

IES LM-79-19

MEASUREMENT AND TEST REPORT

For

Beyond LED Technology

1939 Parker Ct, Stone Mountain, GA 30087

#Test Model: DLX1-40CS192-S471W-02A8

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
Test Engineer:	Hexy He <i>Hexy He</i>
Report Number:	RSZ200110507-10-1
Test Date:	2020-01-15 to 2020-01-16
Report Date:	2020-01-21
Reviewed By:	Bill Xiong / EE Engineer <i>Bill Xiong</i>
Prepared By:	Bay Area Compliance Laboratories Corp. (Dongguan). No.69,Pulongcun ,Puxinhu Industrial Area, Tangxia , Dongguan, Guangdong, China. Tel: +86-0769-86858888 Fax:+86-0769-86858588
Accreditation:	The IAS Accreditation Number TL-460.

1. Product Description

General Information:

One test sample was in good condition and received on 2020-01-10, and used for testing.

#Model Tested: DLX1-40CS192-S471W-02A8

#Manufacturer: Sundopt Led Lighting Co., Ltd.

#Product Designation: LED Recessed Downlight

Burning Time Before Test: 0hour(For New Products)

#Rated Values:

Rated Voltage/Frequency: 120-277V AC 50/60HZ

Rated Power: 40W

Nominal CCT: 3000K/4000K/5000K

Nominal Lumen Output: 4000lm

2. Standards Used

- ANSI/IES LM-79-19: Approved method :Optical and Electrical Measurements of Solid-State Lighting Products
- ANSI C82.77-10-2014: Harmonic Emission Limits – Related Power Quality Requirements for Lighting
- IES TM-30-18: IES Method for Evaluating Light Source Color Rendition (This method is not in IAS accreditation scope)

3. Description of Test Equipment

Device	Manufacture	Model No	Serial No	Calibration date	Calibration due date
1.5m temperature integrating sphere	SENSING	SPR-600	S09008	2019-06-28	2020-06-27
High-precision rapid spectral analysis system	EVERFINE	HAAS-2000	M112048CA1361125	2019-10-24	2020-10-23
Digital power meter	YOKOGAWA	WT310	13398	2019-07-12	2020-07-11
Programmable Precision DC Power Supply	ITECH	IT6154	0061 0417 6471 0010 19	2019-03-08	2020-03-07
thermometer	SENSING	NA	NA	2019-03-08	2020-03-07
Standard Light Source	EVERFINE	D204	N/A	2019-07-19	2020-07-18
Precision frequency power supply	ALL Power	APW-105N	970613	2019-03-08	2020-03-07
AC POWER SUPPLY	EVERFINE	VPS1030 PWM	1012017	2019-03-08	2020-03-07
Digital CC&CV DC Power Supply	EVERFINE	WY12010	1009009	2019-04-10	2020-04-09
Digital power meter	YOKOGAWA	WT-210	91j926132	2019-03-08	2020-03-07
full-field speed goniophotometer	EVERFINE	GO-R5000	YG108492N10120001	2019-03-08	2020-03-07
Wireless Remote Sensor	N/A	433MHz	N/A	2019-03-08	2020-03-07

Device	Manufacture	Model No	Serial No	Calibration date	Calibration due date
Standard Light Source	EVERFINE	D908	1012003	2019-11-27	2020-11-26

Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attested that all calibration has been performed using suitable standards traceable to National Primary Standards and International System of Units (SI).

4. Test Method

Product was tested with no seasoning. All stabilization and measurements were made in compliance with ANSI/IES LM-79-19. The product was operated at rated voltage or at voltage required by manufacturer. The ambient temperature of the sample was maintained at $25^{\circ}\text{C} \pm 1.2^{\circ}\text{C}$ during measurement. And relative humidity is maintained between 10% and 65%. The air flow around the SSL product is less than 0.2m/s.

Integrating Sphere System

The system includes AC power source, digital power meter, DC power supply, Spectroradiometer, and integrating sphere. The integrating sphere system is calibrated by standard spectrum light source before measurement.

4π geometry was used during measurement. The product was operated in its intended orientation in application and was recorded in this report.

The uncertainty of the light output (luminous flux) measurements is $U=2.1\%$ ($K=2$), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is $U=22\text{K}$ ($K=2$), at the 95% confidence level. The uncertainty of the CRI is $U=2.1(K=2)$, at the 95% confidence level.

The uncertainty of power meter AC current $U=0.39\%$ of rdg, AC Voltage $U=0.25\%$ of rdg, Power $U=0.42\%$ ($K=2$), at the 95% confidence level.

Goniophotometer System

The luminaire was tested in a can.

The goniophotometer system is calibrated by standard light source before measurement.

Type C goniophotometer was used for measuring total luminous flux, luminous intensity distribution, and color spatial uniformity. The product was operated in its intended orientation in application and was recorded in this report. For luminous intensity distribution, The vertical angle (γ) test intervals were set no more than 2.5 degree, The horizontal angle (C plane) test intervals were set no more than 22.5 degree. For color spatial uniformity, The vertical angle (γ) test intervals were set no more than 90 degree. The horizontal angle (C plane) test intervals were set no more than 10 degree

The uncertainty of the luminous intensity is $U=2.00\%$ ($K=2$), at the 95% confidence level.

Fidelity Index and Gamut Index Calculation

The R_i , R_g was calculated according to IES TM-30-18 by using calculation tools. The calculation was based on the measured SPD from 380nm to 780nm with 1nm intervals. All the colors in this report is for reference only.

5. Test Result

[Integrating Sphere System]

Total operating time for integrating sphere test: **1.0 hour**

Test orientation: **Downward**

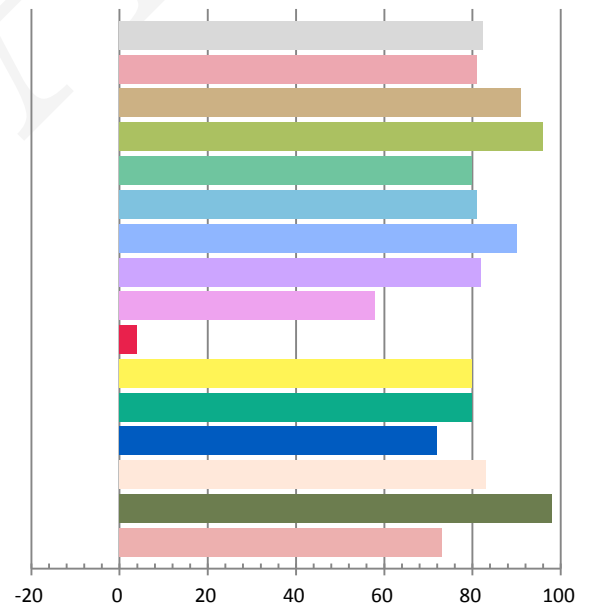
Photometric and Electrical Measurement Result

