

Photometric Test Report

Relevant Standards

- ☒ IES LM-79-2008
- ☒ ANSI C82.77:2017

Prepared For

RAB Lighting Inc.

Room 6A33, No.1388, Wuzhong road, Shanghai, China

Xiao Xiang, 15921313292, Gary.Xiao@rabweb.com

Prepared By

Deliver Co., Ltd.

Block 11, 78 Keling Road, SSTP, Suzhou, China

0512-66801950, kevin.jia@szdeliver.com

Project Number

DLF2212110

Report Number

DLF2212110-10a

Test Date

2023/1/3

Issue Date

2023/1/5

Prepared By



Wangzun Zhu

Approved By



Kevin Jia

The results contained in this report pertain only to the tested sample.

This report shall not be reproduced, except in full, without written approval of Deliver Co., Ltd.

This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP.

1.0 Test Summary

DLC Technical Requirements v5.1

Indoor - Linear Ambient - Direct Linear Ambient Luminaires				
Requirement Category	Test Method	Requirements		Test value
Luminaire Output (lm) (Goniophotometer - Section 4.2)	IES LM-79-2008	1500		2883
Lumen/ft (Goniophotometer - Section 4.2)	IES LM-79-2008	≥375		721
Minimum Luminaire Efficacy (lm/W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Standard 115	Premium 130	137.3
Power (Input Wattage) (W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Wrost Case		21.0
Total Harmonic Distortion (A%) (THD & PF - section 4.3)	ANSI C82.77:2014	20.00%	120V	6.14%
		20.00%	277V	12.25%
Power Factor (THD & PF - section 4.3)	ANSI C82.77:2014	0.9	120V	0.989
		0.9	277V	0.899
Allowable CCTs* (K) (Integrating Sphere - Section 4.1)	IES LM-79-2008	7 step	3465±245	3445
		4 step	3465±124	
Minimum CRI (Integrating Sphere - Section 4.1)	IES LM-79-2008 CIE 13.3-1995	≥80		84
Minimum R9 (Integrating Sphere - Section 4.1)	IES LM-79-2008 CIE 13.3-1995	≥0		10
Minimum Rf (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-18	≥70		85
Minimum Rg (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-18	≥89		95
Minimum IES Rcs,h1 (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-18	-12%≤IES Rcs,h1≤+23%		-12%
Zonal Lumen Requirement (0°-60°) (Goniophotometer - Section 4.2)	IES LM-79-2008	≥40%		71.84%
Corrected UGR (X=4H, Y=8H, 70/50/20%) (Goniophotometer - Section 4.2)	CIE 190-2010	<22		21.0
Input Voltage (V)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Wrost Case		277
(Goniophotometer - Section 4.2)		Non-Wrost Case		120
Input Current (A)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Wrost Case		0.085
(Goniophotometer - Section 4.2)		Non-Wrost Case		0.165
Power (Input Wattage - W)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Wrost Case		21.0
(Goniophotometer - Section 4.2)		Non-Wrost Case		19.5

2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2023/1/3	GUSJR4/20W/3500K	J1
2	Goniophotometer Test	2023/1/3	GUSJR4/20W/3500K	J1
3	THD and PF Test	2023/1/3	GUSJR4/20W/3500K	J1

Remark(If any)

- 1、 This report shall not be used by the client to claim product endorsement by NVLAP, NIST or any agency of the US government.
- 2、 The results reported herein have been performed in accordance with the laboratory's terms of accreditation. This report shall not be reproduced except in full without the written approval of the Laboratory. The results in this report apply to the test sample(s) mentioned above at the time of the testing period only and are not to be used to indicate applicability to other similar products. This report does not imply that the product(s) has met the criteria for certification.

3.0 Production Description

Luminaire Description: GUSJR4/20W/3500K

Electrical Specification: 120V-277V,50/60HZ

Photos of Luminaire Characteristics



4.0 LM-79 Measurement and Test Results

4.1 Integrating Sphere Test

Model No.	GUSJR4/20W/3500K	Sample ID.	J1
Operate time (Min.)	90	Stabilization time (Min.)	45
Temperature (°C)	25.3	Humidity (%RH)	56.0

Test Method

The samples were tested according to the IES LM-79-2008.

Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$.

The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere.

The voltage of an AC power supply (RMS voltage) or DC power supply (instantaneous voltage) applied to the device under test shall be regulated to within ± 0.2 percent under load.

The sample was measured using 4π geometry and operated at rated voltage and was stabilized before measurement. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral radiant flux measurements taken at 1 nm intervals over the range of 380 to 780 nm.

Test Result

Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
120.02	60	0.163	19.4	0.989
276.95	60	0.084	20.9	0.899

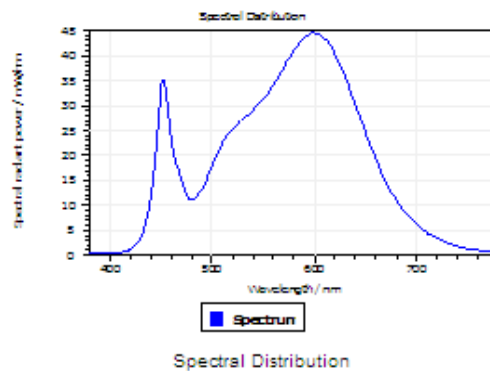
Test Result

CCT (K)	CRI	R9	Duv
3445	84	10	0.0013

Rf	Rg	IES Rcs,h1
85	95	-12%

4.1 Integrating Sphere Test

Results

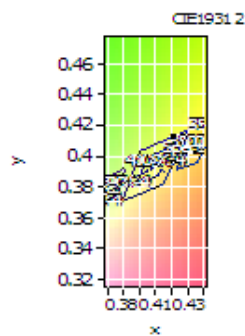


Spectral values

DominantWavelength 580.55 nm
Purity 0.419
PeakWavelength 589.53 nm
Radiant Power 7.179 W
Width50%:

Color Coordinates

Correlated Color Temperat 3445 K
x: 0.4099 u: 0.2365 u': 0.2365
y: 0.3980 v: 0.3428 v': 0.5141
CRI01 81.9 CRI09 10.1
CRI02 90.7 CRI10 78.2
CRI03 96.8 CRI11 81.4
CRI04 82.1 CRI12 65.7
CRI05 82.1 CRI13 84.0
CRI06 88.0 CRI14 98.6
CRI07 85.0 CRI15 74.7
CRI08 62.7 CRI16 72.1
ResultsCRI 83.7



