02 / 11.01.2019

Sayfa / Page : 4 / 16

1.2 Deney Standartları (Test Standards)

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

Standart / Standard

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

1.3 Deney Ekipmanları (Test Equipments)

Model No	Tip (Type)	Kalibrasyon Tarihi (Calibration Date)	Kontrol (Check Point)
GO-R5000	Goniophotometer	20.10.2019	<input checked="" type="checkbox"/>
WY12010	AC Power Supply	21.10.2019	<input checked="" type="checkbox"/>
PF-2010A	Digital Multimeter	20.10.2019	<input checked="" type="checkbox"/>
D908	Standart Lamp	19.10.2019	<input checked="" type="checkbox"/>
ALP-01	Lighting Passport Spectrometer	25.03.2019	<input checked="" type="checkbox"/>

1.3 Komponent listesi (Compenent list)

Komponent (Componenets)	Üretici (Manufacturer)	Model (Model)	Certificate no. (Certificate no.)	Standart no. (Standart No.)
LED Light Source	Cree Inc	CLX6F-FKC RGB 3 COLOUR LED	REACH/RoHS	REACH/RoHS
LED Control Unit	Texas Ins.	TLC5971PWPR	REACH/RoHS	REACH/RoHS



Doc No: FRM-LAB-009a

Rev.No/Date: 02 / 11.01.2019

Sayfa / Page : 5 / 16

2.1 Fotometrik Deney Sonuçları (Photometric Test Results)**Elektriksel Ölçümler**

(Electrical Measurements)

Ölçülen Güç (W) (Input Power)	2.4
Ölçülen Gerilim (V) (Input Voltage)	48
Ölçülen Akım (A) (Input Current)	0.05
Güç Faktörü (PF) (Power Factor)	-
Ölçülen Frekans (Hz) (Input Frequency)	-
Ortam Sıcaklığı / Bağlı Nem (Ambient Temperature / Relative Humidity)	25,1 °C 48% Rh
Stabilizasyon Süresi (Stabilization Time)	2 hours

Fotometrik Ölçüm Sonuçları

(Photometric Measurement Results)

Toplam Işık Akısı (Total Luminous Flux) (lm)	40.86
Maksimum Işık Şiddeti (Max. Light Intensity) (cd)	9.559
Armatür Etkinliği (Luminaire Efficacy) (lm/W)	17.05
Illuminaire Intensity (lux)	7

