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ÖLÇÜM RAPORU
MEASUREMENT REPORT

TL-806

19-TST-0095-
141

07-19

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

: PD60S-RGBW-4CH.DMX DOME PIXEL DOT.

Numunenin kabul tarihi
The date of receipt of test item

: 01.07.2019

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

: 10.07.2019

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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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, 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

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

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1.1

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

Markası / Brand

: HERA

Modeli / Model

: PD60S-RGBW-4CH.DMX DOME PIXEL DOT.

Seri Numarası / Serial Number

: Test Numunesi
Test Sample

Beyan Gücü / Rated Power

: 4.32 W

Beyan Gerilimi / Rated Voltage

: 48 VDC

Sembollerin Tanımı / Definitions 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 standards):

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 (Next Calibration 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	Integrating sphere	28.05.2018	28.05.2020	☑

1.3 Komponent listesi (Component list)

Komponent (Components)	Üretici (Manufacturer)	Model (Model)	Teknik Data (Technical Data)	Standart no. (Standart No.)
LED	Cree Inc	CLQ6A	Led-RGBW, IF= 100 mA, VF= 2.1 V, 3 V, 3.1 V, 2.9 V	Cree® LED Lamp, Reliability Test Standard (JEITA ED-4701 100, 105, MIL-STD-202G, JEITA ED-4701 200 201, JEITA ED-4701 100 103, JEITA ED-4701 200 202,
PCB	Odak Baskılı Devre San. Ve Tic. Ltd.Şti.	C13091_R1.1	2 Layer 1.6mm FR4 BlackSolderMask/WhiteSilkScreen/GoldPlating/ 35+35umCu	UL 796, IPC, RoHs

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2.1 RGBW FULL ON Fotometrik Deney Sonuçları (Photometric Test Results of the RGBW FULL ON

Elektriksel Ölçümler

(Electrical Measurements)

Ölçülen Güç (W) (Input Power)	4,32
Ölçülen Gerilim (V) (Input Voltage)	48 VDC
Ölçülen Akım (A) (Input Current)	0,09
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 Luminous Flux) (lm)	86,636
Maksimum Işık Şiddeti (Max. Light Intensity) (cd)	15,86
Armatür Etkinliği (Luminaire Efficacy) (lm/W)	20,05



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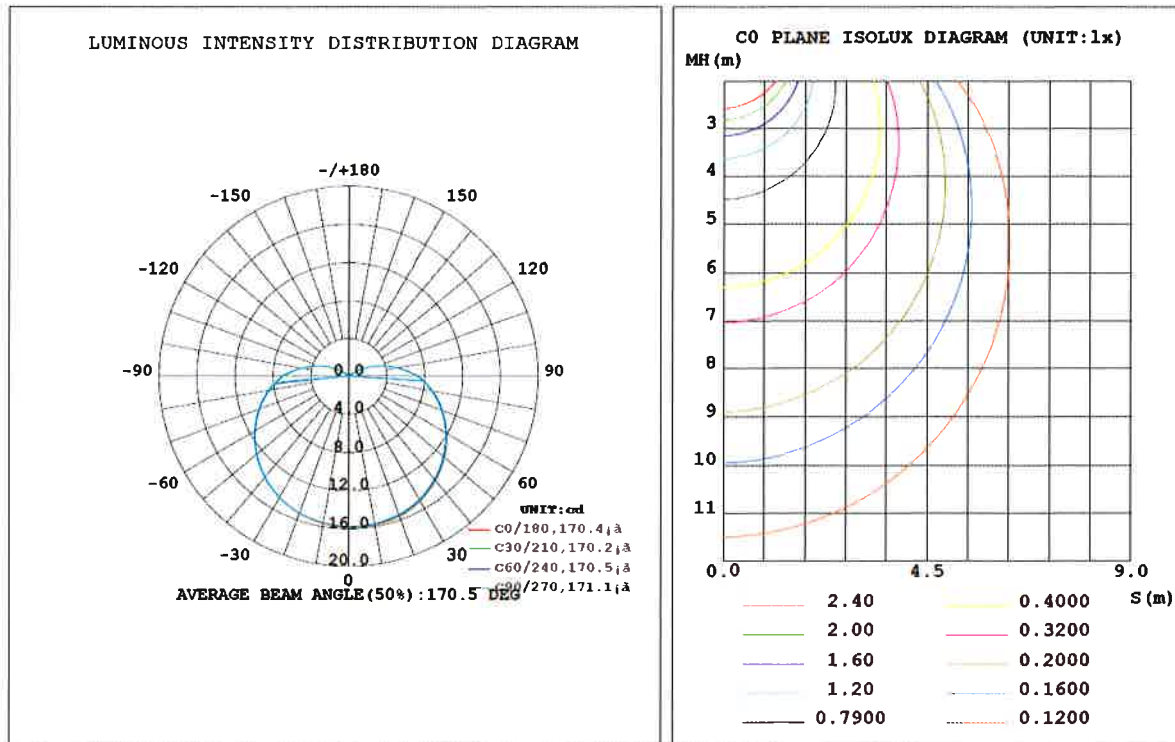
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2.1 RGBW FULL ON Fotometrik Deney Sonuçları (Photometric Test Results of the RGBW FULL ON



