

LM-79-08 Test Report

For

VENAS Co., LIMITED

Flat /RM 8B 4/F Lippo Sun Plaza 28 Canton Road TSIM SHA TSUI Kowloon Hong Kong SAR, China

LED Panel Light

Model Name(s):

P4-40W DXYYZZ

Representative (Tested) Model:

P4-40W DXYYZZ (0%, 3500K)

P4-40W DXYYZZ (50%, 4000K)

P4-40W DXYYZZ (100%, 5000K)

Model Difference: N/A

Prepare by:



Engineer: Alan Wang

Date: 2021-04-09

Review by:



Technical Lead: Vincent Yuan

Issue Date: 2021-05-18

Revised Date: N/A

Note:

1. The results contained in this report pertain only to the tested samples.
2. This report shall not be reproduced, no limited part or full, without approval of Dongguan New Testing Centre Co., Ltd
3. This report does not imply product certification, approval, or endorsement by NVLAP, or any agency of the Federal Government.

Client Information:

Applicant Name:	VENAS Co., LIMITED
Brand Name:	

Product Information:

Model Number:	P4-40W DXYYZZ
Product Type:	2x2 Luminaires for Ambient Lighting of Interior Commercial Spaces
Rating Input:	120-277Vac, 50/60Hz, 30/36/40W
Declared CCT:	3500K/4000K/5000K
Declared Light Output:	5030 lm
LED Manufacturer:	Shenzhen Runlite Technology Co., Ltd
LED Model:	P28351-W34SJ0K1FE8F2-XXXX and P28351-W50SJ0K2FE8F2-XXXX
LED Quantity:	P28351-W34SJ0K1FE8F2-XXXX: 48 pcs P28351-W50SJ0K2FE8F2-XXXX: 48 pcs
Driver Manufacturer:	Shenzhen Xiezhen Electronics Co., LTD
Driver Model:	XZ-SE40B-380105-095075-Y-D

Test Information:

Standard Lamp:	Total Spectral Radiant Flux Standard Lamp, trace to NIST. 1. D908S for Gonio 2. D215S for Integrating Sphere
Date of Receipt Samples:	2021-01-30
Quantity of Receipt Samples:	1 pc
Sample Number:	210130006-S1

Laboratory Information:

Test Laboratory:	Dongguan New Testing Centre Co., Ltd
Laboratory Address:	3F, No. 1 the 1 st North Industry Road, Songshan Lake Science & Technology Park, Dongguan, Guangdong, China
Laboratory Contact Name:	Neil Zhong
Laboratory Contact E-mail:	Neil_zhong@ntc-cert.com

Report Information:

Issued Date of Test Report:	2021-05-18
Revised Date of Test Report:	N/A
Test Report No.:	NTCLR21030380
Remark (If applicable):	1. Product tested IS and Electrical tests for all CCT with the default maximum wattage; 2. Product tested Gonio test for the lowest CCT with the default maximum wattage.

Test Specification:	
Date of Test	2021-03-14
Test Item	1. Total Luminous Flux 2. Luminous Distribution Intensity 3. Luminous Efficacy 4. Correlated Color Temperature 5. Color Rendering Index 6. Chromaticity Coordinate 7. Fidelity Index 8. Gamut Index 9. Local Chroma Shift 10. THD and PF
Reference Standard	IES LM-79-2008 Electrical and Photometric Measurements of Solid-State Lighting Products ANSI C78.377-2017 Specifications for the Chromaticity of Solid State Lighting Products CIE 13.3-1995 Method of Measuring and Specifying Color Rendering Properties of Light Sources CIE 15-2004 Technical Report Colorimetry ANSI IES TM-30-18 IES Method for Evaluating Light Source Color Rendition ANSI C78.77-10-2014 Harmonic Emission Limits – Related Power Quality Requirements IES TM-15-11 Luminaire Classification System for Outdoor Luminaires Addendum A for IES TM-15-11 Backlight, Uplight, and Glare (BUG) Ratings ANSI IES TM-30-18 IES Method for Evaluating Light Source Color Rendition ANSI C78.77-10-2014 Harmonic Emission Limits – Related Power Quality Requirements

Test Methods:
1. Photometric and Electrical Measurements – Light Distribution Method: Photometric parameters were measured using the 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 sample was operated at required Voltage and Frequency. It was stabilized before measurement was made. Luminous Flux, Luminaire Efficacy and Zonal Lumen were calculated from the software taken at 1° vertical intervals and 15° horizontal intervals.
2. Photometric and Electrical Measurements – Integrating Sphere Method: Photometric parameters were measured using an integrating sphere, as spectroradiometer and software. The ambient temperature condition inside the sphere was measured at 25 °C ± 1°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 sample was operated at require Voltage and Frequency. It was stabilized before measurement was made. Chromaticity Coordinates, Correlated Color Temperature and Color Rendering Index were calculated from the spectral radiant flux measurements taken at least 1 nm intervals over the rage of 380 to 780 nm.
3. THD and PF Measurements: The sample was tested according to the ANSI C82.77-2002, the sample was operated at requirement Voltage and Frequency, and was stabilized before measurement. The Total Harmonic Distortion was calculated from the Digital Power Meter.