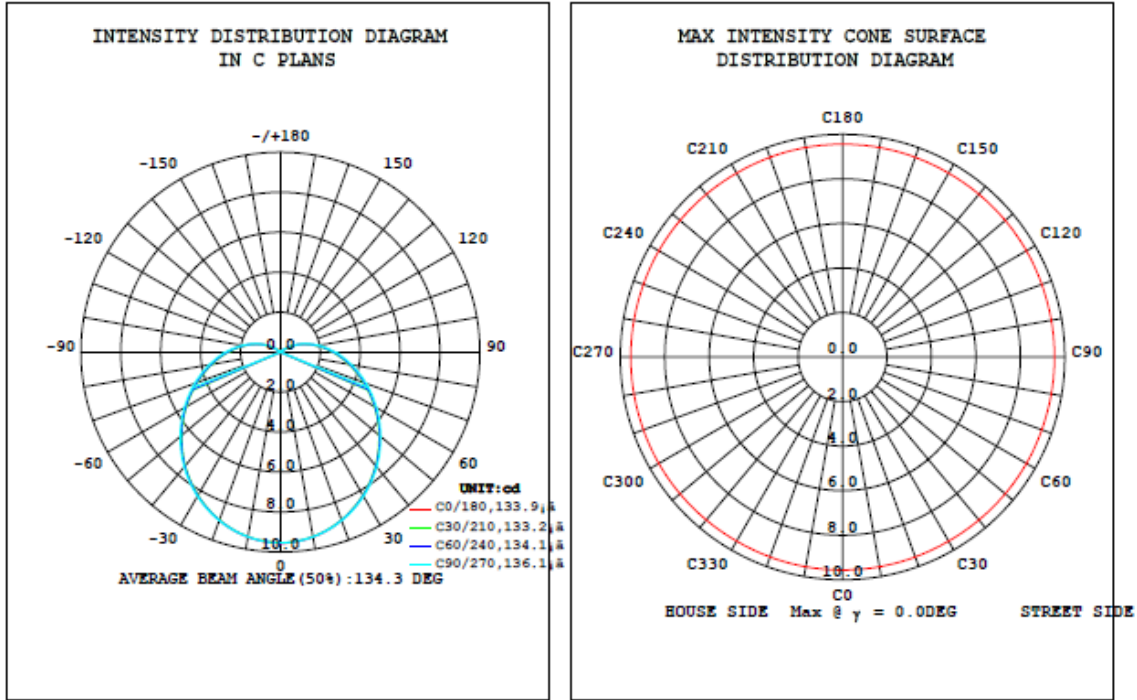


Doc No: FRM-LAB-009a

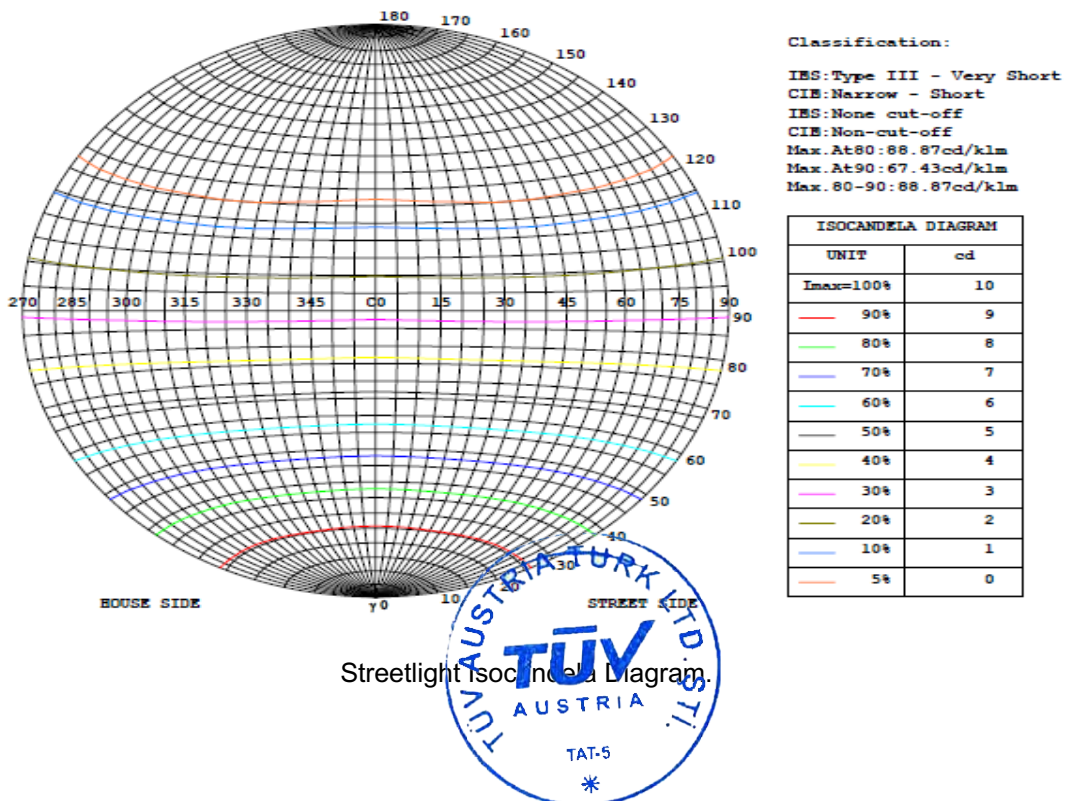
Rev.No/Date: 02 / 11.01.2019

Sayfa / Page : 6 / 16

2.1 Fotometrik Deney Sonuçları (Photometric Test Results)



Goniophotometer Measurement Result.



Streetlight Isocandela Diagram.