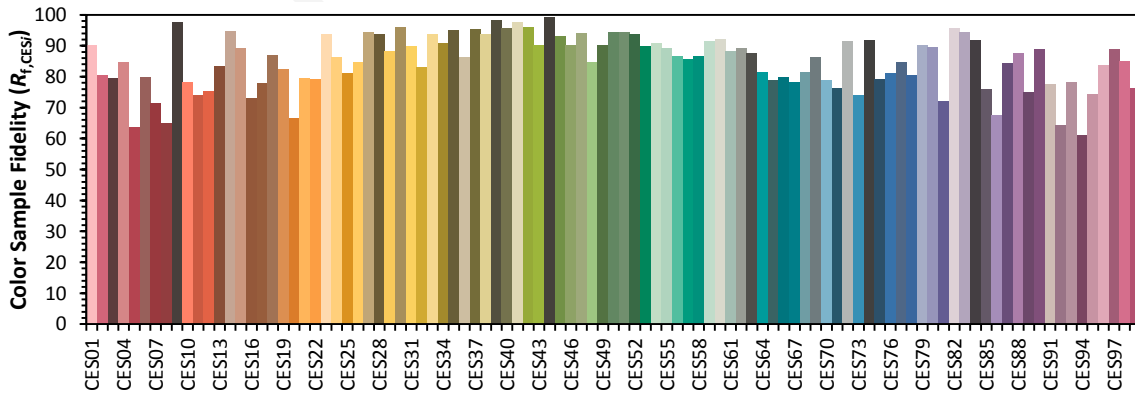
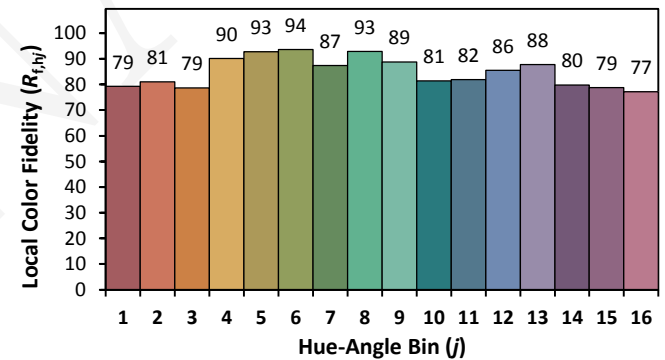
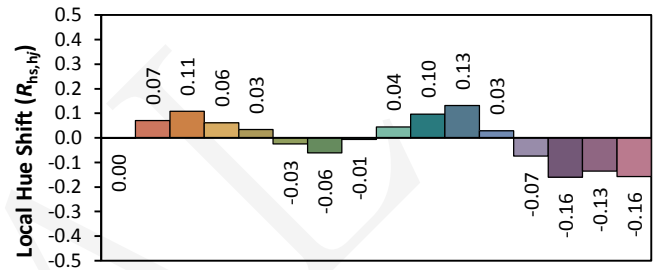
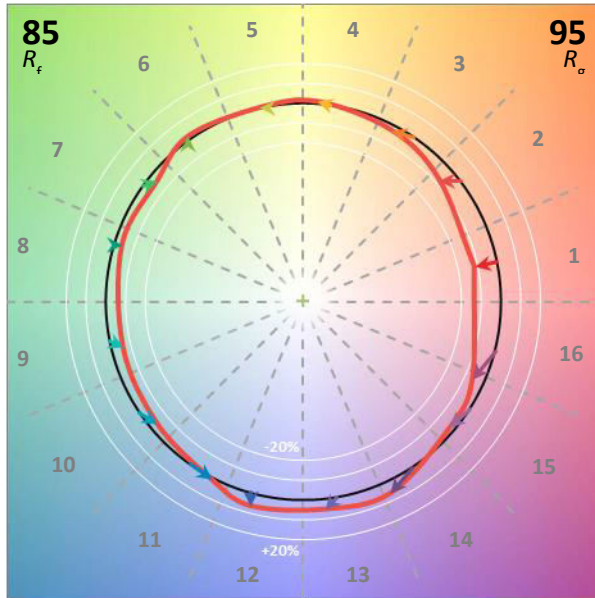
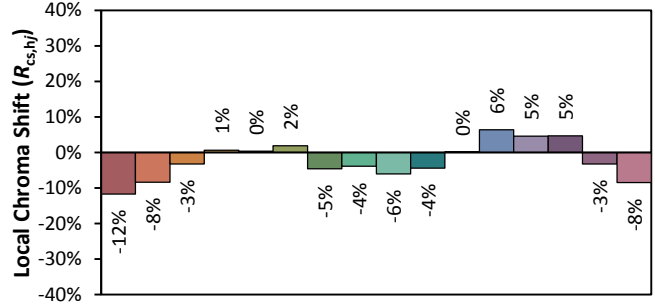
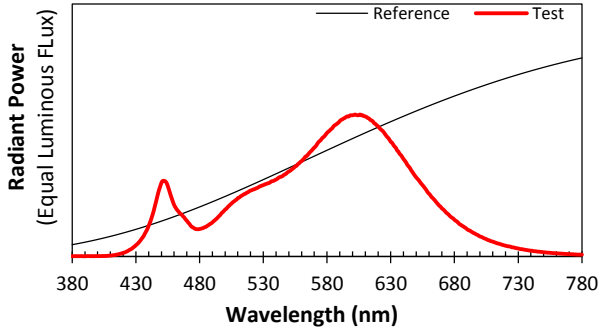
Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120	60	0.3135	37.05	0.9846	4005.8	108.12

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
12.075	3023	-0.00000554	0.4353	0.4035	0.2498	0.5209