Integrating Sphere Test Results:

Test Condition:

Test Ambient (°C)	Test Humidity (%)	Orientation	Stabilization Time (minute)	Test Time (minute)
25.1	41.0	Face Down	90	10

Electrical Data:

Rated CCT	Voltage (V)	Frequency (Hz)	Current (A)	Wattage (W)	Power Factor
3500K	120.0	60	0.3341	39.97	0.9969
4000K	120.0	60	0.3235	38.87	0.9969
5000K	120.0	60	0.3408	39.96	0.9971

Color Data:

Rated CCT	Test CCT (K)	R _a	R ₉	R _f	R _g	R _{cs, h1}	Chromaticity		
							(x, y)	(u', v')	Duv
3500K	3504	83.9	12	85	97	-11%	(0.4045, 0.3889)	(0.2359, 0.5104)	-0.0006
4000K	4139	83.7	14	84	95	-11%	(0.3744, 0.3726)	(0.2228, 0.4988)	-0.0002
5000K	5166	83.7	13	83	96	-12%	(0.3408, 0.3512)	(0.2087, 0.4838)	0.0015

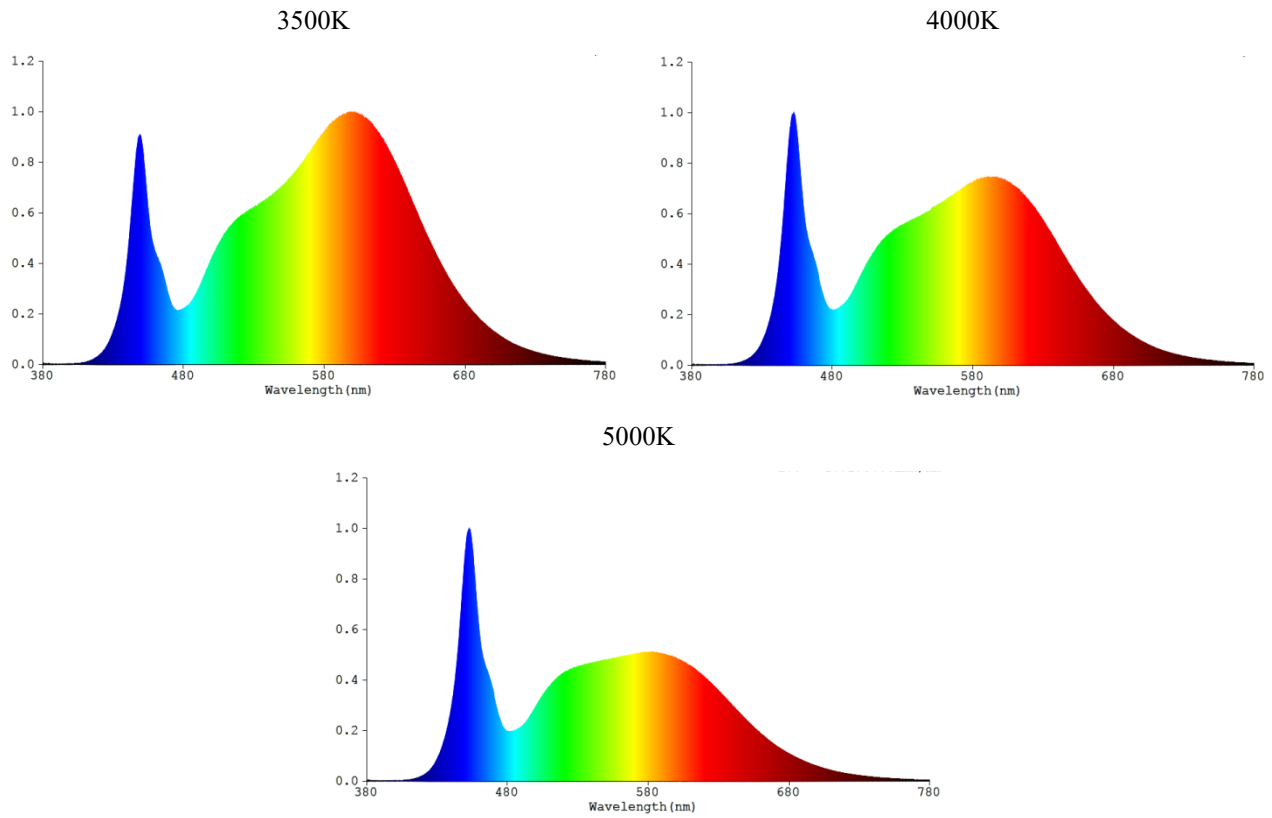
Specify Color Rendering

Rated CCT	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
3500K	83	90	96	83	83	87	85	64	12	77	83	69	84	98	76
4000K	82	90	94	82	82	85	87	67	14	75	81	59	84	97	77
5000K	82	89	92	83	83	84	87	69	13	72	82	59	84	96	78

Output Data:

Rated CCT (K)	Light output (lm)	Efficacy (lm/W)
3500K	5035.6	125.98
4000K	5316.2	136.77
5000K	5248.3	131.34