Doc No: FRM-LAB-009a

Rev.No/Date: 02 / 11.01.2019

Sayfa / Page : 7 / 16

2.1 Fotometrik Deney Sonuçları (Photometric Test Results)

ZONAL FLUX DIAGRAM

γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	Φ zone	Φ total	%lum,lamp
5	9.512	9.497	9.496	9.497	9.512	9.497	9.496	9.497	0- 5	0.2276	0.2276	0.56,0.56
10	9.393	9.376	9.385	9.376	9.393	9.376	9.385	9.376	5- 10	0.6752	0.9029	2.21,2.21
15	9.211	9.192	9.211	9.192	9.211	9.192	9.211	9.192	10- 15	1.102	2.005	4.91,4.91
20	8.960	8.940	8.970	8.940	8.960	8.940	8.970	8.940	15- 20	1.495	3.500	8.57,8.57
25	8.654	8.634	8.677	8.634	8.654	8.634	8.677	8.634	20- 25	1.845	5.345	13.1,13.1
30	8.297	8.276	8.332	8.276	8.297	8.276	8.332	8.276	25- 30	2.142	7.487	18.3,18.3
35	7.893	7.871	7.938	7.871	7.893	7.871	7.938	7.871	30- 35	2.381	9.868	24.2,24.2
40	7.453	7.434	7.510	7.434	7.453	7.434	7.510	7.434	35- 40	2.558	12.43	30.4,30.4
45	6.985	6.962	7.050	6.962	6.985	6.962	7.050	6.962	40- 45	2.671	15.10	36.9,36.9
50	6.494	6.472	6.572	6.472	6.494	6.472	6.572	6.472	45- 50	2.721	17.82	43.6,43.6
55	5.990	5.968	6.074	5.968	5.990	5.968	6.074	5.968	50- 55	2.713	20.53	50.2,50.2
60	5.484	5.459	5.574	5.459	5.484	5.459	5.574	5.459	55- 60	2.651	23.18	56.7,56.7
65	4.976	4.952	5.073	4.952	4.976	4.952	5.073	4.952	60- 65	2.541	25.72	63,63
70	4.477	4.454	4.580	4.454	4.477	4.454	4.580	4.454	65- 70	2.392	28.11	68.8,68.8
75	3.990	3.966	4.098	3.966	3.990	3.966	4.098	3.966	70- 75	2.213	30.33	74.2,74.2
80	3.527	3.501	3.631	3.501	3.527	3.501	3.631	3.501	75- 80	2.011	32.34	79.1,79.1
85	3.084	3.055	3.185	3.055	3.084	3.055	3.185	3.055	80- 85	1.795	34.13	83.5,83.5
90	2.661	2.630	2.755	2.630	2.661	2.630	2.755	2.630	85- 90	1.571	35.70	87.4,87.4
95	2.264	2.232	2.349	2.232	2.264	2.232	2.349	2.232	90- 95	1.345	37.05	90.7,90.7
100	1.890	1.856	1.963	1.856	1.890	1.856	1.963	1.856	95-100	1.124	38.17	93.4,93.4
105	1.542	1.494	1.592	1.494	1.542	1.494	1.592	1.494	100-105	0.9107	39.08	95.7,95.7
110	1.205	1.144	1.243	1.144	1.205	1.144	1.243	1.144	105-110	0.7049	39.79	97.4,97.4
115	0.8858	0.8089	0.9223	0.8089	0.8858	0.8089	0.9223	0.8089	110-115	0.5117	40.30	98.6,98.6
120	0.5938	0.4944	0.6791	0.4944	0.5938	0.4944	0.6791	0.4944	115-120	0.3369	40.64	99.5,99.5
125	0.3090	0.1131	0.3697	0.1131	0.3090	0.1131	0.3697	0.1131	120-125	0.1760	40.81	99.9,99.9
130	0.0529	0	0.1635	0	0.0529	0	0.1635	0	125-130	0.0418	40.86	100,100
135	0	0	0.0002	0	0	0	0.0002	0	130-135	0.0029	40.86	100,100
140	0	0	0	0	0	0	0	0	135-140	0.0000	40.86	100,100
145	0	0	0	0	0	0	0	0	140-145	0	40.86	100,100
150	0	0	0	0	0	0	0	0	145-150	0	40.86	100,100
155	0	0	0	0	0	0	0	0	150-155	0	40.86	100,100
160	0	0	0	0	0	0	0	0	155-160	0	40.86	100,100
165	0	0	0	0	0	0	0	0	160-165	0	40.86	100,100
170	0	0	0	0	0	0	0	0	165-170	0	40.86	100,100
175	0	0	0	0	0	0	0	0	170-175	0	40.86	100,100
180	0	0	0	0	0	0	0	0	175-180	0	40.86	100,100
DEG	LUMINOUS INTENSITY:cd									UNIT:lm		



Doc No: FRM-LAB-009a

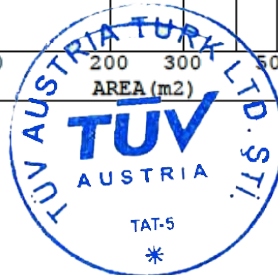
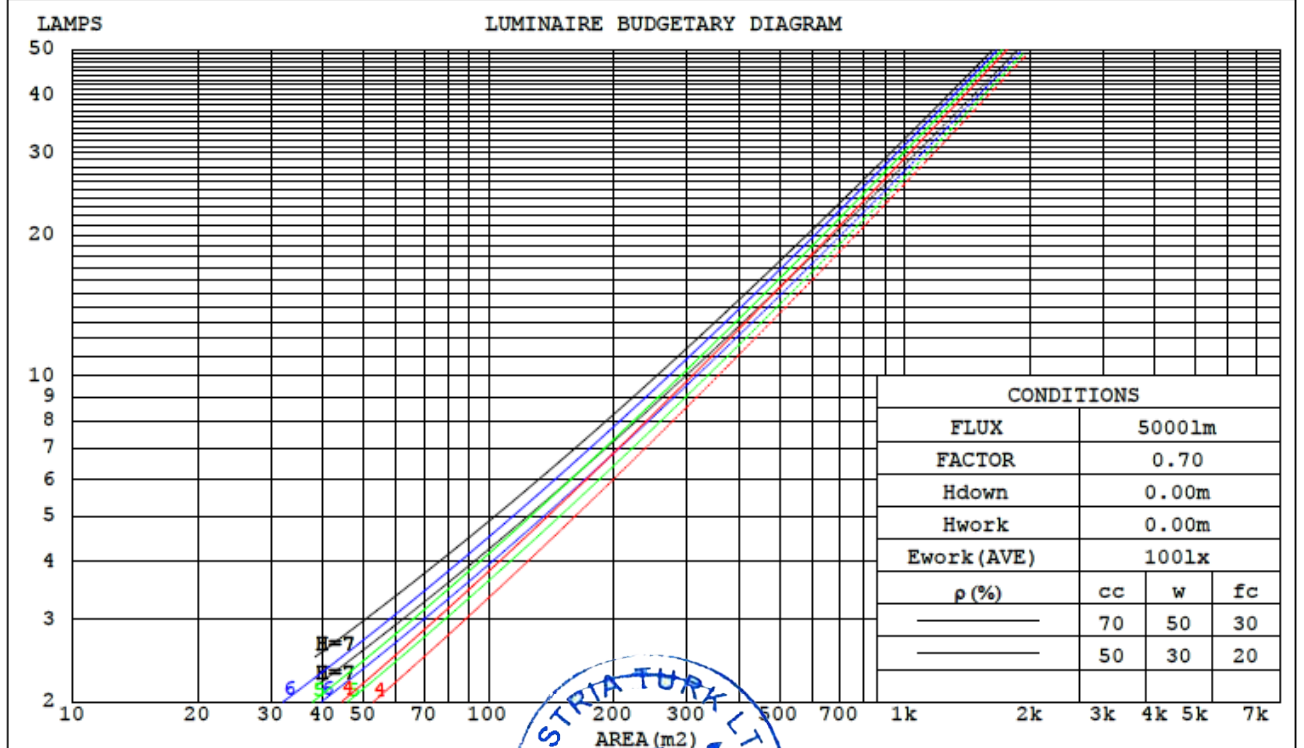
Rev.No/Date: 02 / 11.01.2019