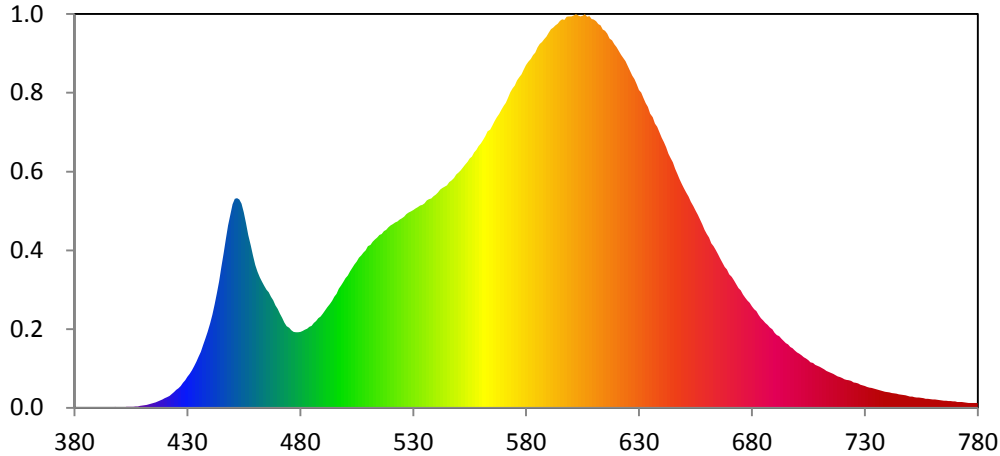
Color Rendering Index

Ra			
82.4			
R1	R2	R3	R4
81	91	96	80
R5	R6	R7	R8
81	90	82	58
R9	R10	R11	R12
4	80	80	72
R13	R14	R15	
83	98	73	





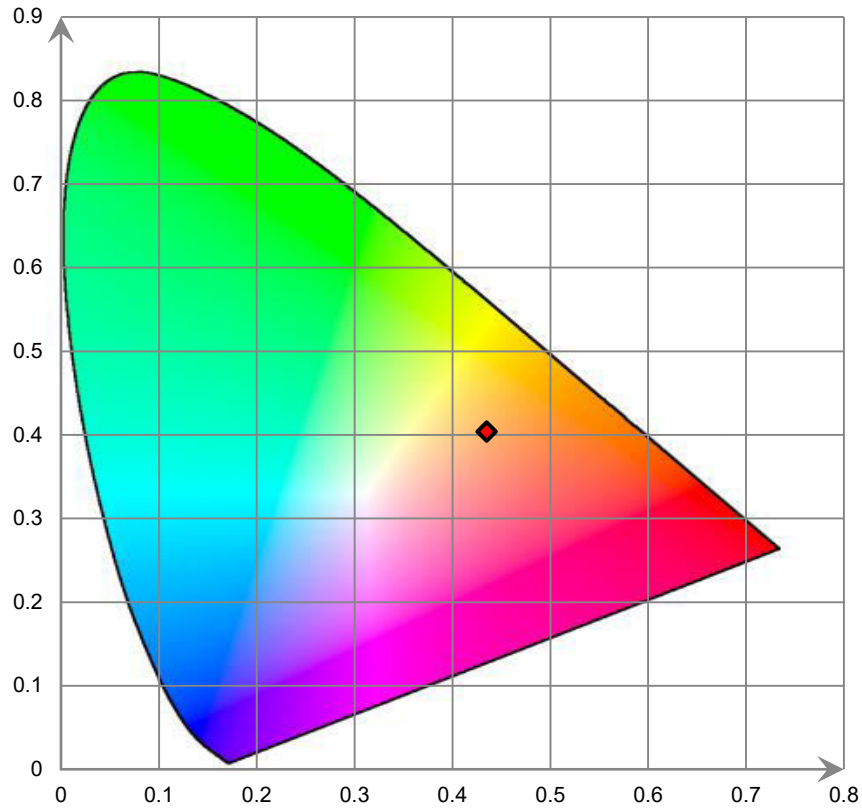
Relative Spectral Power Distribution



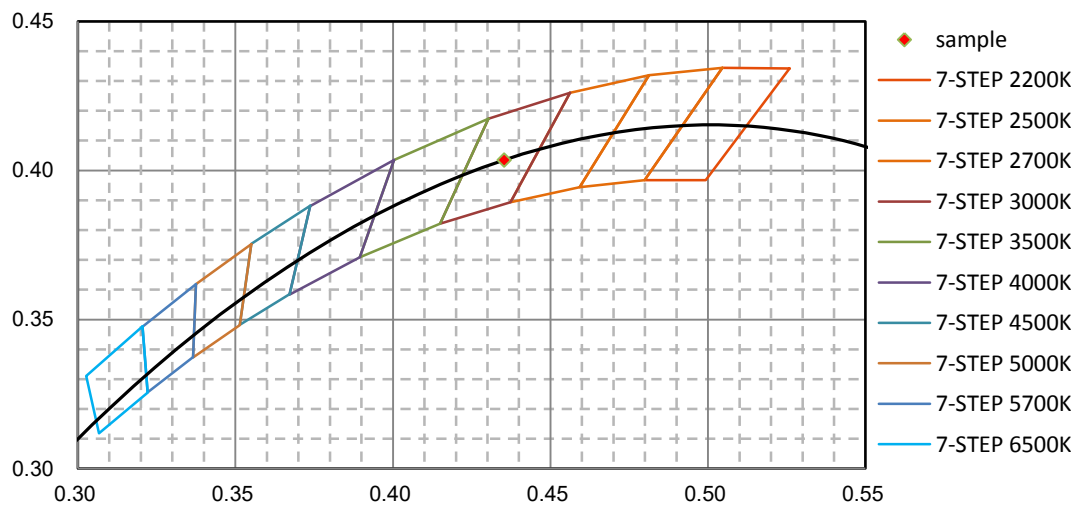
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	6.240E-02	421	2.196E+00	462	2.732E+01	503	2.925E+01	544	4.628E+01
381	1.284E-01	422	2.501E+00	463	2.640E+01	504	3.002E+01	545	4.655E+01
382	7.907E-02	423	2.900E+00	464	2.550E+01	505	3.063E+01	546	4.724E+01
383	1.539E-01	424	3.256E+00	465	2.467E+01	506	3.139E+01	547	4.762E+01
384	7.094E-02	425	3.753E+00	466	2.417E+01	507	3.188E+01	548	4.809E+01
385	1.261E-01	426	4.102E+00	467	2.323E+01	508	3.250E+01	549	4.883E+01
386	9.222E-02	427	4.570E+00	468	2.252E+01	509	3.298E+01	550	4.924E+01
387	1.525E-01	428	5.222E+00	469	2.141E+01	510	3.382E+01	551	4.968E+01
388	8.872E-02	429	5.745E+00	470	2.067E+01	511	3.411E+01	552	5.028E+01
389	7.203E-02	430	6.462E+00	471	1.968E+01	512	3.473E+01	553	5.088E+01
390	5.292E-02	431	7.113E+00	472	1.883E+01	513	3.521E+01	554	5.146E+01
391	1.185E-01	432	7.831E+00	473	1.779E+01	514	3.565E+01	555	5.217E+01
392	1.437E-01	433	8.703E+00	474	1.708E+01	515	3.616E+01	556	5.254E+01
393	1.542E-01	434	9.661E+00	475	1.673E+01	516	3.638E+01	557	5.344E+01
394	1.229E-01	435	1.073E+01	476	1.617E+01	517	3.698E+01	558	5.399E+01
395	1.025E-01	436	1.168E+01	477	1.586E+01	518	3.725E+01	559	5.477E+01
396	1.466E-01	437	1.312E+01	478	1.577E+01	519	3.780E+01	560	5.530E+01
397	6.374E-02	438	1.448E+01	479	1.577E+01	520	3.819E+01	561	5.607E+01
398	1.627E-01	439	1.586E+01	480	1.588E+01	521	3.845E+01	562	5.684E+01
399	1.285E-01	440	1.770E+01	481	1.604E+01	522	3.881E+01	563	5.789E+01
400	1.492E-01	441	1.946E+01	482	1.630E+01	523	3.898E+01	564	5.822E+01
401	1.547E-01	442	2.160E+01	483	1.651E+01	524	3.939E+01	565	5.906E+01
402	1.465E-01	443	2.396E+01	484	1.693E+01	525	3.964E+01	566	5.997E+01
403	1.678E-01	444	2.647E+01	485	1.713E+01	526	4.001E+01	567	6.079E+01
404	1.955E-01	445	2.945E+01	486	1.772E+01	527	4.051E+01	568	6.148E+01
405	1.912E-01	446	3.228E+01	487	1.815E+01	528	4.083E+01	569	6.236E+01
406	2.074E-01	447	3.532E+01	488	1.873E+01	529	4.113E+01	570	6.314E+01
407	2.857E-01	448	3.815E+01	489	1.910E+01	530	4.136E+01	571	6.386E+01
408	2.871E-01	449	4.040E+01	490	1.971E+01	531	4.174E+01	572	6.491E+01
409	3.838E-01	450	4.262E+01	491	2.038E+01	532	4.198E+01	573	6.606E+01
410	4.525E-01	451	4.375E+01	492	2.101E+01	533	4.229E+01	574	6.682E+01
411	5.294E-01	452	4.384E+01	493	2.167E+01	534	4.249E+01	575	6.746E+01
412	6.128E-01	453	4.357E+01	494	2.235E+01	535	4.277E+01	576	6.847E+01
413	7.247E-01	454	4.270E+01	495	2.321E+01	536	4.337E+01	577	6.916E+01
414	8.416E-01	455	4.090E+01	496	2.387E+01	537	4.368E+01	578	6.979E+01
415	1.023E+00	456	3.864E+01	497	2.488E+01	538	4.383E+01	579	7.077E+01
416	1.110E+00	457	3.616E+01	498	2.557E+01	539	4.424E+01	580	7.170E+01
417	1.341E+00	458	3.394E+01	499	2.630E+01	540	4.460E+01	581	7.238E+01