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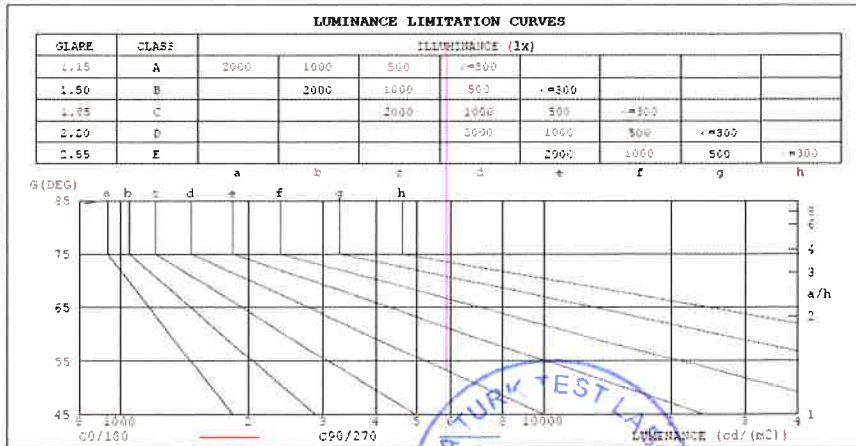
**ZONAL FLUX DIAGRAM
AND LUMINANCE LIMITATION CURVES**

ZONAL FLUX DIAGRAM:

γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	Φ zone	Φ total	llum, lamp
5	15.78	15.60	15.63	15.62	15.85	15.76	15.67	15.59	0- 5	0.3752	0.3752	0.43, 0.43
10	15.65	15.55	15.53	15.55	15.81	15.72	15.61	15.50	5- 10	1.118	1.493	1.72, 1.72
15	15.50	15.40	15.40	15.47	15.74	15.65	15.51	15.37	10- 15	1.043	3.337	3.85, 3.85
20	15.30	15.20	15.22	15.32	15.61	15.51	15.36	15.19	15- 20	2.539	5.875	6.78, 6.78
25	15.02	14.93	14.97	15.09	15.38	15.29	15.13	14.94	20- 25	3.188	9.063	10.5, 10.5
30	14.68	14.59	14.64	14.78	15.08	14.99	14.82	14.62	25- 30	3.775	12.84	14.8, 14.8
35	14.27	14.19	14.25	14.40	14.70	14.62	14.44	14.24	30- 35	4.289	17.13	19.0, 19.0
40	13.81	13.73	13.80	13.97	14.26	14.18	14.01	13.80	35- 40	4.721	21.85	23.2, 23.2
45	13.30	13.22	13.30	13.47	13.75	13.68	13.50	13.32	40- 45	5.064	26.91	28.1, 28.1
50	12.73	12.66	12.75	12.92	13.19	13.13	12.96	12.77	45- 50	5.314	32.23	33.2, 33.2
55	12.11	12.04	12.15	12.31	12.57	12.52	12.36	12.15	50- 55	5.465	37.69	38.5, 38.5
60	11.46	11.39	11.52	11.67	11.92	11.87	11.72	11.50	55- 60	5.519	43.21	43.9, 43.9
65	10.78	10.71	10.85	10.98	11.22	11.17	11.05	10.81	60- 65	5.482	48.69	49.2, 49.2
70	10.08	10.01	10.14	10.27	10.50	10.45	10.34	10.11	65- 70	5.357	54.05	54.4, 54.4
75	9.337	9.275	9.412	9.525	9.741	9.688	9.590	9.372	70- 75	5.150	59.20	60.3, 60.3
80	8.579	8.518	8.654	8.753	8.956	8.903	8.816	8.611	75- 80	4.868	64.07	65.9, 65.9
85	7.795	7.739	7.869	7.951	8.133	8.083	8.002	7.825	80- 85	4.519	68.59	70.2, 70.2
90	6.968	6.899	7.014	7.096	7.267	7.187	7.102	6.980	85- 90	4.103	72.69	73.9, 73.9
95	5.985	5.919	6.027	6.094	6.242	6.149	6.086	5.986	90- 95	3.588	76.28	77.8, 77.8
100	5.013	4.951	5.056	5.087	5.220	5.123	5.092	5.003	95- 100	3.015	79.29	80.5, 80.5
105	4.075	4.013	4.115	4.112	4.233	4.130	4.131	4.046	100- 105	2.445	81.74	82.3, 82.3
110	3.186	3.113	3.228	3.181	3.301	3.180	3.223	3.129	105- 110	1.895	83.63	84.5, 84.5
115	2.091	2.266	2.414	2.311	2.449	2.294	2.396	2.274	110- 115	1.379	85.01	85.1, 85.1
120	1.021	1.457	1.682	1.510	1.685	1.478	1.647	1.433	115- 120	0.9141	85.93	86.2, 86.2
125	0.2425	0.7091	1.036	0.6042	1.021	0.6494	0.9941	0.4899	120- 125	0.3052	86.43	86.6, 86.6
130	0	0.1024	0.4926	0.0626	0.2233	0.0708	0.4475	0.0364	125- 130	0.1742	86.60	86.6, 86.6
135	0	0	0.0771	0	0	0	0.0379	0	130- 135	0.0310	86.64	86.6, 86.6
140	0	0	0	0	0	0	0	0	135- 140	0.0004	86.64	86.6, 86.6
145	0	0	0	0	0	0	0	0	140- 145	0	86.64	86.6, 86.6
150	0	0	0	0	0	0	0	0	145- 150	0	86.64	86.6, 86.6
155	0	0	0	0	0	0	0	0	150- 155	0	86.64	86.6, 86.6
160	0	0	0	0	0	0	0	0	155- 160	0	86.64	86.6, 86.6
165	0	0	0	0	0	0	0	0	160- 165	0	86.64	86.6, 86.6
170	0	0	0	0	0	0	0	0	165- 170	0	86.64	86.6, 86.6
175	0	0	0	0	0	0	0	0	170- 175	0	86.64	86.6, 86.6
180	0	0	0	0	0	0	0	0	175- 180	0	86.64	86.6, 86.6