Sayfa / Page : 8 / 16

2.1 Fotometrik Deney Sonuçları (Photometric Test Results)

CU AND LUMINAIRE BUDGETARY ESTIMATE DIAGRAM

pcc	80%			70%			50%			30%			10%			0
pw	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	0
pfc	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	1.09	1.07	1.04	1.07	1.05	1.02	1.03	1.01	.99	.99	.98	.96	.96	.95	.94	.92
2.0	1.00	.96	.92	.99	.94	.91	.95	.92	.89	.92	.89	.87	.89	.87	.85	.83
3.0	.92	.87	.82	.91	.86	.81	.88	.84	.80	.86	.82	.79	.83	.80	.78	.76
4.0	.85	.79	.74	.84	.78	.74	.82	.77	.73	.80	.75	.72	.78	.74	.71	.69
5.0	.79	.72	.67	.78	.72	.67	.76	.71	.66	.74	.70	.66	.73	.69	.65	.64
6.0	.73	.67	.62	.72	.66	.62	.71	.65	.61	.69	.64	.61	.68	.64	.60	.59
7.0	.68	.62	.57	.68	.61	.57	.66	.61	.56	.65	.60	.56	.64	.59	.56	.54
8.0	.64	.57	.53	.63	.57	.53	.62	.56	.52	.61	.56	.52	.60	.55	.52	.50
9.0	.60	.53	.49	.59	.53	.49	.58	.53	.49	.57	.52	.49	.57	.52	.48	.47
10.0	.56	.50	.46	.56	.50	.46	.55	.49	.46	.54	.49	.45	.53	.49	.45	.44



Doc No: FRM-LAB-009a

Rev.No/Date: 02 / 11.01.2019

Sayfa / Page : 9 / 16

2.1 Fotometrik Deney Sonuçları (Photometric Test Results)

WEC AND CCEC

ρ_{cc}	80%			70%			50%			30%			10%			0
ρ_w	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	0
ρ_{fc}	20%			20%			20%			20%			20%			0
RCR	RCR:Room Cavity Ratio						Wall Exitance Coefficients(WEC)									
0.0																
1.0	.203	.115	.037	.196	.112	.035	.183	.105	.034	.171	.099	.032	.161	.093	.030	
2.0	.196	.107	.033	.190	.105	.032	.179	.100	.031	.169	.095	.030	.160	.091	.029	
3.0	.187	.099	.030	.182	.097	.029	.173	.094	.028	.164	.090	.028	.156	.086	.027	
4.0	.177	.092	.027	.173	.091	.027	.165	.087	.026	.157	.084	.025	.150	.082	.025	
5.0	.168	.086	.025	.164	.084	.025	.157	.082	.024	.151	.079	.024	.144	.077	.023	
6.0	.159	.080	.023	.156	.079	.023	.150	.077	.022	.144	.075	.022	.138	.073	.022	
7.0	.151	.075	.021	.149	.074	.021	.143	.072	.021	.138	.071	.021	.133	.069	.020	
8.0	.144	.070	.020	.141	.070	.020	.136	.068	.019	.132	.067	.019	.127	.065	.019	
9.0	.137	.066	.019	.135	.066	.018	.130	.064	.018	.126	.063	.018	.122	.062	.018	
10.0	.131	.063	.017	.129	.062	.017	.125	.061	.017	.121	.060	.017	.117	.059	.017	

ρ_{cc}	80%			70%			50%			30%			10%			0
ρ_w	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	0
ρ_{fc}	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	.173	.157	.143	.148	.135	.123	.101	.093	.085	.058	.054	.049	.019	.017	.016	
2.0	.159	.132	.110	.137	.114	.095	.094	.079	.066	.054	.046	.039	.017	.015	.013	
3.0	.148	.114	.086	.127	.098	.075	.087	.068	.052	.050	.040	.031	.016	.013	.010	
4.0	.139	.099	.069	.119	.086	.060	.082	.060	.042	.047	.035	.025	.015	.011	.008	
5.0	.131	.088	.056	.113	.076	.049	.078	.053	.035	.045	.031	.021	.014	.010	.007	
6.0	.124	.079	.047	.107	.068	.041	.073	.048	.029	.043	.028	.017	.014	.009	.006	
7.0	.118	.072	.040	.101	.062	.035	.070	.044	.024	.041	.026	.015	.013	.008	.005	
8.0	.112	.066	.034	.096	.057	.030	.067	.040	.021	.039	.024	.013	.013	.008	.004	
9.0	.107	.061	.030	.092	.053	.026	.064	.037	.018	.037	.022	.011	.012	.007	.004	
10.0	.102	.056	.026	.088	.049	.023	.061	.034	.016	.035	.020	.010	.012	.007	.003	