PlanckDistance 1.3E-003

4.1 Integrating Sphere Test

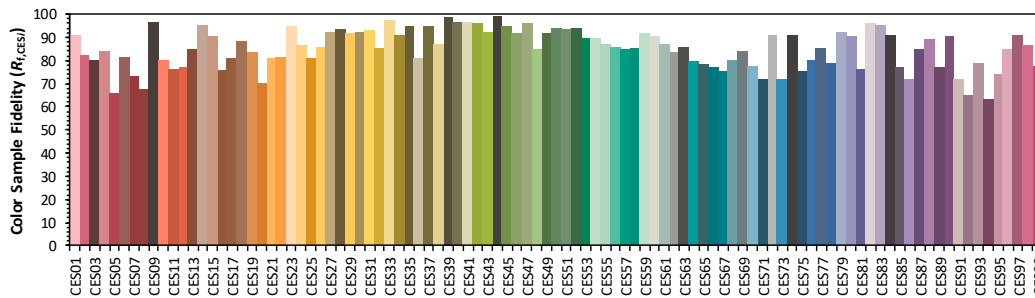
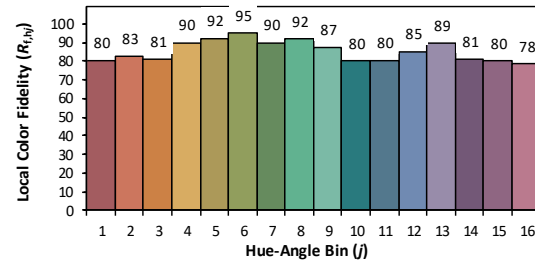
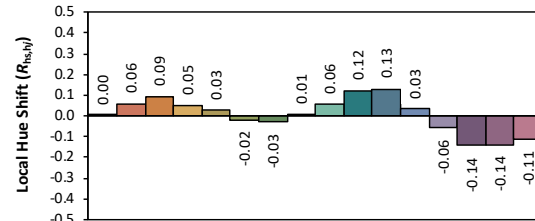
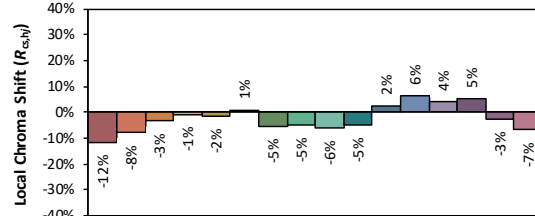
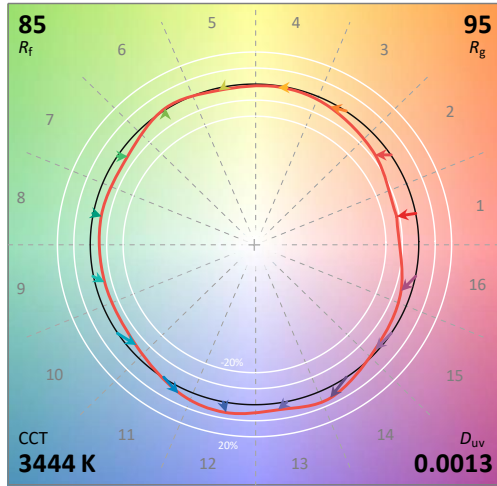
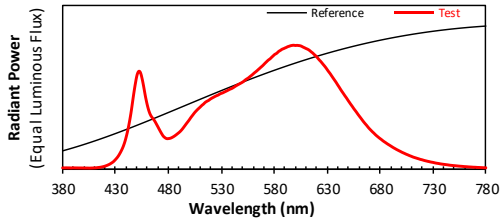
IES TM-30-18 Color Rendition Report

Source: DLF2212110-10a

Manufacturer: RAB Lighting Inc.

Date: 2023/1/3

Model: GUSJR4/20W/3500K



Notes: This is a recommended method for displaying IES TM-30-18 information.

x 0.4099
 y 0.3960
 u' 0.2365
 v' 0.5141

CIE 13.3-1995
(CRI)

R_a 84
 R_g 14

4.0 LM-79 Measurement and Test Results

4.2 Goniophotometer Test

Model No.	GUSJR4/20W/3500K	Sample ID.	J1
Opreate time (Min.)	90	Stabilization time (Min.)	45
Temperature (°C)	25.3	Humidity (%RH)	54.0

Test Method

The samples were tested according to the IES LM-79-2008.

Photometric paramters were measured using a type C goniophotometer and software.

The ambient temperature shall be maintained at 25° C ± 1° C, measured at a point not more than 1 m from the sample and at the same height as the sample.

The voltage of an AC power supply (RMS voltage) or DC power supply (instantaneous voltage) applied to the device under test shall be regulated to within ±0.2 percent under load.

The samples were operated at rated voltage and was stabilized before measurement. Luminous flux, luminaire efficacy, zonal lumen were calculated from the software taken at 0.5° vertical intervals and 10° horizontal intervals.

Test Conditions

Condition	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
WROST CASE	276.99	60	0.085	21.0	0.892
NON-WROST CASE	120.02	60	0.165	19.5	0.982