418	1.544E+00	459	3.181E+01	500	2.712E+01	541	4.504E+01	582	7.300E+01
419	1.749E+00	460	2.988E+01	501	2.767E+01	542	4.566E+01	583	7.377E+01
420	2.004E+00	461	2.849E+01	502	2.856E+01	543	4.602E+01	584	7.434E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	7.539E+01	626	7.050E+01	667	3.034E+01	708	8.963E+00	749	2.464E+00
586	7.612E+01	627	6.951E+01	668	2.945E+01	709	8.735E+00	750	2.368E+00
587	7.655E+01	628	6.876E+01	669	2.891E+01	710	8.543E+00	751	2.316E+00
588	7.712E+01	629	6.772E+01	670	2.794E+01	711	8.263E+00	752	2.218E+00
589	7.769E+01	630	6.652E+01	671	2.737E+01	712	8.012E+00	753	2.144E+00
590	7.851E+01	631	6.598E+01	672	2.666E+01	713	7.696E+00	754	2.127E+00
591	7.923E+01	632	6.480E+01	673	2.582E+01	714	7.488E+00	755	2.063E+00
592	7.954E+01	633	6.376E+01	674	2.507E+01	715	7.305E+00	756	1.980E+00
593	8.006E+01	634	6.298E+01	675	2.454E+01	716	7.093E+00	757	1.894E+00
594	8.039E+01	635	6.152E+01	676	2.372E+01	717	6.828E+00	758	1.864E+00
595	8.097E+01	636	6.081E+01	677	2.302E+01	718	6.575E+00	759	1.820E+00
596	8.127E+01	637	5.946E+01	678	2.245E+01	719	6.393E+00	760	1.755E+00
597	8.119E+01	638	5.881E+01	679	2.199E+01	720	6.192E+00	761	1.719E+00
598	8.182E+01	639	5.764E+01	680	2.124E+01	721	5.988E+00	762	1.649E+00
599	8.194E+01	640	5.654E+01	681	2.063E+01	722	5.855E+00	763	1.603E+00
600	8.191E+01	641	5.557E+01	682	2.021E+01	723	5.757E+00	764	1.568E+00
601	8.210E+01	642	5.453E+01	683	1.944E+01	724	5.615E+00	765	1.491E+00
602	8.235E+01	643	5.317E+01	684	1.873E+01	725	5.269E+00	766	1.442E+00
603	8.209E+01	644	5.223E+01	685	1.827E+01	726	5.227E+00	767	1.391E+00
604	8.193E+01	645	5.134E+01	686	1.775E+01	727	5.052E+00	768	1.384E+00
605	8.205E+01	646	5.005E+01	687	1.736E+01	728	4.814E+00	769	1.314E+00
606	8.237E+01	647	4.895E+01	688	1.681E+01	729	4.718E+00	770	1.362E+00
607	8.181E+01	648	4.784E+01	689	1.637E+01	730	4.558E+00	771	1.221E+00
608	8.196E+01	649	4.679E+01	690	1.568E+01	731	4.347E+00	772	1.228E+00
609	8.140E+01	650	4.585E+01	691	1.520E+01	732	4.216E+00	773	1.204E+00
610	8.123E+01	651	4.498E+01	692	1.499E+01	733	4.152E+00	774	1.134E+00
611	8.090E+01	652	4.419E+01	693	1.444E+01	734	4.015E+00	775	1.099E+00
612	8.033E+01	653	4.310E+01	694	1.402E+01	735	3.859E+00	776	1.031E+00
613	8.005E+01	654	4.216E+01	695	1.354E+01	736	3.734E+00	777	9.997E-01
614	7.920E+01	655	4.128E+01	696	1.327E+01	737	3.617E+00	778	1.030E+00
615	7.888E+01	656	4.040E+01	697	1.274E+01	738	3.489E+00	779	9.821E-01
616	7.830E+01	657	3.940E+01	698	1.247E+01	739	3.375E+00	780	9.802E-01
617	7.732E+01	658	3.837E+01	699	1.198E+01	740	3.277E+00		
618	7.685E+01	659	3.722E+01	700	1.155E+01	741	3.241E+00		
619	7.610E+01	660	3.639E+01	701	1.133E+01	742	3.038E+00		
620	7.551E+01	661	3.560E+01	702	1.100E+01	743	2.990E+00		
621	7.465E+01	662	3.444E+01	703	1.057E+01	744	2.907E+00		
622	7.384E+01	663	3.380E+01	704	1.028E+01	745	2.775E+00		
623	7.321E+01	664	3.300E+01	705	9.969E+00	746	2.720E+00		
624	7.255E+01	665	3.213E+01	706	9.526E+00	747	2.649E+00		
625	7.152E+01	666	3.118E+01	707	9.379E+00	748	2.580E+00		