DEG LUMINOUS INTENSITY:cd

UNIT:lm



LUMINANCE cd/ (m2)		
G(DEG)	C0/180	C90/270
85	894	903
80	494	498
75	361	364
70	295	297
65	255	257
60	229	230
55	211	212
50	198	198
45	188	188

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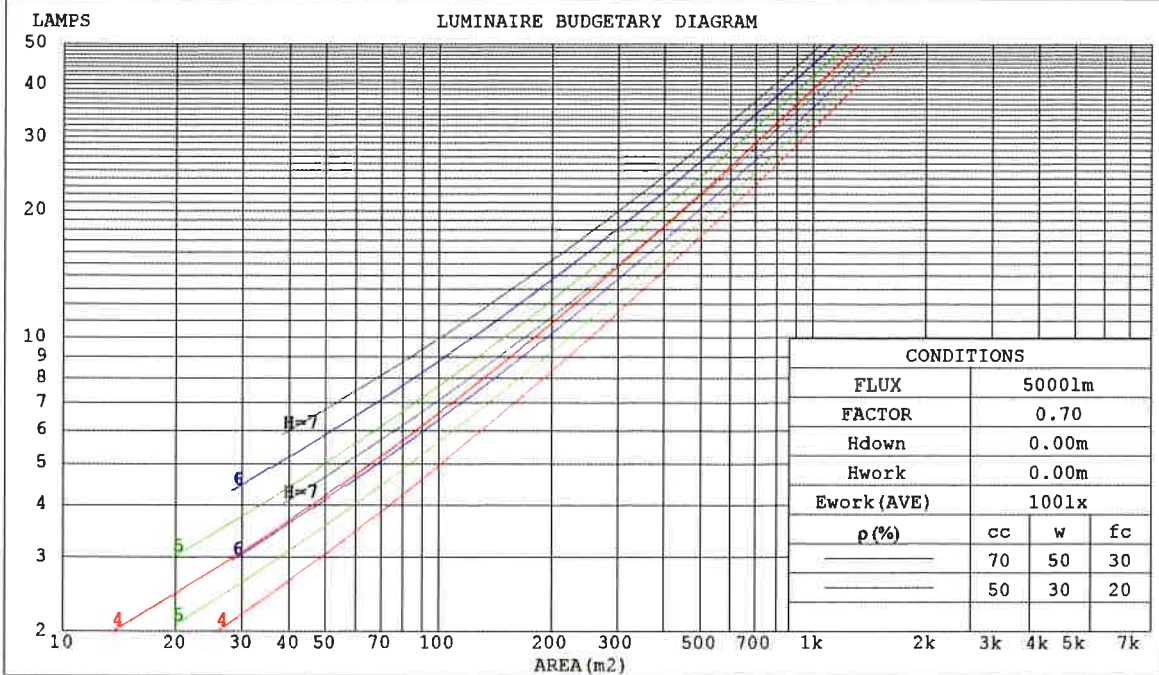
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2.1 RGBW FULL ON Fotometrik Deney Sonuçları (Photometric Test Results of the RGBW FULL ON)

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	1.15	1.15	1.15	1.11	1.11	1.11	1.02	1.02	1.02	.94	.94	.94	.87	.87	.87	.84	
1.0	.94	.88	.83	.90	.85	.80	.83	.78	.74	.76	.72	.69	.70	.67	.64	.61	
2.0	.80	.71	.64	.76	.68	.62	.70	.63	.58	.64	.59	.54	.59	.54	.51	.47	
3.0	.68	.59	.51	.66	.57	.50	.60	.53	.47	.55	.49	.44	.50	.45	.41	.38	
4.0	.60	.50	.42	.57	.48	.41	.53	.45	.39	.48	.42	.36	.44	.39	.34	.31	
5.0	.53	.43	.36	.51	.42	.35	.47	.39	.33	.43	.36	.31	.39	.34	.29	.26	
6.0	.47	.37	.31	.45	.36	.30	.42	.34	.28	.39	.32	.27	.36	.30	.25	.23	
7.0	.42	.33	.27	.41	.32	.26	.38	.30	.25	.35	.28	.23	.32	.26	.22	.20	
8.0	.39	.30	.23	.37	.29	.23	.34	.27	.22	.32	.25	.21	.30	.24	.19	.17	
9.0	.35	.27	.21	.34	.26	.20	.32	.24	.19	.29	.23	.18	.27	.22	.17	.15	
10.0	.32	.24	.19	.31	.23	.18	.29	.22	.17	.27	.21	.17	.25	.20	.16	.14	



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2.1 RGBW FULL ON Fotometrik Deney Sonuçları (Photometric Test Results of the RGBW FULL ON WEC AND CCEC

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						Wall Exitance Coefficients(WEC)										
0.0																	
1.0	.425	.242	.077	.413	.235	.075	.390	.224	.071	.369	.213	.068	.349	.202	.065		
2.0	.359	.197	.060	.348	.192	.059	.327	.182	.057	.308	.173	.054	.290	.164	.052		
3.0	.315	.167	.050	.305	.163	.049	.286	.155	.047	.268	.147	.045	.252	.140	.043		
4.0	.280	.146	.043	.271	.142	.042	.254	.135	.040	.239	.128	.039	.224	.122	.037		
5.0	.253	.129	.037	.245	.126	.037	.230	.120	.035	.215	.114	.034	.202	.108	.032		
6.0	.231	.116	.033	.223	.113	.032	.209	.107	.031	.196	.102	.030	.184	.097	.029		
7.0	.212	.105	.030	.205	.102	.029	.192	.097	.028	.180	.092	.027	.169	.088	.026		
8.0	.196	.096	.027	.190	.093	.026	.178	.089	.025	.167	.085	.024	.157	.080	.023		
9.0	.182	.088	.025	.176	.086	.024	.166	.082	.023	.155	.078	.022	.146	.074	.021		
10.0	.170	.081	.023	.165	.080	.022	.155	.076	.021	.145	.072	.021	.137	.069	.020		