Doc No: FRM-LAB-009a

Rev.No/Date: 02 / 11.01.2019

Sayfa / Page : 10 / 16

2.1 Fotometrik Deney Sonuçları (Photometric Test Results)

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	13.0	14.1	13.3	14.3	14.5	10.9	12.0	11.1	12.2	12.3
3H	13.2	14.2	13.4	14.4	14.6	10.9	11.9	11.2	12.1	12.3
4H	13.2	14.1	13.5	14.4	14.6	10.9	11.8	11.2	12.1	12.3
6H	13.1	14.0	13.4	14.3	14.5	10.8	11.7	11.1	11.9	12.2
8H	13.1	13.9	13.4	14.2	14.5	10.8	11.6	11.1	11.9	12.1
12H	13.0	13.9	13.4	14.1	14.4	10.7	11.5	11.0	11.8	12.1
4H 2H	12.9	13.9	13.2	14.1	14.3	11.0	11.9	11.2	12.1	12.4
3H	13.2	14.0	13.5	14.2	14.5	11.1	11.9	11.4	12.1	12.4
4H	13.2	13.9	13.5	14.2	14.6	11.0	11.8	11.4	12.1	12.4
6H	13.2	13.8	13.5	14.2	14.5	11.0	11.6	11.4	12.0	12.3
8H	13.1	13.7	13.5	14.1	14.5	10.9	11.5	11.3	11.9	12.3
12H	13.1	13.6	13.5	14.0	14.4	10.9	11.4	11.3	11.8	12.2
8H 4H	13.1	13.7	13.5	14.1	14.4	11.0	11.6	11.4	11.9	12.3
6H	13.1	13.6	13.5	14.0	14.4	10.9	11.4	11.4	11.8	12.2
8H	13.0	13.5	13.5	13.9	14.3	10.9	11.3	11.3	11.7	12.2
12H	13.0	13.4	13.5	13.8	14.3	10.8	11.2	11.3	11.6	12.1
12H 4H	13.0	13.6	13.5	14.0	14.4	10.9	11.5	11.3	11.9	12.3
6H	13.0	13.5	13.5	13.9	14.3	10.9	11.3	11.3	11.7	12.2
8H	13.0	13.4	13.5	13.8	14.3	10.8	11.2	11.3	11.6	12.1
Variations with the observer position at spacings:										
S = 1.0H	+ 1.4 / - 2.3					+ 1.7 / - 3.0				
1.5H	+ 2.1 / - 1.9					+ 2.0 / - 2.0				
2.0H	+ 3.0 / - 2.7					+ 2.9 / - 2.6				



Doc No: FRM-LAB-009a

Rev.No/Date: 02 / 11.01.2019

Sayfa / Page : 11 / 16

2.1 Fotometrik Deney Sonuçları (Photometric Test Results)**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) $k(RI) \times RCR = 5$										
$k = 0.60$	78	70	65	77	70	65	77	69	65	61	
0.80	87	79	74	86	79	74	85	78	74	69	
1.00	93	86	81	92	85	81	90	86	80	76	
1.25	98	91	87	97	91	87	95	90	86	81	
1.50	101	95	91	100	95	91	98	93	90	84	
2.00	105	100	96	104	99	96	101	97	94	88	
2.50	108	103	99	106	102	98	103	99	96	90	
3.00	110	105	102	108	104	101	104	101	99	92	
4.00	112	109	106	110	107	104	106	104	102	94	
5.00	113	111	108	111	109	107	107	105	104	96	
ROOM INDEX	UF(total)									Direct	
According to DIN EN 13032-2 2004				Suspended				SHRNOM = 1.25			