CIE 1931 x y Chromaticity Diagram



7-Step Chromaticity Quadrangles



[Goniophotometer System]

Total operating time for luminous intensity distribution: **1.5 hour**

Test orientation: **Downward**

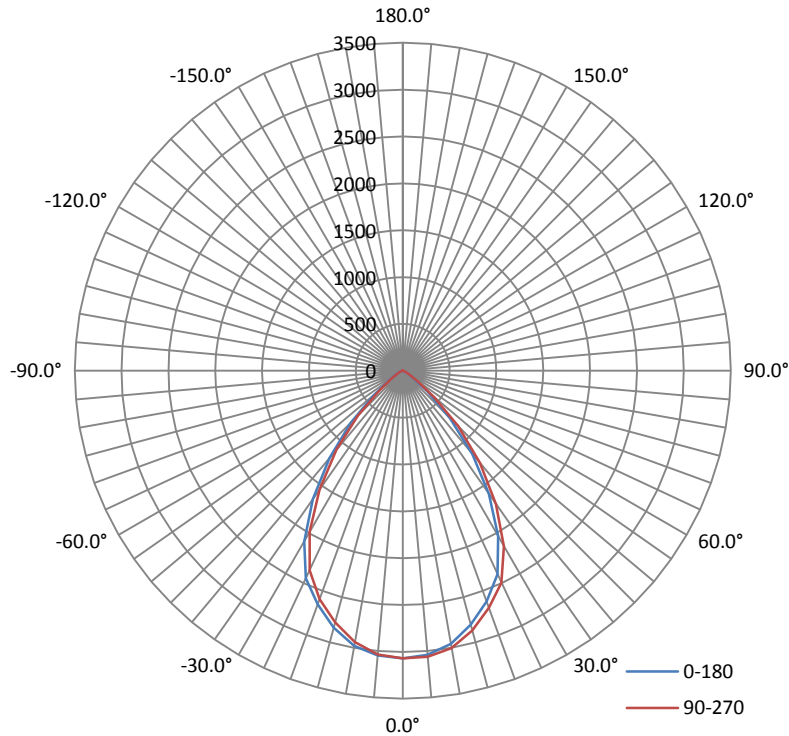
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.1	60	0.3153	37.15	0.9811

Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	I _{max} (cd)	S/MH (C0/180)	S/MH (C90/270)
4022.78	108.28	3072	1.05	1.08

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I _{max}):	72.2	72.3	72.3	72.3	72.3
Field Angle (10% I _{max}):	102.4	102.4	102.6	102.7	102.5

Luminous Intensity (cd) Distribution Data

C \ Y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0°	3068	3068	3068	3068	3068	3068	3068	3068
1°	3067	3069	3069	3069	3065	3059	3063	3061
2°	3063	3065	3064	3065	3061	3055	3062	3057
3°	3060	3063	3061	3061	3056	3048	3054	3053
4°	3057	3058	3052	3051	3046	3039	3045	3049
5°	3050	3051	3043	3043	3038	3030	3038	3035
6°	3045	3040	3036	3028	3026	3018	3023	3028
7°	3029	3028	3020	3011	3008	3002	3007	3013
8°	3019	3011	2999	2993	2990	2983	2989	2997
9°	3001	2992	2980	2973	2965	2961	2971	2977
10°	2981	2973	2956	2946	2941	2938	2945	2953
11°	2957	2947	2929	2922	2913	2910	2917	2925
12°	2931	2918	2900	2888	2883	2880	2888	2892
13°	2898	2886	2867	2857	2851	2847	2856	2863
14°	2870	2855	2831	2823	2813	2811	2820	2835
15°	2839	2820	2799	2789	2782	2779	2788	2797
16°	2801	2784	2765	2750	2744	2744	2752	2762
17°	2765	2751	2723	2708	2704	2706	2714	2724
18°	2729	2710	2683	2668	2666	2664	2673	2685
19°	2690	2670	2643	2631	2626	2626	2637	2647
20°	2650	2629	2608	2594	2592	2594	2604	2614
21°	2618	2597	2577	2564	2562	2561	2574	2578
22°	2582	2562	2538	2523	2518	2519	2529	2538
23°	2546	2522	2492	2474	2467	2468	2481	2494
24°	2499	2471	2439	2420	2410	2412	2424	2439
25°	2442	2418	2382	2359	2349	2349	2364	2377
26°	2386	2358	2320	2295	2286	2287	2299	2315
27°	2321	2291	2249	2225	2214	2214	2230	2250
28°	2255	2218	2178	2152	2140	2139	2154	2174
29°	2180	2141	2101	2080	2061	2062	2075	2097
30°	2103	2061	2024	1996	1982	1979	1996	2017
31°	2020	1980	1941	1916	1900	1894	1912	1933
32°	1937	1895	1859	1830	1813	1808	1824	1846
33°	1852	1809	1771	1745	1725	1720	1735	1760
34°	1761	1720	1683	1655	1634	1628	1642	1668
35°	1670	1630	1593	1566	1544	1536	1551	1577
36°	1578	1539	1503	1477	1454	1445	1460	1487
37°	1487	1450	1413	1385	1365	1355	1368	1397
38°	1394	1355	1322	1296	1273	1264	1277	1304
39°	1302	1265	1232	1205	1184	1174	1187	1213
40°	1214	1176	1144	1118	1096	1087	1098	1123
41°	1122	1086	1054	1028	1008	998	1010	1032
42°	1033	998	966	940	921	913	923	943
43°	947	912	880	855	836	830	840	860
44°	862	827	793	770	751	746	755	774
45°	779	746	713	689	673	666	675	692
46°	697	663	633	608	603	593	608	612
47°	619	590	562	537	527	521	531	539
48°	547	517	490	466	452	448	455	466