pcc	80%			70%			50%			30%			10%			0
pw	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	0
pf _c	20%			20%			20%			20%			20%			0
RCR	RCR:Room Cavity Ratio						Ceiling Cavity Exitance Coefficients(CCEC)									
0.0	.313	.313	.313	.268	.268	.268	.183	.183	.183	.105	.105	.105	.034	.034	.034	
1.0	.312	.279	.249	.267	.239	.214	.183	.165	.148	.105	.095	.086	.034	.031	.028	
2.0	.306	.256	.214	.262	.220	.185	.179	.153	.129	.103	.089	.076	.033	.029	.025	
3.0	.298	.240	.193	.256	.207	.167	.176	.144	.117	.101	.084	.069	.033	.027	.023	
4.0	.290	.227	.179	.249	.196	.156	.171	.137	.110	.099	.080	.065	.032	.026	.021	
5.0	.282	.218	.170	.242	.188	.148	.167	.132	.104	.097	.077	.062	.031	.025	.020	
6.0	.275	.210	.163	.236	.182	.142	.163	.127	.101	.094	.075	.060	.030	.024	.020	
7.0	.267	.203	.158	.230	.176	.138	.159	.123	.098	.092	.073	.058	.030	.024	.019	
8.0	.260	.198	.155	.224	.171	.135	.155	.120	.096	.090	.071	.057	.029	.023	.019	
9.0	.254	.193	.152	.219	.167	.132	.151	.118	.094	.088	.069	.056	.029	.023	.019	
10.0	.248	.189	.149	.213	.164	.130	.148	.115	.093	.086	.068	.055	.028	.022	.018	



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2.1 RGBW FULL ON Fotometrik Deney Sonuçları (Photometric Test Results of the RGBW FULL ON

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	6.5	7.9	7.0	8.4	9.0	6.5	8.0	7.0	8.4	9.0
3H	9.1	10.5	9.6	11.0	11.6	9.1	10.5	9.7	11.0	11.6
4H	10.6	11.9	11.1	12.4	13.0	10.6	11.9	11.1	12.4	13.0
6H	12.2	13.4	12.7	13.9	14.6	12.2	13.4	12.8	14.0	14.6
8H	13.0	14.2	13.6	14.8	15.4	13.1	14.3	13.7	14.8	15.5
12H	14.0	15.2	14.6	15.8	16.4	14.1	15.2	14.7	15.8	16.5
4H 2H	7.3	8.6	7.9	9.2	9.8	7.4	8.6	7.9	9.2	9.8
3H	10.2	11.3	10.8	11.9	12.5	10.2	11.3	10.8	11.9	12.6
4H	11.8	12.8	12.4	13.4	14.1	11.8	12.9	12.4	13.5	14.1
6H	13.6	14.5	14.2	15.1	15.8	13.6	14.5	14.2	15.2	15.9
8H	14.5	15.4	15.2	16.1	16.8	14.6	15.5	15.2	16.1	16.8
12H	15.7	16.5	16.3	17.1	17.9	15.7	16.5	16.4	17.2	17.9
8H 4H	12.4	13.3	13.0	13.9	14.7	12.4	13.3	13.1	14.0	14.7
6H	14.5	15.2	15.1	15.9	16.7	14.5	15.3	15.2	15.9	16.7
8H	15.6	16.3	16.3	17.0	17.8	15.7	16.4	16.3	17.0	17.8
12H	17.0	17.6	17.7	18.3	19.1	17.0	17.6	17.7	18.3	19.1
12H 4H	12.6	13.4	13.2	14.0	14.8	12.6	13.4	13.2	14.1	14.8
6H	14.7	15.4	15.4	16.1	16.9	14.8	15.4	15.4	16.1	16.9
8H	16.0	16.6	16.7	17.3	18.1	16.0	16.7	16.7	17.4	18.2
Variations with the observer position at spacings:										
S = 1.0H	+ 0.1 / - 0.1					+ 0.1 / - 0.1				
1.5H	+ 0.2 / - 0.3					+ 0.2 / - 0.3				
2.0H	+ 0.3 / - 0.4					+ 0.3 / - 0.4				

CIE Pub.117 Corrected 86.64 lm Total Lamp Luminous Flux. (8log(F/F0) = -8.5)



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2.1 RGBW FULL ON Fotometrik Deney Sonuçları (Photometric Test Results of the RGBW FULL ON

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) $k(RI) \times RCR = 5$									
$k = 0.60$	46	33	25	45	33	25	43	32	25	18
0.80	55	41	33	53	40	32	51	39	32	24
1.00	62	49	40	61	48	39	57	49	38	30
1.25	69	56	47	67	55	46	63	52	45	35
1.50	74	61	52	72	60	51	67	57	49	39
2.00	82	70	61	79	68	60	74	64	57	46
2.50	87	75	67	83	73	65	77	69	62	50
3.00	90	80	72	87	78	70	81	73	67	54
4.00	95	87	79	92	84	77	85	78	73	59
5.00	99	91	84	95	88	82	88	82	77	62
ROOM INDEX	UF(total)									Direct
According to DIN EN 13032-2 2004										
Suspended										
SHRNM = 1.25										