Spectrum Diagram:



IES TM-30-18 Color Rendition Result for 3500K:

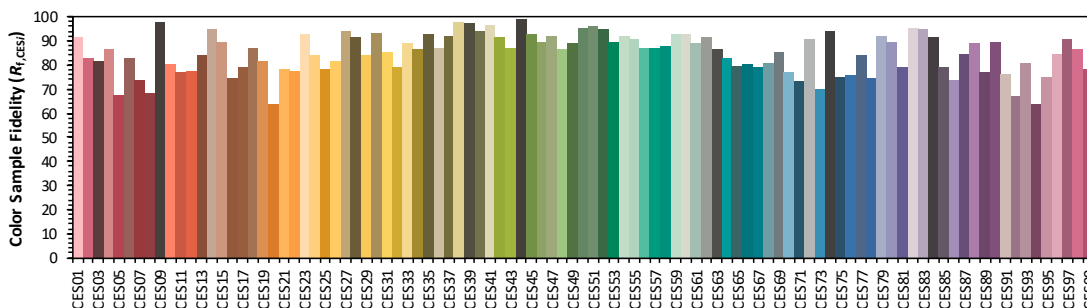
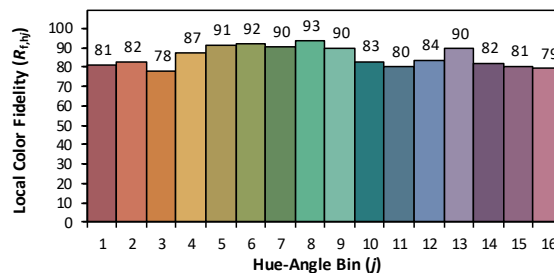
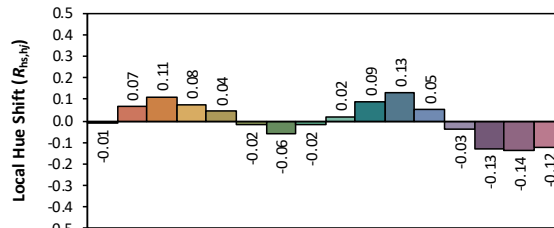
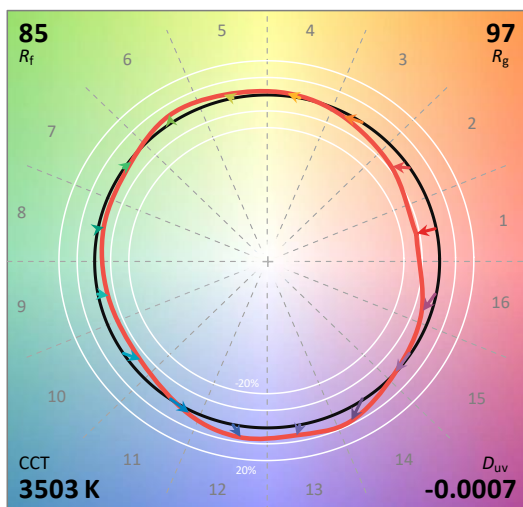
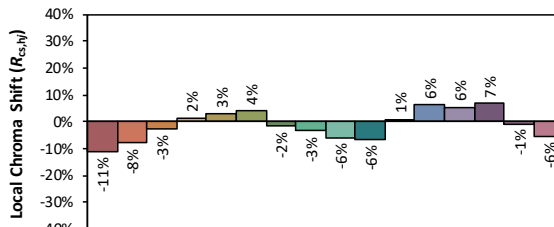
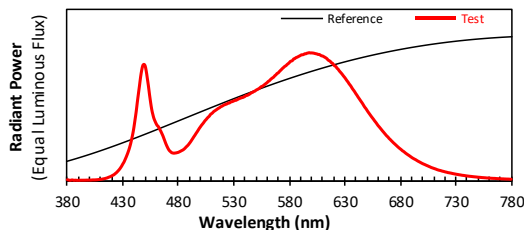
ANSI/IES TM-30-18 Color Rendition Report

Source: 1 CIE F1

Date: 2021/4/9

Manufacturer: VENAS Co., LIMITED

Model: P4-40W DXYYZZ



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

x 0.4045
 y 0.3888
 u' 0.2360
 v' 0.5103

CIE 13.3-1995
(CRI)
 R_a 84
 R_g 12

Colors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.00.

Spectrum Data for 3500K:

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	0.0064	447	0.8627	514	0.5518	581	0.9312	648	0.5743	715	0.0807
381	0.0046	448	0.8994	515	0.5577	582	0.9344	649	0.5635	716	0.0788
382	0.0021	449	0.9082	516	0.5643	583	0.9394	650	0.5504	717	0.0763
383	0.0023	450	0.8983	517	0.5682	584	0.9510	651	0.5370	718	0.0734
384	0.0045	451	0.8599	518	0.5755	585	0.9532	652	0.5250	719	0.0716
385	0.0038	452	0.8027	519	0.5799	586	0.9607	653	0.5128	720	0.0690
386	0.0013	453	0.7425	520	0.5842	587	0.9637	654	0.5008	721	0.0667
387	0.0029	454	0.6746	521	0.5901	588	0.9683	655	0.4894	722	0.0649
388	0.0021	455	0.6125	522	0.5934	589	0.9729	656	0.4781	723	0.0622
389	0.0016	456	0.5574	523	0.5967	590	0.9775	657	0.4658	724	0.0609
390	0.0021	457	0.5181	524	0.6000	591	0.9828	658	0.4549	725	0.0592
391	0.0015	458	0.4861	525	0.6058	592	0.9832	659	0.4429	726	0.0575
392	0.0026	459	0.4645	526	0.6060	593	0.9859	660	0.4304	727	0.0553
393	0.0025	460	0.4452	527	0.6127	594	0.9910	661	0.4206	728	0.0535
394	0.0026	461	0.4303	528	0.6157	595	0.9912	662	0.4101	729	0.0519
395	0.0027	462	0.4217	529	0.6185	596	0.9954	663	0.3993	730	0.0501
396	0.0027	463	0.4041	530	0.6221	597	0.9972	664	0.3884	731	0.0486
397	0.0033	464	0.3894	531	0.6277	598	0.9994	665	0.3783	732	0.0472
398	0.0031	465	0.3706	532	0.6271	599	0.9974	666	0.3679	733	0.0453
399	0.0037	466	0.3516	533	0.6324	600	0.9979	667	0.3576	734	0.0443
400	0.0034	467	0.3290	534	0.6361	601	0.9970	668	0.3478	735	0.0426
401	0.0034	468	0.3057	535	0.6415	602	0.9960	669	0.3399	736	0.0410
402	0.0041	469	0.2831	536	0.6436	603	0.9936	670	0.3289	737	0.0401
403	0.0050	470	0.2640	537	0.6480	604	0.9915	671	0.3210	738	0.0388
404	0.0048	471	0.2466	538	0.6491	605	0.9896	672	0.3118	739	0.0374
405	0.0051	472	0.2338	539	0.6532	606	0.9858	673	0.3032	740	0.0361
406	0.0058	473	0.2257	540	0.6573	607	0.9856	674	0.2943	741	0.0350
407	0.0064	474	0.2182	541	0.6644	608	0.9809	675	0.2867	742	0.0338
408	0.0076	475	0.2154	542	0.6657	609	0.9752	676	0.2786	743	0.0329
409	0.0081	476	0.2139	543	0.6697	610	0.9738	677	0.2706	744	0.0320
410	0.0091	477	0.2150	544	0.6745	611	0.9692	678	0.2624	745	0.0310
411	0.0104	478	0.2161	545	0.6807	612	0.9642	679	0.2549	746	0.0300
412	0.0124	479	0.2184	546	0.6867	613	0.9588	680	0.2478	747	0.0290
413	0.0139	480	0.2206	547	0.6897	614	0.9523	681	0.2411	748	0.0282
414	0.0160	481	0.2249	548	0.6960	615	0.9424	682	0.2332	749	0.0273
415	0.0185	482	0.2293	549	0.6990	616	0.9370	683	0.2278	750	0.0263
416	0.0211	483	0.2340	550	0.7060	617	0.9313	684	0.2208	751	0.0254
417	0.0250	484	0.2383	551	0.7109	618	0.9209	685	0.2134	752	0.0249
418	0.0282	485	0.2446	552	0.7155	619	0.9164	686	0.2073	753	0.0239
419	0.0316	486	0.2523	553	0.7208	620	0.9050	687	0.2012	754	0.0230
420	0.0363	487	0.2619	554	0.7287	621	0.8963	688	0.1956	755	0.0226
421	0.0414	488	0.2701	555	0.7351	622	0.8919	689	0.1892	756	0.0218
422	0.0459	489	0.2792	556	0.7377	623	0.8785	690	0.1831	757	0.0212
423	0.0533	490	0.2906	557	0.7452	624	0.8711	691	0.1769	758	0.0201
424	0.0601	491	0.3022	558	0.7517	625	0.8586	692	0.1720	759	0.0200
425	0.0690	492	0.3155	559	0.7587	626	0.8482	693	0.1671	760	0.0194
426	0.0783	493	0.3287	560	0.7653	627	0.8386	694	0.1628	761	0.0188
427	0.0886	494	0.3424	561	0.7745	628	0.8277	695	0.1570	762	0.0178
428	0.1006	495	0.3548	562	0.7797	629	0.8160	696	0.1519	763	0.0174
429	0.1142	496	0.3688	563	0.7889	630	0.8055	697	0.1472	764	0.0169
430	0.1299	497	0.3813	564	0.7966	631	0.7933	698	0.1427	765	0.0168
431	0.1441	498	0.3952	565	0.8031	632	0.7806	699	0.1377	766	0.0162
432	0.1635	499	0.4088	566	0.8092	633	0.7695	700	0.1332	767	0.0153
433	0.1836	500	0.4209	567	0.8197	634	0.7557	701	0.1291	768	0.0150
434	0.2054	501	0.4332	568	0.8262	635	0.7450	702	0.1255	769	0.0144
435	0.2290	502	0.4435	569	0.8370	636	0.7320	703	0.1215	770	0.0141
436	0.2561	503	0.4550	570	0.8412	637	0.7175	704	0.1176	771	0.0137
437	0.2876	504	0.4674	571	0.8510	638	0.7060	705	0.1140	772	0.0131
438	0.3261	505	0.4763	572	0.8598	639	0.6936	706	0.1099	773	0.0130
439	0.3669	506	0.4871	573	0.8684	640	0.6794	707	0.1063	774	0.0123
440	0.4169	507	0.4962	574	0.8773	641	0.6672	708	0.1019	775	0.0120
441	0.4768	508	0.5041	575	0.8849	642	0.6530	709	0.0990	776	0.0115
442	0.5367	509	0.5171	576	0.8929	643	0.6408	710	0.0959	777	0.0114
443	0.6094	510	0.5232	577	0.8978	644	0.6278	711	0.0929	778	0.0112
444	0.6763	511	0.5306	578	0.9067	645	0.6153	712	0.0900	779	0.0104
445	0.7417	512	0.5400	579	0.9137	646	0.6029	713	0.0862	780	0.0104
446	0.8092	513	0.5455	580	0.9212	647	0.5884	714	0.0832	N/A	N/A