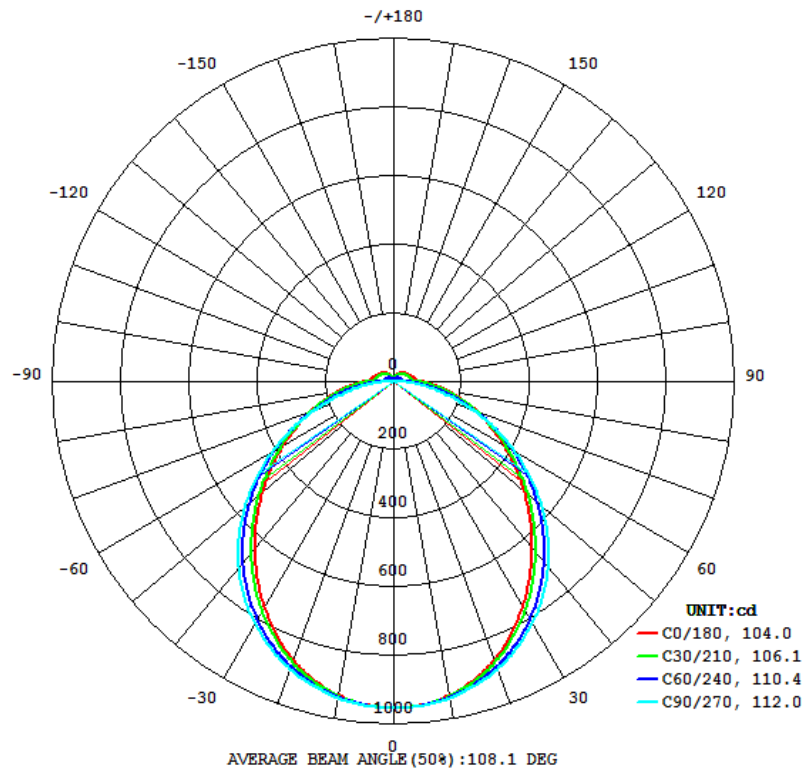
Test Result

Flux (lm)	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
	C0-180	C90-270	C0-180	C90-270	
2883	174.6	161.4	104.0	112.0	137.3

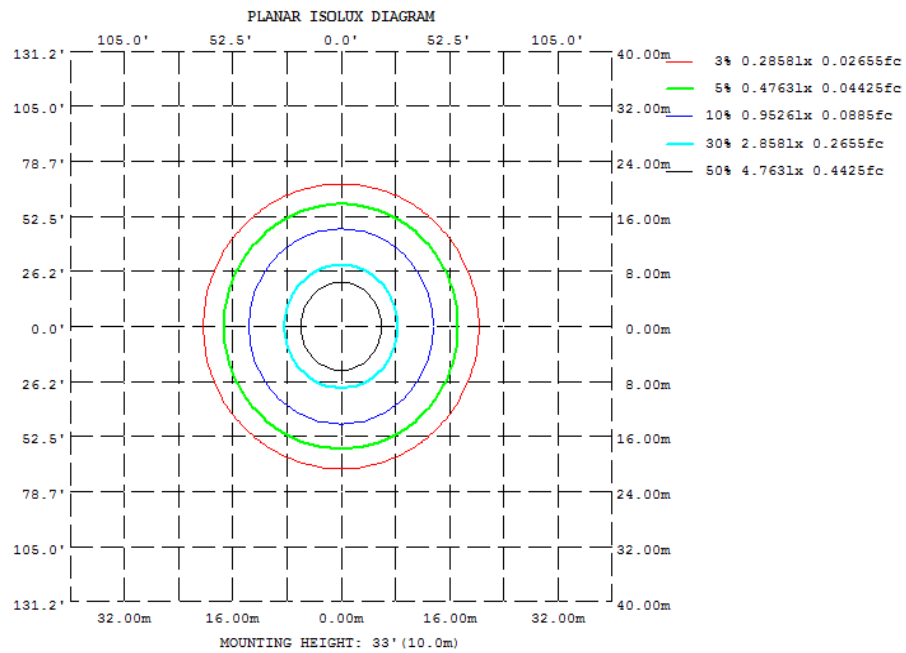
Zonal Lumen Requirement (0°-60°)	UGR (X=4H, Y=8H, 70/50/20%)	Length(ft)	Lumen/ft
71.84%	21.0	4.00	721