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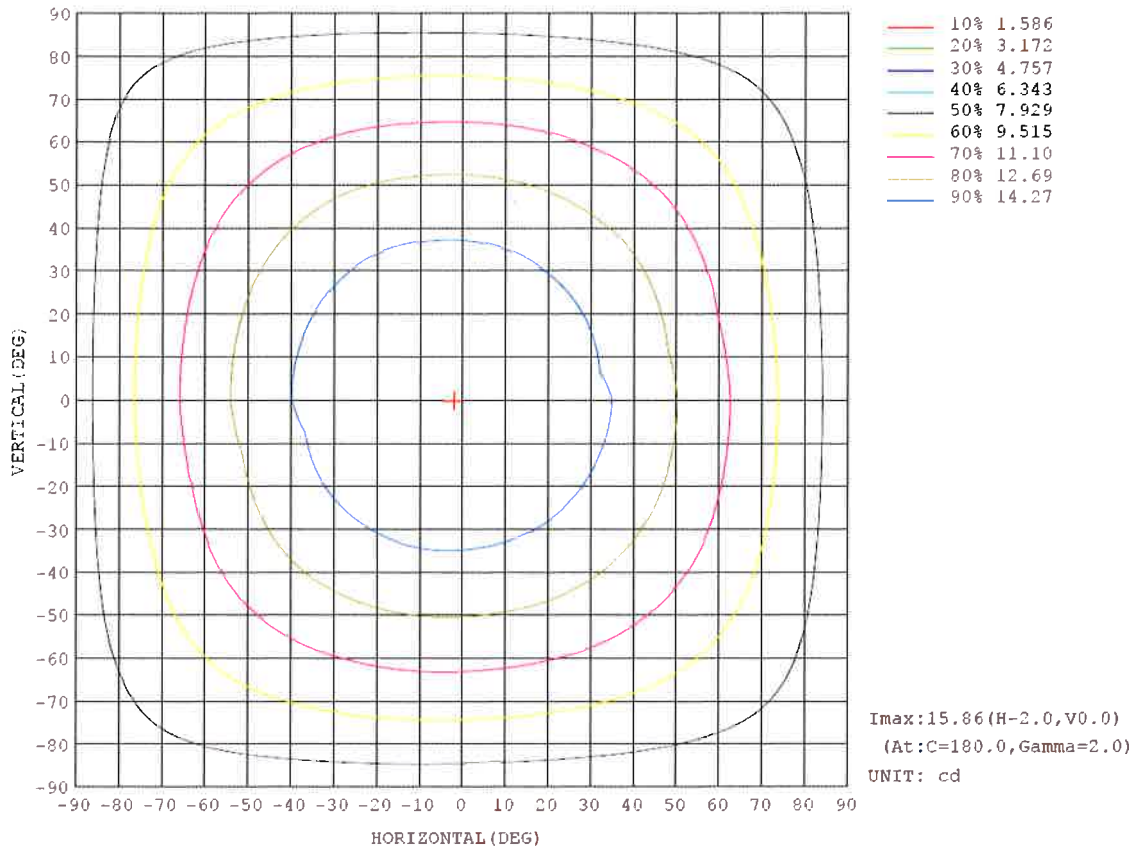
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2.1 RGBW FULL ON Fotometrik Deney Sonuçları (Photometric Test Results of the RGBW FULL ON ISOCANDELA DIAGRAM)



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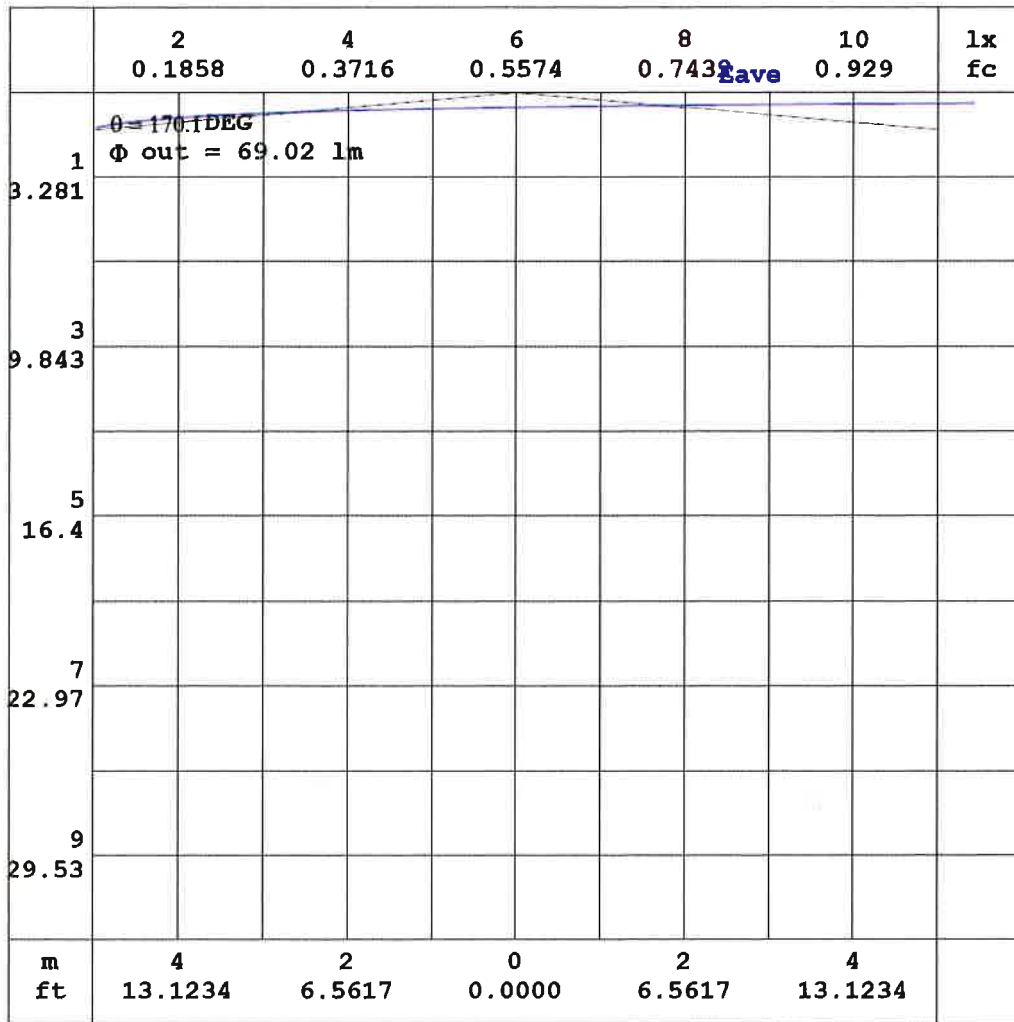
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2.1