IES TM-30-18 Color Rendition Result for 4000K:

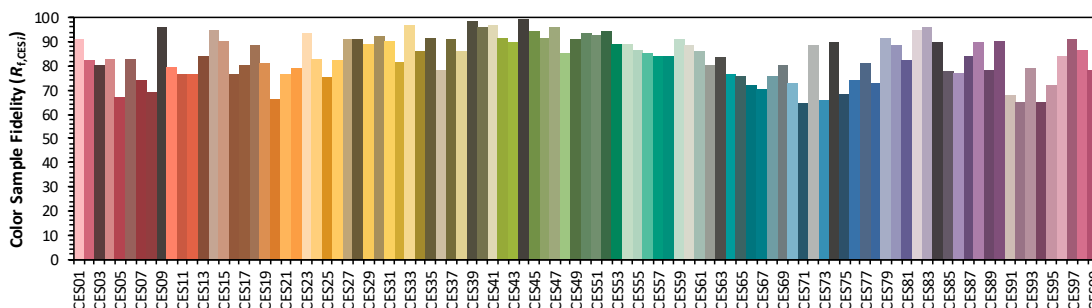
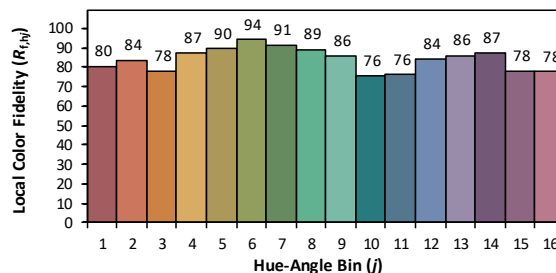
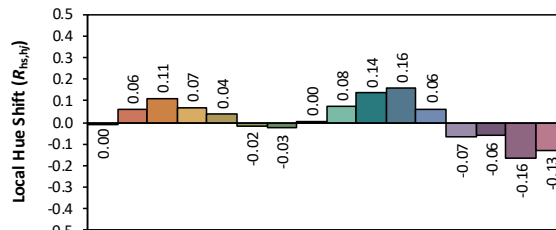
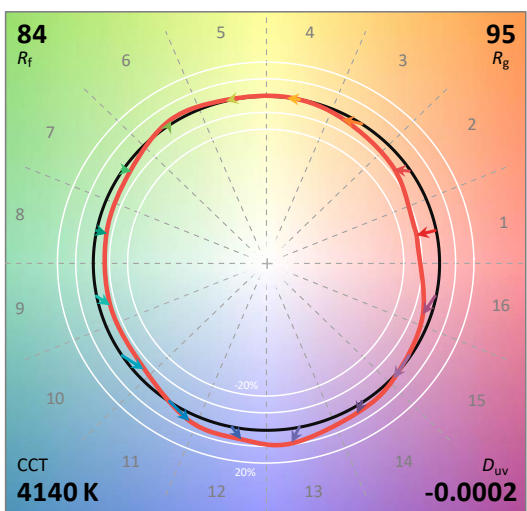
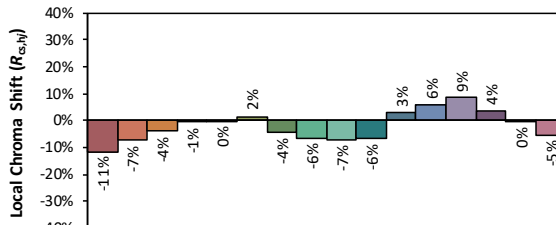
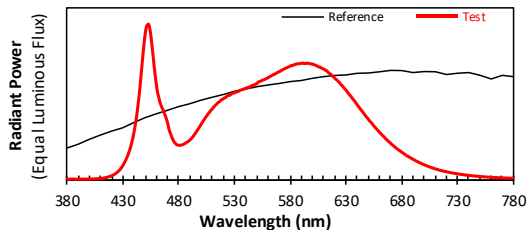
ANSI/IES TM-30-18 Color Rendition Report

Source: 1 CIE F1

Date: 2021/4/9

Manufacturer: VENAS Co., LIMITED

Model: P4-40W DXYYZZ



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

x 0.3743
 y 0.3724
 u' 0.2228
 v' 0.4987

CIE 13.3-1995
(CRI)
 R_a 84
 R_9 14

Colors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.00.