Luminous Intensity (cd) Distribution Data

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
49°	476	444	418	401	387	383	389	399
50°	405	380	357	341	330	326	331	339
51°	344	320	301	287	278	274	278	285
52°	290	270	253	241	234	231	234	238
53°	242	226	212	203	198	196	198	201
54°	203	191	182	176	173	172	172	174
55°	175	167	159	154	151	150	150	151
56°	153	145	138	134	132	131	131	131
57°	133	126	120	116	115	114	114	113
58°	115	110	104	101	100	100	99	98
59°	101	96	91	88	87	87	86	85
60°	88	83	80	77	76	76	75	74
61°	77	73	70	68	67	67	66	65
62°	67	64	61	61	60	60	59	58
63°	60	58	54	54	53	53	52	51
64°	53	51	48	47	46	46	45	44
65°	46	44	43	42	41	41	40	39
66°	41	40	38	37	37	37	36	35
67°	37	36	34	34	33	33	32	31
68°	33	32	31	30	30	30	29	28
69°	30	29	28	27	27	27	27	26
70°	27	26	25	25	25	25	24	23
71°	25	24	23	23	22	22	22	21
72°	22	22	21	21	20	20	20	19
73°	20	19	19	19	18	18	18	17
74°	18	18	17	17	17	17	16	16
75°	17	16	16	15	15	15	15	14
76°	15	14	14	14	14	13	13	13
77°	13	13	13	12	12	12	12	11
78°	12	12	11	11	11	11	10	10
79°	11	10	10	10	10	9	9	9
80°	9	9	9	9	8	8	8	8
81°	8	8	8	7	7	7	7	7
82°	7	7	6	6	6	6	6	6
83°	6	6	5	5	5	5	5	5
84°	5	5	4	4	4	4	4	4
85°	4	4	3	3	3	3	3	3
86°	3	3	2	2	2	2	2	2
87°	2	2	1	1	1	1	1	1
88°	1	1	1	1	0	0	0	0
89°	0	0	0	0	0	0	0	0
90°	0	0	0	0	0	0	0	0
91°	0	0	0	0	0	0	0	0
92°	0	0	0	0	0	0	0	0
93°	0	0	0	0	0	0	0	0
94°	0	0	0	0	0	0	0	0
95°	0	0	0	0	0	0	0	0
96°	0	0	0	0	0	0	0	0
97°	0	0	0	0	0	0	0	0

Luminous Intensity (cd) Distribution Data

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
98°	0	0	0	0	0	0	0	0
99°	0	0	0	0	0	0	0	0
100°	0	0	0	0	0	0	0	0
101°	0	0	0	0	0	0	0	0
102°	0	0	0	0	0	0	0	0
103°	0	0	0	0	0	0	0	0
104°	0	0	0	0	0	0	0	0
105°	0	0	0	0	0	0	0	0
106°	0	0	0	0	0	0	0	0
107°	0	0	0	0	0	0	0	0
108°	0	0	0	0	0	0	0	0
109°	0	0	0	0	0	0	0	0
110°	0	0	0	0	0	0	0	0
111°	0	0	0	0	0	0	0	0
112°	0	0	0	0	0	0	0	0
113°	0	0	0	0	0	0	0	0
114°	0	0	0	0	0	0	0	0
115°	0	0	0	0	0	0	0	0
116°	0	0	0	0	0	0	0	0
117°	0	0	0	0	0	0	0	0
118°	0	0	0	0	0	0	0	0
119°	0	0	0	0	0	0	0	0
120°	0	0	0	0	0	0	0	0
121°	0	0	0	0	1	1	0	0
122°	0	0	1	1	1	1	1	1
123°	1	1	1	1	1	1	1	1
124°	1	1	1	1	1	1	1	1
125°	1	1	1	1	1	1	1	1
126°	1	1	1	1	1	1	1	1
127°	1	1	1	1	1	1	1	1
128°	1	1	1	1	1	1	1	1
129°	1	1	1	1	1	1	1	1
130°	1	1	1	1	1	1	1	1
131°	1	1	1	1	1	1	1	1
132°	1	1	1	1	1	1	1	1
133°	1	1	1	1	1	1	1	1
134°	1	1	1	1	2	1	1	1
135°	1	1	2	2	2	2	2	1
136°	1	2	2	2	2	2	2	2
137°	2	2	2	2	2	2	2	2
138°	2	2	2	2	2	2	2	2
139°	2	2	2	2	2	2	2	2
140°	2	2	2	2	2	2	2	2
141°	2	2	2	2	2	2	2	2
142°	2	2	3	3	3	3	2	2
143°	2	2	3	3	3	3	3	2
144°	2	3	3	3	3	3	3	3
145°	3	3	3	3	3	3	3	3
146°	3	3	3	3	3	3	3	3

Luminous Intensity (cd) Distribution Data

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
147°	3	3	3	3	3	3	3	3
148°	3	3	3	4	4	4	3	3
149°	3	3	3	4	4	4	3	3
150°	3	3	4	4	4	4	4	3
151°	3	4	4	4	4	4	4	3
152°	3	4	4	4	4	4	4	4
153°	3	4	4	4	4	4	4	4
154°	4	4	4	4	4	4	4	4
155°	4	4	4	4	4	4	4	4
156°	4	4	4	4	4	4	4	4
157°	4	4	4	5	5	4	4	4
158°	4	4	4	5	5	5	4	4
159°	4	4	4	5	5	5	4	4
160°	4	4	4	5	5	5	5	4
161°	4	4	4	5	5	5	5	4
162°	4	4	5	5	5	5	5	4
163°	4	4	4	5	5	5	5	4
164°	4	4	4	5	5	5	5	4
165°	4	4	4	5	5	5	4	4
166°	4	4	4	4	5	4	4	4
167°	4	4	4	4	5	4	4	4
168°	4	4	4	4	4	4	4	4
169°	4	4	4	4	4	4	4	4
170°	4	4	4	4	4	4	4	4
171°	4	4	4	4	4	4	4	4
172°	4	4	4	4	4	4	4	4
173°	4	4	4	4	4	4	4	4
174°	4	4	4	4	4	4	4	4
175°	4	4	4	4	4	4	4	4
176°	4	4	4	4	4	4	4	4
177°	4	3	3	3	3	4	4	4
178°	3	3	3	3	3	3	3	4
179°	3	3	3	3	3	3	3	3
180°	3	3	3	3	3	3	3	3

Luminous Intensity (cd) Distribution Data (cont.)