4.2 Goniophotometer Test

Light Distrubtion Curve



Isolux Plot



4.2 Goniophotometer Test

Zonal Lumen Summary

γ	C0	C45	C90	C135	C180	C225	C270	C315
10	930.4	934.0	938.4	934.0	930.4	934.0	938.4	934.0
20	864.6	878.1	892.0	878.1	864.6	878.1	892.0	878.1
30	759.6	787.0	815.7	787.0	759.6	787.0	815.7	787.0
40	634.2	668.5	706.6	668.5	634.2	668.5	706.6	668.5
50	503.0	534.0	569.4	534.0	503.0	534.0	569.4	534.0
60	376.1	394.4	412.4	394.4	376.1	394.4	412.4	394.4
70	261.6	262.0	251.3	262.0	261.6	262.0	251.3	262.0
80	162.4	143.7	102.2	143.7	162.4	143.7	102.2	143.7
90	76.71	53.33	1.424	53.33	76.71	53.33	1.424	53.33
100	65.04	45.31	1.570	45.31	65.04	45.31	1.570	45.31
110	56.43	39.76	2.725	39.76	56.43	39.76	2.725	39.76
120	48.61	34.27	4.132	34.27	48.61	34.27	4.132	34.27
130	40.97	29.48	5.294	29.48	40.97	29.48	5.294	29.48
140	34.19	24.40	6.236	24.40	34.19	24.40	6.236	24.40
150	26.54	18.75	6.497	18.75	26.54	18.75	6.497	18.75
160	18.32	12.85	6.037	12.85	18.32	12.85	6.037	12.85
170	10.51	7.976	5.654	7.976	10.51	7.976	5.654	7.976
180	5.409	6.280	6.439	6.280	5.409	6.280	6.439	6.280
DEG	LUMINOUS INTENSITY:cd							

UGR Table - Corrected

UGR Table - Corrected										
Reflectances										
Ceiling Cavity										
Walls										
Floor Cavity										
Room Size										
X=2H Y=2H										
3H										
4H										
6H										
8H										
12H										
4H 2H										
3H										
4H										
6H										
8H										
12H										
8H 4H										
6H										
8H										
12H										
12H 4H										
6H										
8H										
Maximum UGR = 24.1										

4.2 Goniophotometer Test

ZONAL LUMEN SUMMARY

	Zonal (lm)		Total (lm)	Percent
0-10	90.07	0 - 10	90.07	3.12%
10-20	256.82	0 - 20	346.89	12.03%
20-30	385.27	0 - 30	732.16	25.40%
30-40	457.16	0 - 40	1189.32	41.26%
40-50	465.77	0 - 50	1655.09	57.41%
50-60	415.90	0 - 60	2070.99	71.84%
60-70	322.53	0 - 70	2393.52	83.03%
70-80	207.78	0 - 80	2601.30	90.23%
80-90	95.21	0 - 90	2696.51	93.54%
90-100	46.36	0 - 100	2742.87	95.14%
100-110	39.51	0 - 110	2782.38	96.51%
110-120	32.60	0 - 120	2814.98	97.65%
120-130	25.62	0 - 130	2840.60	98.53%
130-140	18.89	0 - 140	2859.49	99.19%
140-150	12.65	0 - 150	2872.14	99.63%
150-160	7.09	0 - 160	2879.23	99.87%
160-170	2.95	0 - 170	2882.18	99.98%
170-180	0.67	0 - 180	2882.85	100.00%

4.2 Goniophotometer Test

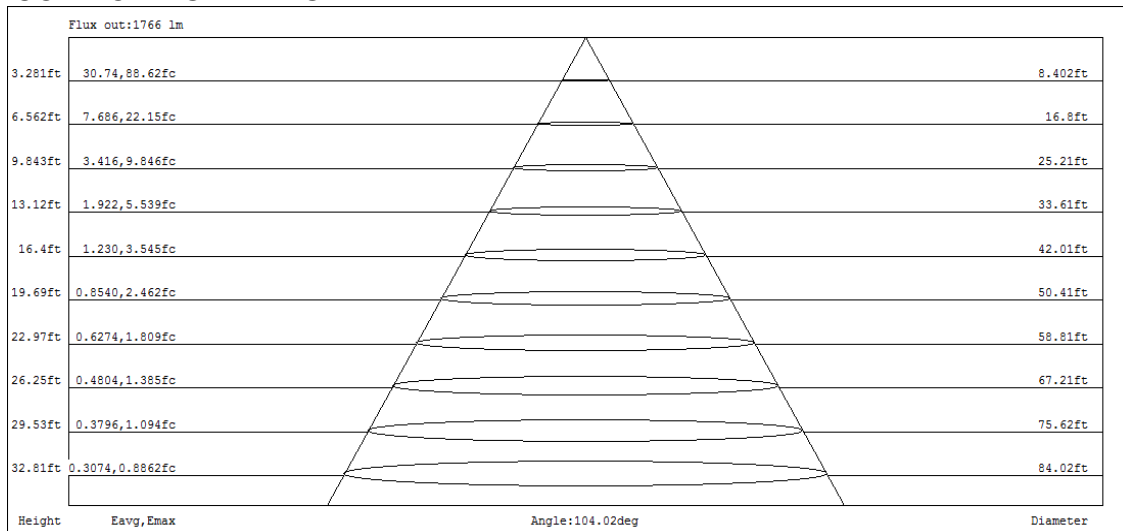
COEFFICIENTS OF UTILIZATION - ZONAL CAVITY METHOD