Spectrum Data for 4000K:

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	0.0052	447	0.7324	514	0.4828	581	0.7309	648	0.4055	715	0.0581
381	0.0013	448	0.8086	515	0.4912	582	0.7303	649	0.3970	716	0.0568
382	0.0011	449	0.8803	516	0.4963	583	0.7332	650	0.3896	717	0.0547
383	0.0022	450	0.9400	517	0.5017	584	0.7374	651	0.3791	718	0.0532
384	0.0034	451	0.9794	518	0.5080	585	0.7378	652	0.3712	719	0.0520
385	0.0027	452	0.9923	519	0.5143	586	0.7415	653	0.3640	720	0.0501
386	0.0031	453	0.9947	520	0.5168	587	0.7416	654	0.3546	721	0.0482
387	0.0018	454	0.9685	521	0.5229	588	0.7427	655	0.3457	722	0.0470
388	0.0015	455	0.9210	522	0.5257	589	0.7434	656	0.3369	723	0.0454
389	0.0020	456	0.8569	523	0.5321	590	0.7444	657	0.3287	724	0.0441
390	0.0025	457	0.7912	524	0.5376	591	0.7461	658	0.3212	725	0.0427
391	0.0026	458	0.7212	525	0.5395	592	0.7451	659	0.3133	726	0.0417
392	0.0026	459	0.6592	526	0.5404	593	0.7428	660	0.3046	727	0.0402
393	0.0023	460	0.6037	527	0.5475	594	0.7459	661	0.2981	728	0.0389
394	0.0025	461	0.5574	528	0.5507	595	0.7444	662	0.2897	729	0.0375
395	0.0020	462	0.5291	529	0.5538	596	0.7455	663	0.2824	730	0.0367
396	0.0031	463	0.4982	530	0.5560	597	0.7442	664	0.2758	731	0.0354
397	0.0026	464	0.4771	531	0.5602	598	0.7425	665	0.2680	732	0.0342
398	0.0027	465	0.4600	532	0.5613	599	0.7404	666	0.2603	733	0.0331
399	0.0029	466	0.4449	533	0.5636	600	0.7408	667	0.2536	734	0.0320
400	0.0027	467	0.4260	534	0.5674	601	0.7369	668	0.2463	735	0.0311
401	0.0025	468	0.4077	535	0.5714	602	0.7353	669	0.2406	736	0.0301
402	0.0036	469	0.3862	536	0.5740	603	0.7323	670	0.2338	737	0.0292
403	0.0033	470	0.3630	537	0.5765	604	0.7286	671	0.2267	738	0.0284
404	0.0037	471	0.3288	538	0.5789	605	0.7254	672	0.2208	739	0.0274
405	0.0039	472	0.3061	539	0.5818	606	0.7207	673	0.2151	740	0.0268
406	0.0045	473	0.2871	540	0.5847	607	0.7201	674	0.2087	741	0.0256
407	0.0044	474	0.2674	541	0.5876	608	0.7152	675	0.2032	742	0.0248
408	0.0055	475	0.2523	542	0.5898	609	0.7120	676	0.1969	743	0.0241
409	0.0058	476	0.2392	543	0.5912	610	0.7083	677	0.1919	744	0.0234
410	0.0066	477	0.2314	544	0.5953	611	0.7045	678	0.1867	745	0.0226
411	0.0070	478	0.2240	545	0.5993	612	0.6993	679	0.1816	746	0.0220
412	0.0086	479	0.2213	546	0.6025	613	0.6970	680	0.1765	747	0.0213
413	0.0099	480	0.2199	547	0.6019	614	0.6877	681	0.1716	748	0.0205
414	0.0112	481	0.2186	548	0.6077	615	0.6826	682	0.1666	749	0.0201
415	0.0129	482	0.2202	549	0.6115	616	0.6768	683	0.1615	750	0.0197
416	0.0147	483	0.2221	550	0.6128	617	0.6722	684	0.1562	751	0.0188
417	0.0170	484	0.2245	551	0.6220	618	0.6629	685	0.1508	752	0.0184
418	0.0192	485	0.2284	552	0.6268	619	0.6575	686	0.1479	753	0.0176
419	0.0215	486	0.2324	553	0.6290	620	0.6505	687	0.1433	754	0.0172
420	0.0245	487	0.2376	554	0.6325	621	0.6434	688	0.1390	755	0.0165
421	0.0283	488	0.2416	555	0.6360	622	0.6381	689	0.1353	756	0.0162
422	0.0317	489	0.2468	556	0.6380	623	0.6303	690	0.1312	757	0.0155
423	0.0369	490	0.2533	557	0.6410	624	0.6243	691	0.1268	758	0.0150
424	0.0420	491	0.2598	558	0.6451	625	0.6145	692	0.1234	759	0.0148
425	0.0474	492	0.2683	559	0.6482	626	0.6072	693	0.1192	760	0.0143
426	0.0540	493	0.2769	560	0.6515	627	0.5993	694	0.1157	761	0.0138
427	0.0611	494	0.2870	561	0.6570	628	0.5908	695	0.1123	762	0.0136
428	0.0704	495	0.2969	562	0.6598	629	0.5826	696	0.1088	763	0.0131
429	0.0801	496	0.3083	563	0.6643	630	0.5748	697	0.1057	764	0.0127
430	0.0922	497	0.3186	564	0.6682	631	0.5653	698	0.1022	765	0.0121
431	0.1047	498	0.3295	565	0.6728	632	0.5560	699	0.0984	766	0.0120
432	0.1179	499	0.3414	566	0.6743	633	0.5462	700	0.0956	767	0.0115
433	0.1343	500	0.3529	567	0.6792	634	0.5377	701	0.0927	768	0.0112
434	0.1497	501	0.3643	568	0.6829	635	0.5301	702	0.0900	769	0.0107
435	0.1694	502	0.3751	569	0.6883	636	0.5191	703	0.0869	770	0.0104
436	0.1897	503	0.3859	570	0.6897	637	0.5109	704	0.0841	771	0.0102
437	0.2145	504	0.3972	571	0.6941	638	0.5020	705	0.0812	772	0.0097
438	0.2423	505	0.4059	572	0.6983	639	0.4916	706	0.0790	773	0.0095
439	0.2721	506	0.4166	573	0.7035	640	0.4821	707	0.0761	774	0.0094
440	0.3098	507	0.4260	574	0.7055	641	0.4717	708	0.0739	775	0.0090
441	0.3515	508	0.4340	575	0.7103	642	0.4627	709	0.0712	776	0.0087
442	0.3961	509	0.4447	576	0.7139	643	0.4531	710	0.0689	777	0.0084
443	0.4526	510	0.4511	577	0.7163	644	0.4433	711	0.0669	778	0.0082
444	0.5120	511	0.4604	578	0.7211	645	0.4352	712	0.0647	779	0.0082
445	0.5786	512	0.4688	579	0.7233	646	0.4257	713	0.0625	780	0.0082
446	0.6548	513	0.4762	580	0.7254	647	0.4160	714	0.0603	N/A	N/A