C Y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0°	3068	3068	3068	3068	3068	3068	3068	3068
1°	3067	3068	3070	3070	3070	3066	3068	3067
2°	3064	3068	3072	3069	3070	3061	3064	3063
3°	3059	3067	3067	3068	3070	3061	3065	3062
4°	3057	3061	3068	3069	3069	3059	3061	3057
5°	3044	3057	3060	3062	3062	3056	3055	3051
6°	3034	3046	3052	3058	3055	3047	3049	3043
7°	3020	3033	3041	3050	3048	3041	3041	3032
8°	3000	3019	3030	3039	3035	3031	3028	3017
9°	2985	2999	3013	3022	3022	3009	3012	3004
10°	2961	2981	2993	3002	3006	2997	2995	2987
11°	2937	2953	2971	2985	2984	2973	2972	2963
12°	2906	2926	2947	2959	2959	2947	2946	2937
13°	2873	2898	2915	2928	2932	2921	2917	2908
14°	2842	2864	2888	2902	2903	2891	2887	2877
15°	2806	2832	2855	2871	2871	2857	2857	2842
16°	2770	2799	2820	2839	2837	2825	2821	2810
17°	2731	2762	2787	2804	2804	2789	2785	2777
18°	2693	2725	2749	2769	2770	2754	2749	2737
19°	2658	2684	2712	2729	2731	2715	2712	2700
20°	2620	2650	2673	2691	2692	2679	2671	2662
21°	2589	2616	2640	2657	2656	2637	2633	2626
22°	2552	2582	2608	2625	2621	2606	2600	2592
23°	2503	2542	2573	2589	2588	2570	2564	2559
24°	2453	2491	2525	2544	2545	2529	2524	2511
25°	2394	2434	2471	2495	2495	2478	2473	2457
26°	2329	2371	2408	2434	2437	2422	2414	2401
27°	2261	2305	2345	2375	2376	2361	2355	2338
28°	2191	2234	2274	2304	2309	2299	2289	2269
29°	2114	2159	2204	2232	2240	2228	2221	2200
30°	2037	2080	2124	2153	2162	2154	2146	2122
31°	1953	1997	2041	2075	2083	2075	2067	2044
32°	1871	1916	1957	1990	2003	1996	1987	1959
33°	1783	1830	1869	1899	1915	1910	1902	1875
34°	1695	1737	1781	1811	1827	1825	1816	1785
35°	1603	1648	1687	1719	1737	1737	1728	1694
36°	1512	1555	1594	1628	1645	1647	1639	1606
37°	1420	1462	1501	1531	1553	1558	1548	1513
38°	1332	1375	1407	1441	1461	1467	1456	1420
39°	1245	1287	1319	1352	1372	1375	1369	1334
40°	1157	1200	1231	1263	1284	1288	1281	1248
41°	1067	1106	1142	1175	1195	1202	1194	1161
42°	975	1015	1053	1082	1103	1110	1102	1072
43°	885	925	961	991	1013	1018	1010	982
44°	798	836	873	903	923	928	922	895
45°	714	750	786	815	835	839	834	807
46°	632	667	702	730	749	754	749	725
47°	554	586	619	647	666	671	667	644
48°	481	511	542	568	586	593	588	567

49°	412	440	468	493	511	517	514	494
50°	350	375	400	423	440	446	443	426
51°	295	316	339	359	375	382	379	363
52°	247	265	284	301	317	324	321	306
53°	207	221	237	251	266	272	271	257
54°	178	188	199	210	223	230	228	216
55°	157	165	172	180	190	195	194	185
56°	136	143	151	159	168	171	170	164
57°	115	121	131	138	145	151	148	142
58°	100	105	110	116	123	131	127	121
59°	86	91	95	101	107	112	111	105
60°	75	79	82	87	93	97	97	92
61°	65	68	72	76	81	85	84	80
62°	57	60	63	66	71	74	74	70
63°	50	52	55	58	62	65	65	62
64°	44	46	48	51	55	57	57	55
65°	39	41	43	45	48	51	51	48
66°	35	36	38	40	43	45	45	43
67°	31	32	34	36	38	40	40	39
68°	28	29	30	32	34	36	36	35
69°	25	26	27	29	31	32	32	31
70°	23	24	25	26	28	29	29	28
71°	21	21	22	24	25	26	26	26
72°	19	19	20	21	23	24	24	23
73°	17	18	18	19	21	22	22	21
74°	15	16	17	18	19	20	20	19
75°	14	14	15	16	17	18	18	17
76°	13	13	14	14	15	16	16	16
77°	11	12	12	13	14	14	15	14
78°	10	10	11	12	12	13	13	13
79°	9	9	10	10	11	11	11	11
80°	8	8	9	9	10	10	10	10
81°	7	7	7	8	8	9	9	9
82°	6	6	6	7	7	8	8	7
83°	5	5	5	6	6	7	7	6
84°	4	4	4	5	5	5	5	5
85°	3	3	3	4	4	4	4	4
86°	2	2	3	3	3	3	3	3
87°	1	1	2	2	2	2	2	2
88°	0	1	1	1	1	2	2	1
89°	0	0	0	1	1	1	1	1
90°	0	0	0	0	0	0	0	0
91°	0	0	0	0	0	0	0	0
92°	0	0	0	0	0	0	0	0
93°	0	0	0	0	0	0	0	0
94°	0	0	0	0	0	0	0	0
95°	0	0	0	0	0	0	0	0
96°	0	0	0	0	0	0	0	0
97°	0	0	0	0	0	0	0	0
98°	0	0	0	0	0	0	0	0
99°	0	0	0	0	0	0	0	0
100°	0	0	0	0	0	0	0	0
101°	0	0	0	0	0	0	0	0
102°	0	0	0	0	0	0	0	0