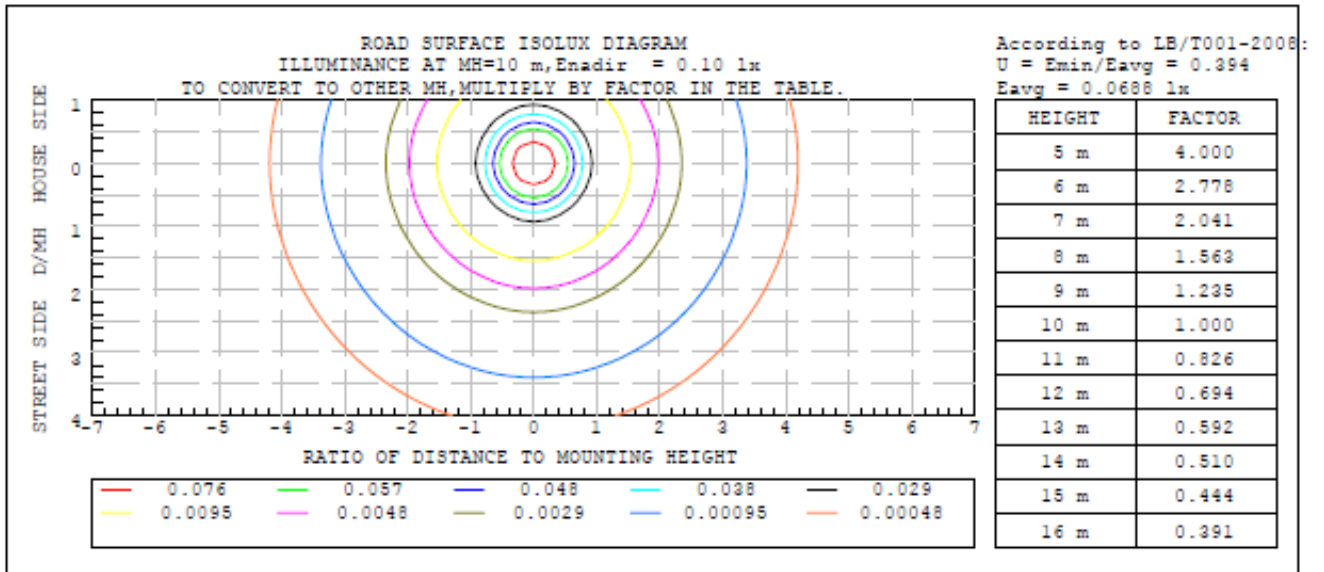
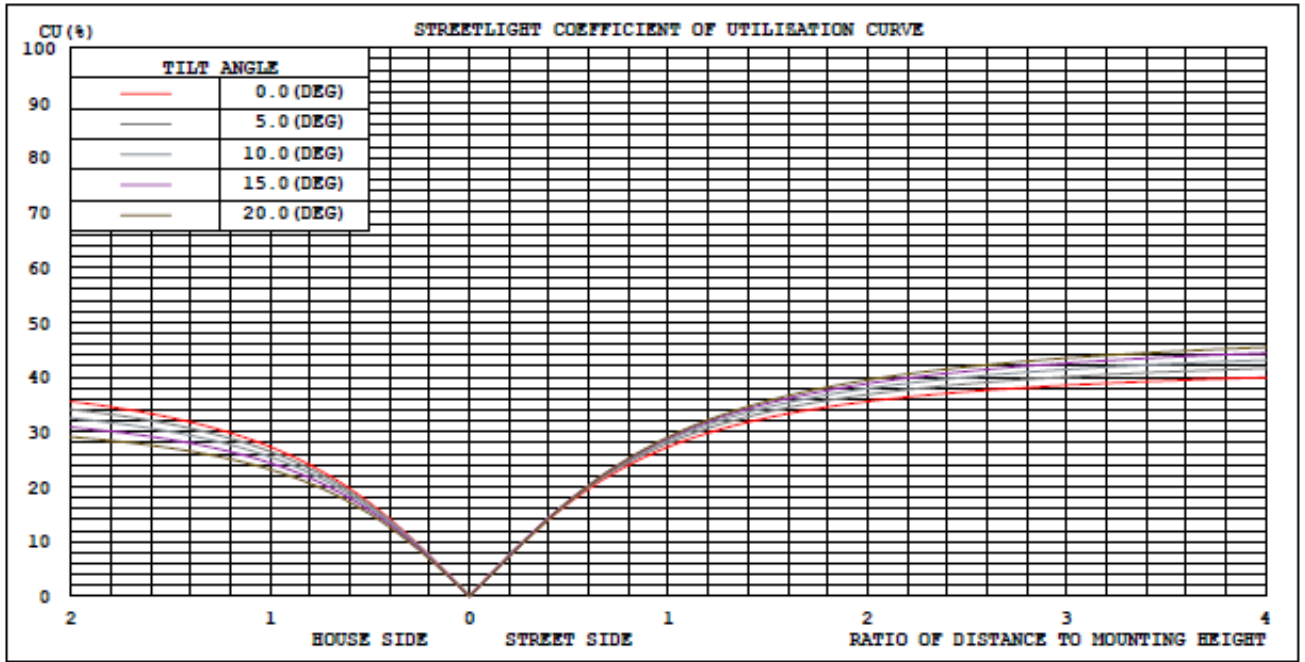


Doc No: FRM-LAB-009a

Rev.No/Date: 02 / 11.01.2019

Sayfa / Page : 12 / 16

2.1 Fotometrik Deney Sonuçları (Photometric Test Results)



Streetlight Coefficient of Utilization Curve, Bottom: Road Surface Isolux Diagram