IES TM-30-18 Color Rendition Result for 5000K:

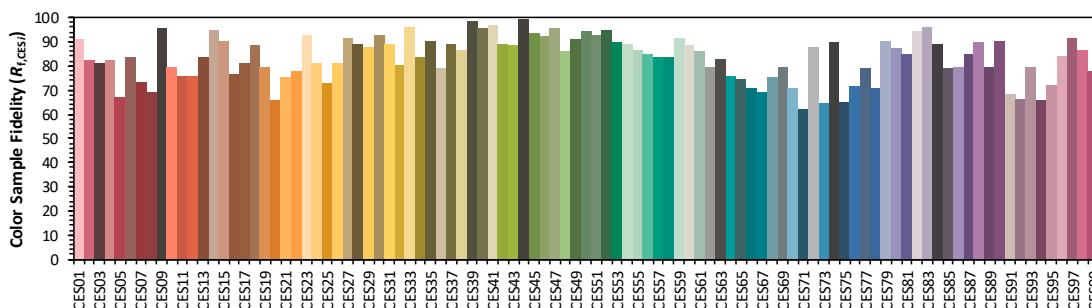
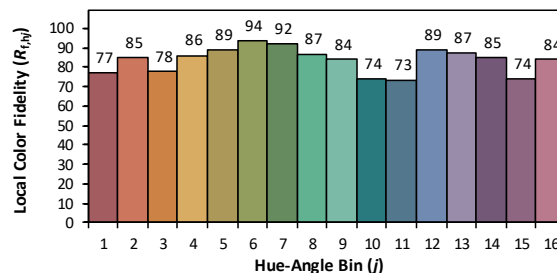
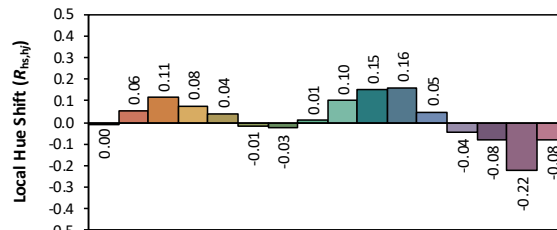
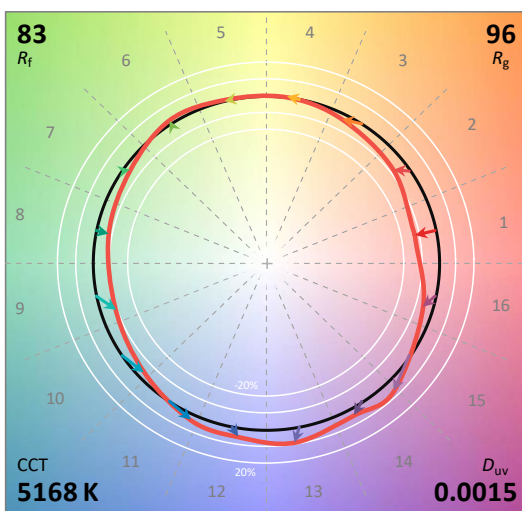
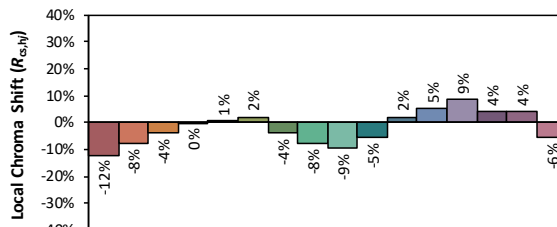
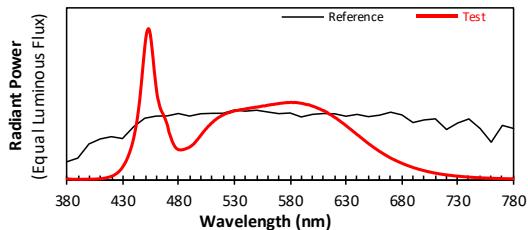
ANSI/IES TM-30-18 Color Rendition Report