103°	0	0	0	0	0	0	0	0
104°	0	0	0	0	0	0	0	0
105°	0	0	0	0	0	0	0	0
106°	0	0	0	0	0	0	0	0
107°	0	0	0	0	0	0	0	0
108°	0	0	0	0	0	0	0	0
109°	0	0	0	0	0	0	0	0
110°	0	0	0	0	0	0	0	0
111°	0	0	0	0	0	0	0	0
112°	0	0	0	0	0	0	0	0
113°	0	0	0	0	0	0	0	0
114°	0	0	0	0	0	0	0	0
115°	0	0	0	0	0	0	0	0
116°	0	0	0	0	0	0	0	0
117°	0	0	0	0	0	0	0	0
118°	0	0	0	0	0	0	0	0
119°	0	0	0	0	0	0	0	0
120°	0	0	0	0	0	0	0	0
121°	0	0	0	0	0	0	0	0
122°	0	0	0	0	0	0	0	0
123°	0	0	0	0	0	0	0	0
124°	0	0	0	0	0	0	0	0
125°	0	0	0	0	0	0	0	0
126°	0	0	0	0	0	0	0	0
127°	0	0	0	0	0	0	0	0
128°	0	0	0	0	0	0	0	0
129°	0	0	0	0	0	0	0	0
130°	0	0	0	0	0	0	0	0
131°	0	0	0	0	0	0	0	0
132°	0	0	0	0	0	0	0	0
133°	0	0	0	0	0	0	0	0
134°	1	0	1	1	1	1	1	0
135°	1	1	1	1	1	1	1	1
136°	1	1	1	1	1	1	1	1
137°	1	1	1	1	1	1	1	1
138°	1	1	1	1	1	1	1	1
139°	1	1	1	1	1	1	1	1
140°	1	1	1	1	1	1	1	1
141°	1	1	1	1	1	1	1	1
142°	1	1	1	1	1	1	1	1
143°	1	1	1	1	1	1	1	1
144°	1	1	1	1	1	1	1	1
145°	1	1	1	1	1	1	1	1
146°	1	1	1	1	1	1	1	1
147°	1	1	1	1	1	1	1	1
148°	1	1	1	1	1	1	1	1
149°	1	1	1	1	1	1	1	1
150°	1	1	1	1	1	1	1	1
151°	1	1	1	1	1	1	1	1
152°	1	1	1	1	1	1	1	1
153°	1	1	1	1	1	1	1	1
154°	1	1	1	2	2	2	2	2
155°	2	1	2	2	2	2	2	2
156°	2	1	2	2	2	2	2	2

157°	2	2	2	2	2	2	2	2
158°	2	2	2	2	2	2	2	2
159°	2	2	2	2	2	2	2	2
160°	2	2	2	2	2	2	2	2
161°	2	2	2	2	2	2	2	2
162°	2	2	2	2	2	2	2	2
163°	2	2	2	2	2	2	2	2
164°	2	2	2	2	2	2	2	2
165°	2	2	2	2	2	2	2	2
166°	2	2	2	2	2	2	2	2
167°	2	2	2	2	2	2	2	2
168°	2	2	2	2	2	2	2	2
169°	2	2	2	2	2	2	2	2
170°	2	2	2	2	2	2	2	2
171°	2	2	2	2	2	2	2	2
172°	2	2	2	2	2	2	2	2
173°	2	2	2	2	2	2	2	2
174°	3	3	2	2	2	2	2	3
175°	3	3	3	2	3	2	3	3
176°	3	3	3	3	3	3	3	3
177°	3	3	3	3	3	3	3	3
178°	3	3	3	3	3	3	3	3
179°	3	3	3	3	3	3	3	3
180°	3	3	3	3	3	3	3	3

Zonal Lumen Density Measurement

Deg	Flux (lm)	%	Deg	Flux (lm)	%
0-5	73.1	1.82	0-5	73.1	1.82
5-10	215.5	5.35	0-10	288.6	7.17
10-15	343.7	8.55	0-15	632.4	15.72
15-20	449.7	11.18	0-20	1082.1	26.90
20-25	532.4	13.23	0-25	1614.4	40.13
25-30	569.5	14.16	0-30	2183.9	54.29
30-35	546.3	13.58	0-35	2730.2	67.87
35-40	469.8	11.68	0-40	3200.0	79.55
40-45	356.8	8.86	0-45	3556.7	88.41
45-50	224.8	5.59	0-50	3781.5	94.00
50-55	112.1	2.79	0-55	3893.6	96.79
55-60	55.9	1.39	0-60	3949.5	98.18
60-65	29.7	0.74	0-65	3979.2	98.92
65-70	17.1	0.42	0-70	3996.4	99.34
70-75	10.6	0.27	0-75	4007.0	99.61
75-80	6.5	0.16	0-80	4013.5	99.77
80-85	3.3	0.08	0-85	4016.8	99.85
85-90	0.8	0.02	0-90	4017.5	99.87
90-95	0.0	0.00	0-95	4017.6	99.87
95-100	0.0	0.00	0-100	4017.6	99.87
100-105	0.0	0.00	0-105	4017.6	99.87
105-110	0.0	0.00	0-110	4017.7	99.87
110-115	0.1	0.00	0-115	4017.7	99.87
115-120	0.1	0.01	0-120	4017.9	99.88
120-125	0.2	0.00	0-125	4018.0	99.88
125-130	0.3	0.01	0-130	4018.3	99.89
130-135	0.3	0.01	0-135	4018.6	99.90
135-140	0.5	0.01	0-140	4019.1	99.91
140-145	0.6	0.01	0-145	4019.6	99.92
145-150	0.6	0.02	0-150	4020.3	99.94
150-155	0.7	0.01	0-155	4020.9	99.95
155-160	0.6	0.02	0-160	4021.6	99.97
160-165	0.5	0.01	0-165	4022.1	99.98
165-170	0.4	0.01	0-170	4022.5	99.99
170-175	0.2	0.01	0-175	4022.7	100.00
175-180	0.1	0.00	0-180	4022.8	100.00

6. Product Photo



Directions

1. The information marked "superscript #" is provided by the applicant, the laboratory is not responsible for its authenticity and this information can affect the validity of the result in the test report.
2. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.
3. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.
4. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.
5. This report cannot be reproduced except in full, without prior written approval of the Company.
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*****END OF REPORT*****