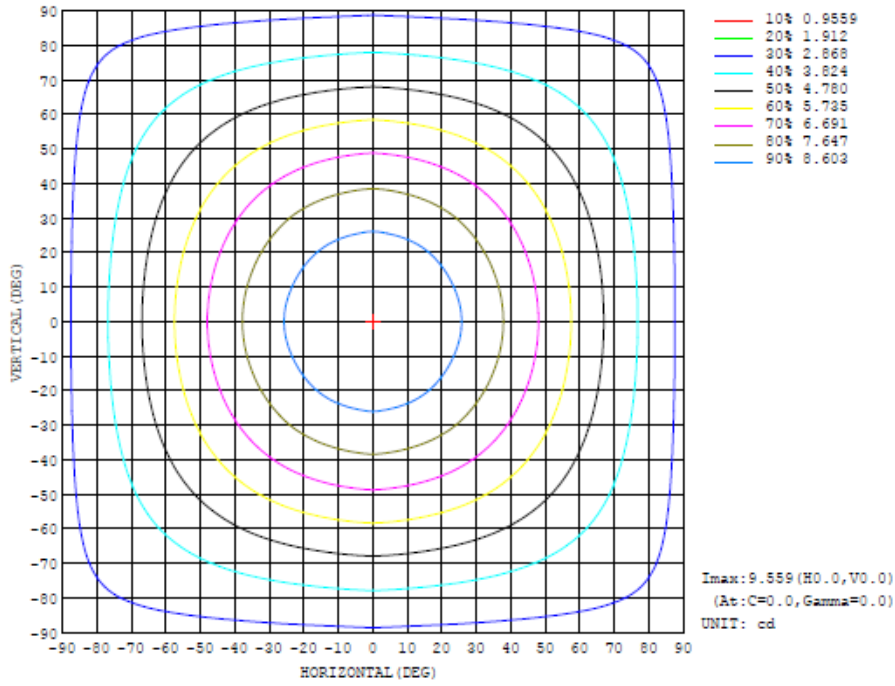


Doc No: FRM-LAB-009a

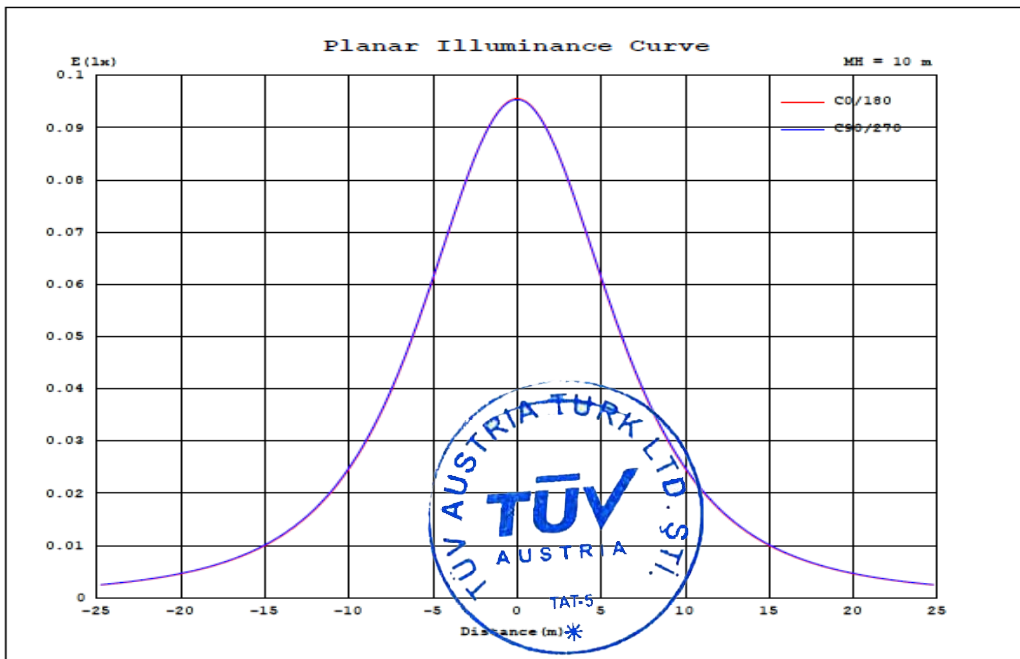
Rev.No/Date: 02 / 11.01.2019

Sayfa / Page : 13 / 16

2.1 Fotometrik Deney Sonuçları (Photometric Test Results)



Isocandela Diagram



Planar Illuminance Curve

Doc No: FRM-LAB-009a

Rev.No/Date: 02 / 11.01.2019

Sayfa / Page : 14 / 16

2.2 Spektrokolorimetrik Deney Sonuçları (spectrocolorimetric Test Results)**Elektriksel Ölçümler**

(Electrical Measurements)

Ölçülen Güç (W) (Input Power)	2.4
Ölçülen Gerilim (V) (Input Voltage)	48
Ölçülen Akım (A) (Input Current)	0.05
Güç Faktörü (PF) (Power Factor)	-
Ölçülen Frekans (Hz) (Input Frequency)	-
Ortam Sıcaklığı / Bağlı Nem (Ambient Temperature / Relative Humidity)	25 °C 48% Rh
Stabilizasyon Süresi (Stabilization Time)	2 hours

Spektrokolorimetrik Ölçüm Sonuçları

(Spectrocolorimetric Measurement Results)

Chrom x	0.2856
Chrom y	0.2827
Duv	-0.0062
Chrom u'	0.1963
Chrom v'	0.4371
Peak	631 nm
Dominant	476 nm
CCT	9758 K
Nominal CCT	10000 K
Ra(CRI)	22
R9	-269
S/P Ratio	3.7
Preburning time	2 hr
Test Configuration	Hand-type spectrocolorimeter