RGBW FULL ON Fotometrik Deney Sonuçları (Photometric Test Results of the RGBW FULL ON**AAI CURVES**

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



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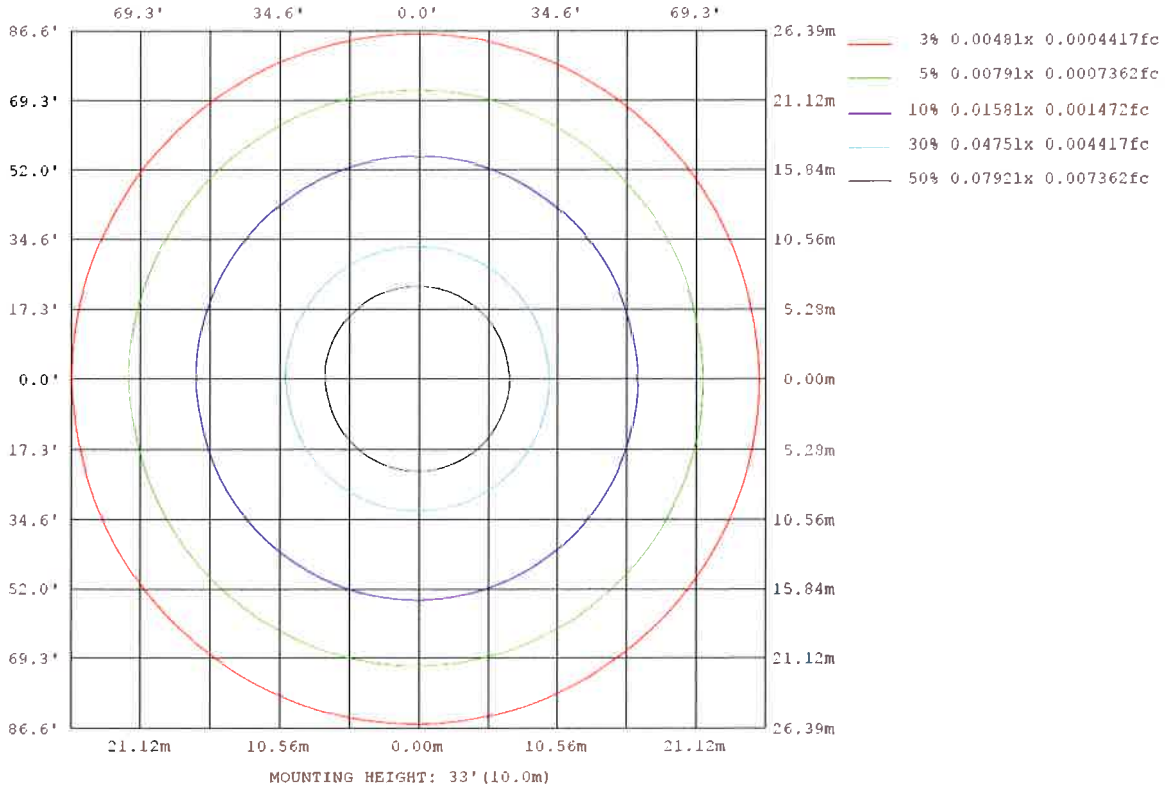
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2.1**RGBW FULL ON Fotometrik Deney Sonuçları (Photometric Test Results of the RGBW FULL ON****ISOLUX DIAGRAM**