Coefficients Of Utilization - Zonal Cavity Method

Effective Floor Cavity Reflectance 0.20

RC	80				70				50			30			10			0
Rw	70	50	30	10	70	50	30	10	50	30	10	50	30	10	50	30	10	0
0	118	118	118	118	114	114	114	114	108	108	108	102	102	102	96	96	96	94
1	107	102	97	93	103	99	95	91	93	90	87	88	86	83	84	81	79	77
2	97	88	81	75	94	86	79	74	81	76	71	77	73	69	73	69	66	64
3	88	77	69	63	85	75	68	62	71	65	60	68	62	58	64	60	56	54
4	81	69	60	53	78	67	59	52	63	56	51	60	54	49	58	52	48	46
5	74	61	52	46	72	60	51	45	57	50	44	54	48	43	52	46	42	40
6	69	55	46	40	66	54	45	39	51	44	38	49	43	38	47	41	37	35
7	64	50	41	35	61	49	41	35	47	39	34	45	38	33	43	37	33	31
8	59	46	37	31	57	45	37	31	43	36	30	41	35	30	39	34	29	27
9	55	42	34	28	53	41	33	28	39	32	27	38	31	27	36	31	26	25
10	52	39	31	25	50	38	30	25	36	30	25	35	29	24	34	28	24	22

CONE OF LIGHT DIAGRAM



4.0 LM-79 Measurement and Test Results

4.3 THD and PF Test

Model No.	GUSJR4/20W/3500 K	Sample ID.	J1
Temperature (°C)	25.3	Humidity (%RH)	56.0

Test Method

The samples were tested according to the ANSI C82.77:2002.

The total harmonic distortion shall be measured to the 40th order.

The ambient temperature condition was maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$. The sample measurements were made using a digital power meter and power supply. The sample was operated at rated voltage and was stabilized before measurement. The total harmonic distortion were calculated.

Test Results

Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD
120.02	60	0.163	19.4	0.989	6.14%
276.95	60	0.084	20.9	0.899	12.25%

5.0 Equipment Information

Test Equipment			
Equipment ID	Equipment Name	Last Calibration Date	Calibration Due Date
DLF107	Integrating Sphere System	2022/12/26	2023/12/25
DLF108	Auxiliary Lamp	2022/12/26	2023/12/25
DLF122	Measurement Standard Lamp Standard Lamp Type: 220 V, 0.4720 A, Tungsten, Omni-derectional	2022/12/26	2023/12/25
DLF116	AC Power Source	2022/12/26	2023/12/25
DLF113	Power Meter	2022/12/26	2023/12/25
DLF112	Temperature Recorder	2022/12/26	2023/12/25
DLF114	Temperature & Humidity Datalogger	2022/12/26	2023/12/25
DLF101	Goniophotometer	2022/12/26	2023/12/25
DLF125	Standard Lamp Standard Lamp Type: 76.58 V, 6.7875 A, Tungsten, Omni-derectional	2022/12/26	2023/12/25
DLF104	AC Power Source	2022/12/26	2023/12/25
DLF507	DC Power Source	2022/12/26	2023/12/25
DLF102	Power Meter	2022/12/26	2023/12/25
DLF111	Temperature & Humidity Datalogger	2022/12/26	2023/12/25
DLF119	Power Meter	2022/12/26	2023/12/25
DLF031	Temperature data logger	2022/12/26	2023/12/25
DLF022	Digital power meter	2022/12/26	2023/12/25
DLF003	Temperature & Humidity Datalogger	2022/12/26	2023/12/25

***** End of Test Report*****