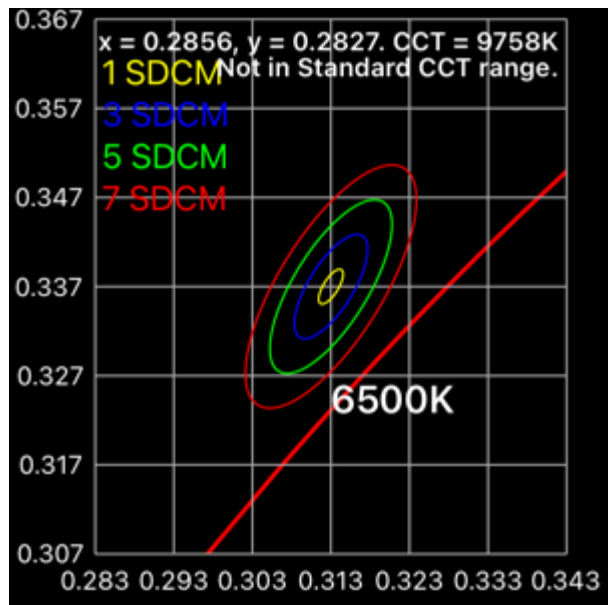
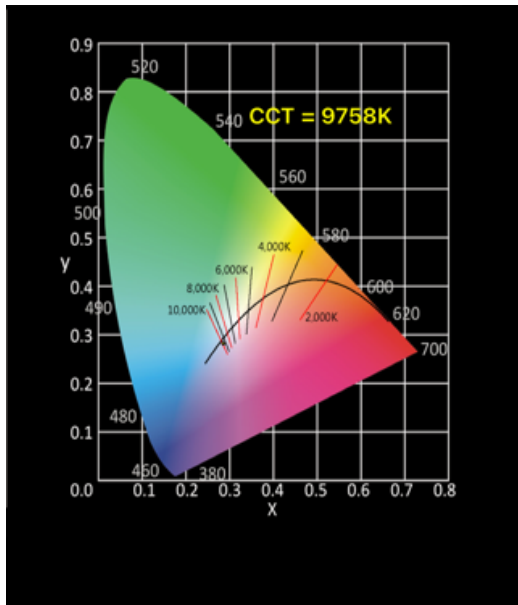
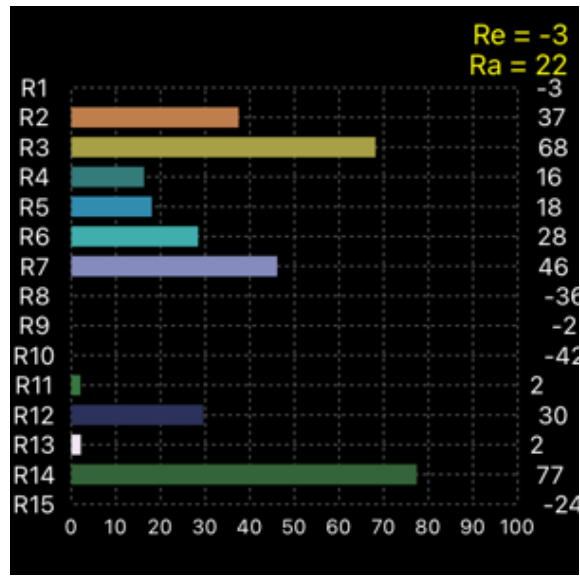
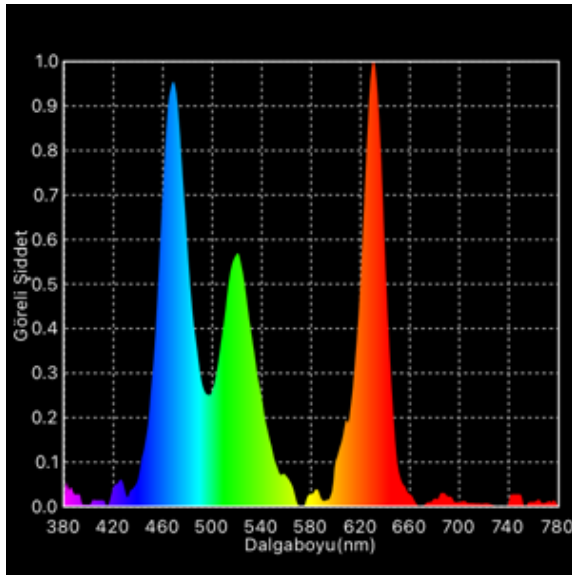
Doc No: FRM-LAB-009a

Rev.No/Date: 02 / 11.01.2019

Sayfa / Page : 15 / 16

2.2 Spektrokolorimetrik Deney Sonuçları (spectrocolorimetric Test Results)

Spectral Power Distribution



Doc No: FRM-LAB-009a

Rev.No/Date: 02 / 11.01.2019

Sayfa / Page : 16 / 16

3.1 DGC'nin Fotoğrafları (Photos of EUT)