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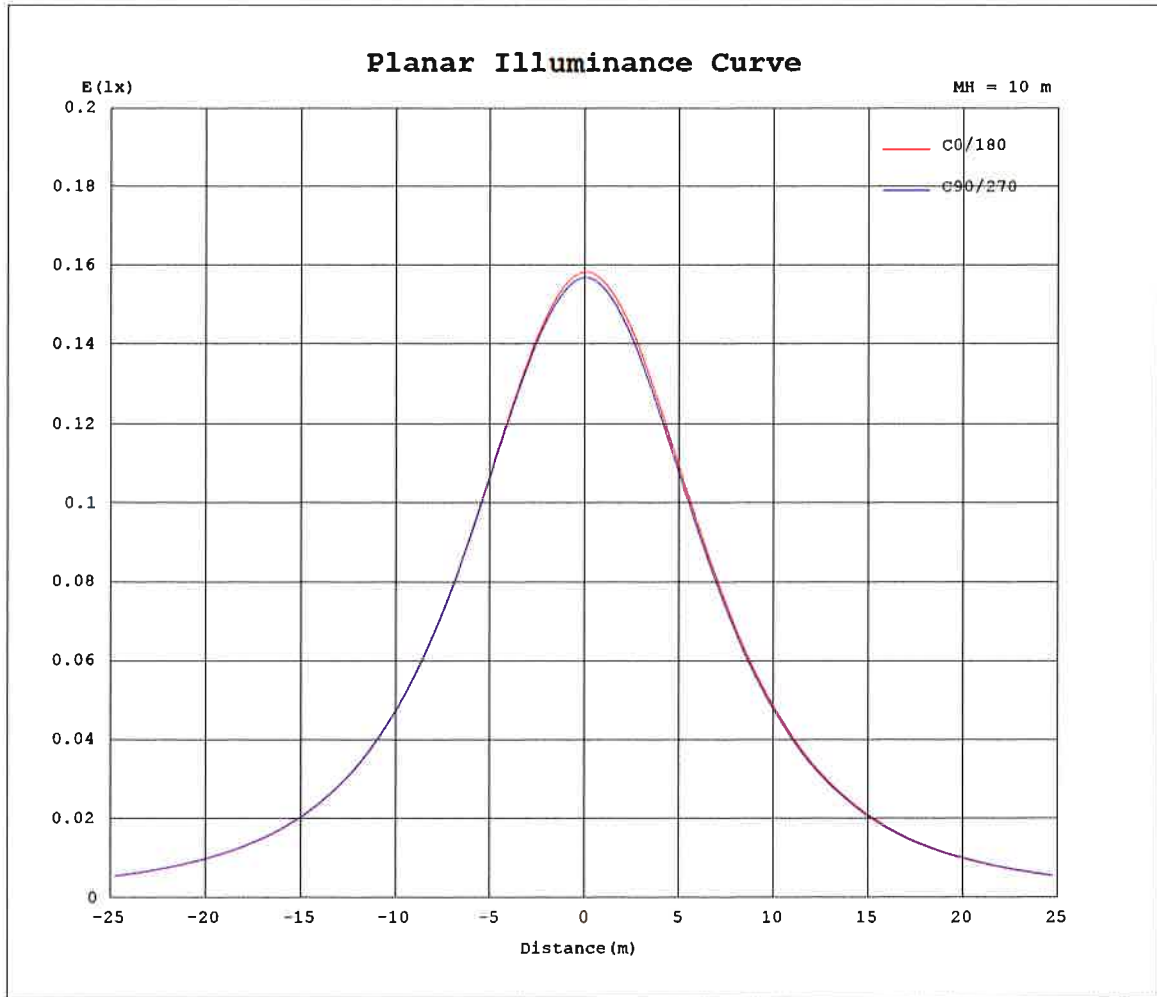
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2.1

RGBW FULL ON Fotometrik Deney Sonuçları (Photometric Test Results of the RGBW FULL ON



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2.2

RGBW FULL ON Spektrokolorimetrik Deney Sonuçları (spectrocolorimetric Test Results of the RGBW FULL ON)**Elektriksel Ölçümler**
(Electrical Measurements)

Ölçülen Güç (W) (Input Power)	4,32
Ölçülen Gerilim (V) (Input Voltage)	48 VDC
Ölçülen Akım (A) (Input Current)	0,09
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	0,2570
Chrom y	0,3139
Duv	0,0268
Chrom u'	0,1644
Chrom v'	0,4518
Peak	467 nm
Dominant	488 nm
CCT	11010 K
Nominal CCT	-K
Ra(CRI)	85
R9	18
S/P Ratio	3,3
Preburning time	1 hr
Test Configuration	4π



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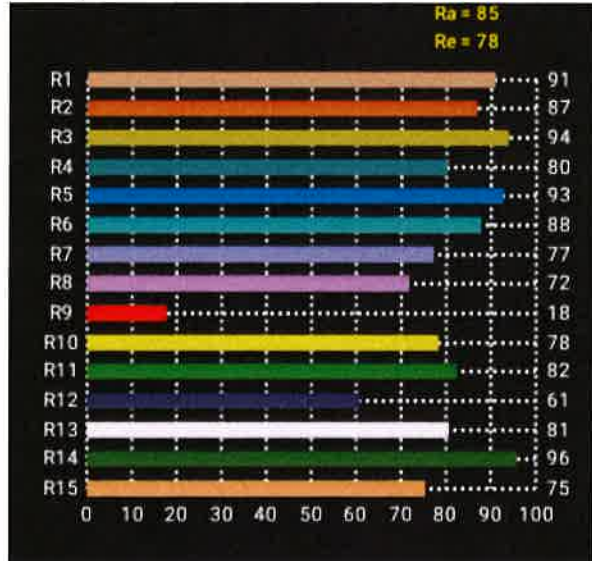
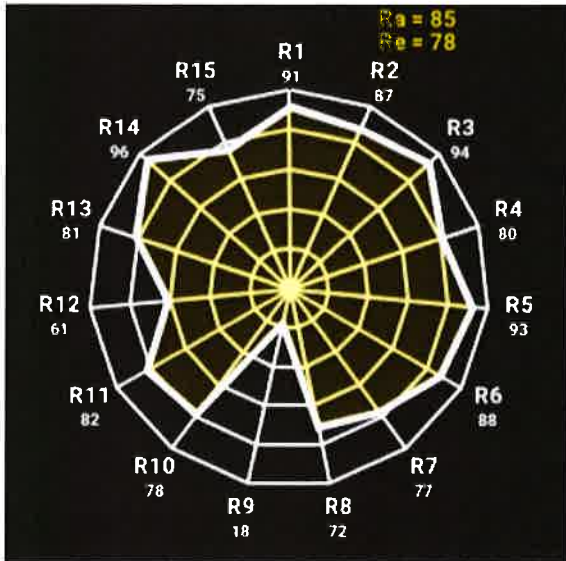
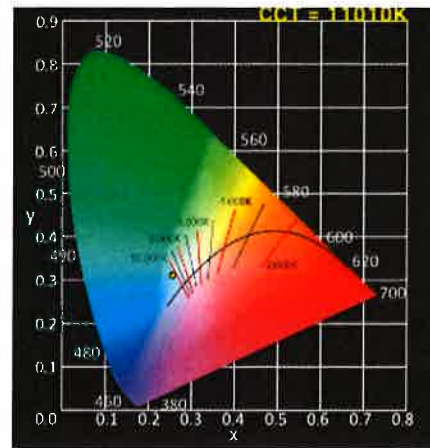
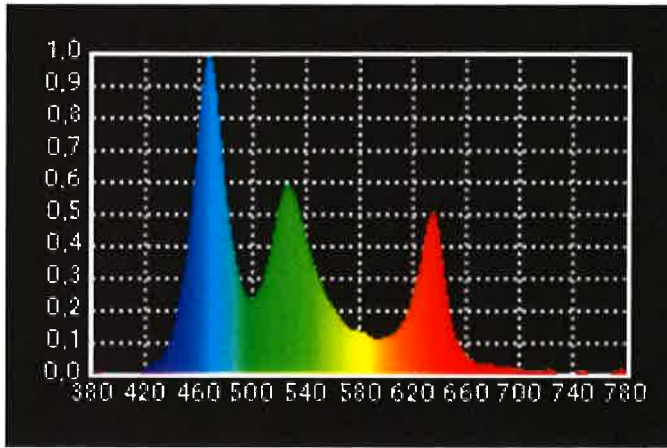
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2.2

RGBW FULL ON Spektrokolorimetrik Deney Sonuçları (spectrocolorimetric Test Results of the RGBW FULL ON)

Spectral Power Distribution



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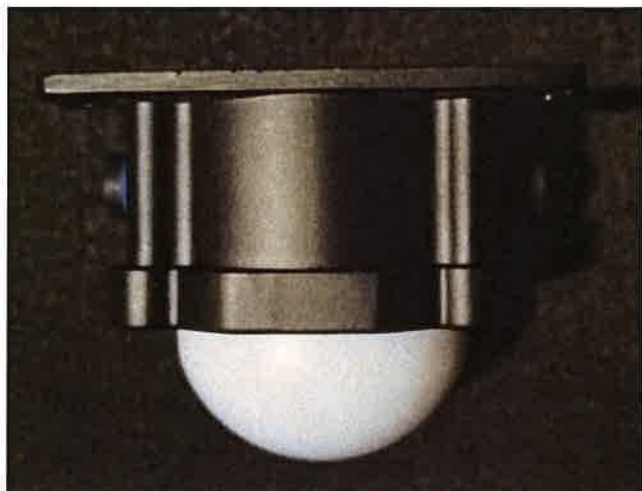
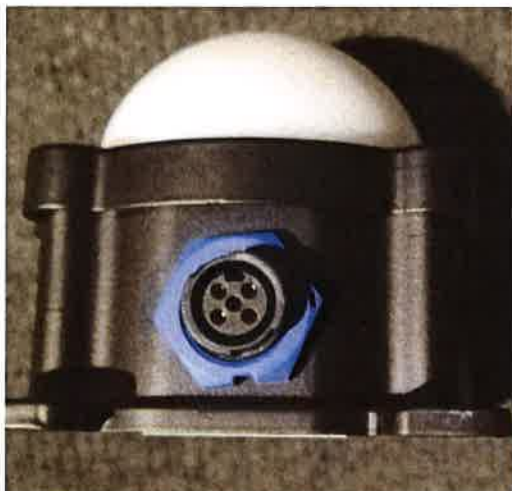
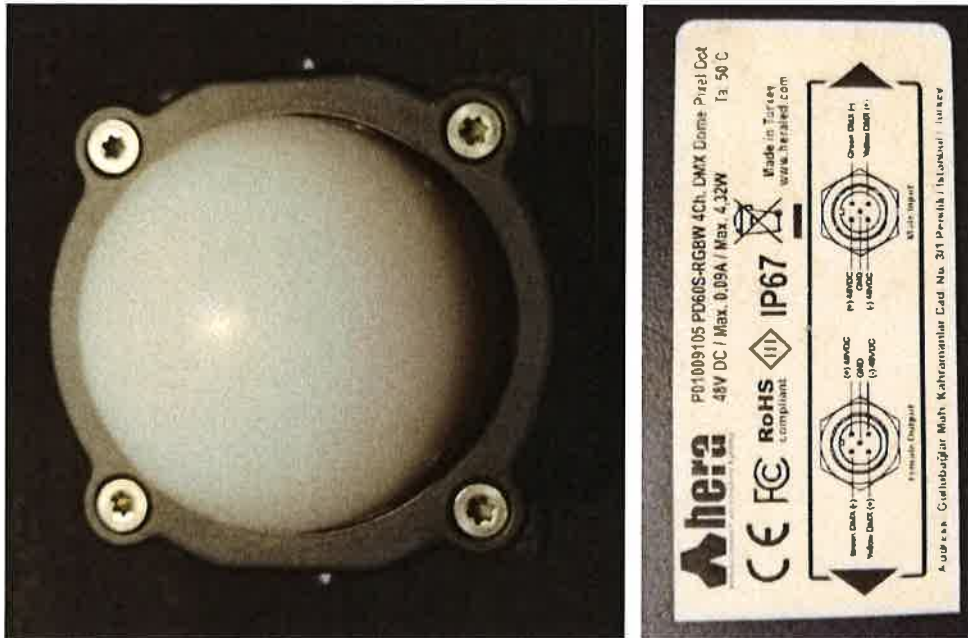
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3.1 DGC'nin Fotoğrafları (*Photos of EUT*)



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