Source: 1 CIE F1

Date: 2021/4/9

Manufacturer: VENAS Co., LIMITED

Model: P4-40W DXYYZZ



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

x 0.3407
 y 0.3510
 u' 0.2087
 v' 0.4837

CIE 13.3-1995
(CRI)
 R_a 84
 R_9 13

Colors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.00.

Spectrum Data for 5000K:

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	0.0029	447	0.6799	514	0.4019	581	0.5117	648	0.2521	715	0.0368
381	0.0046	448	0.7614	515	0.4071	582	0.5103	649	0.2461	716	0.0356
382	0.0036	449	0.8376	516	0.4120	583	0.5089	650	0.2407	717	0.0346
383	0.0031	450	0.9090	517	0.4155	584	0.5115	651	0.2350	718	0.0337
384	0.0027	451	0.9622	518	0.4210	585	0.5095	652	0.2300	719	0.0324
385	0.0018	452	0.9893	519	0.4245	586	0.5098	653	0.2245	720	0.0317
386	0.0021	453	0.9984	520	0.4279	587	0.5082	654	0.2190	721	0.0309
387	0.0026	454	0.9788	521	0.4329	588	0.5073	655	0.2137	722	0.0297
388	0.0021	455	0.9338	522	0.4349	589	0.5059	656	0.2079	723	0.0287
389	0.0025	456	0.8685	523	0.4381	590	0.5047	657	0.2036	724	0.0281
390	0.0016	457	0.7995	524	0.4415	591	0.5043	658	0.1983	725	0.0272
391	0.0021	458	0.7218	525	0.4441	592	0.5016	659	0.1934	726	0.0262
392	0.0020	459	0.6563	526	0.4437	593	0.4997	660	0.1880	727	0.0254
393	0.0020	460	0.5943	527	0.4490	594	0.4985	661	0.1839	728	0.0245
394	0.0024	461	0.5446	528	0.4499	595	0.4955	662	0.1793	729	0.0240
395	0.0024	462	0.5146	529	0.4517	596	0.4956	663	0.1744	730	0.0232
396	0.0027	463	0.4828	530	0.4545	597	0.4952	664	0.1696	731	0.0226
397	0.0024	464	0.4626	531	0.4570	598	0.4912	665	0.1656	732	0.0219
398	0.0025	465	0.4459	532	0.4564	599	0.4887	666	0.1610	733	0.0209
399	0.0030	466	0.4328	533	0.4580	600	0.4869	667	0.1569	734	0.0206
400	0.0031	467	0.4156	534	0.4598	601	0.4836	668	0.1524	735	0.0197
401	0.0029	468	0.3986	535	0.4622	602	0.4819	669	0.1483	736	0.0192
402	0.0029	469	0.3776	536	0.4632	603	0.4782	670	0.1442	737	0.0185
403	0.0036	470	0.3564	537	0.4645	604	0.4757	671	0.1400	738	0.0181
404	0.0035	471	0.3214	538	0.4642	605	0.4720	672	0.1362	739	0.0176
405	0.0036	472	0.2986	539	0.4663	606	0.4684	673	0.1331	740	0.0169
406	0.0040	473	0.2779	540	0.4674	607	0.4668	674	0.1294	741	0.0165
407	0.0047	474	0.2559	541	0.4698	608	0.4621	675	0.1258	742	0.0161
408	0.0047	475	0.2403	542	0.4709	609	0.4589	676	0.1226	743	0.0154
409	0.0056	476	0.2251	543	0.4709	610	0.4567	677	0.1188	744	0.0151
410	0.0062	477	0.2146	544	0.4734	611	0.4537	678	0.1161	745	0.0145
411	0.0067	478	0.2057	545	0.4743	612	0.4493	679	0.1120	746	0.0141
412	0.0080	479	0.2010	546	0.4754	613	0.4454	680	0.1099	747	0.0136
413	0.0090	480	0.1973	547	0.4756	614	0.4403	681	0.1061	748	0.0131
414	0.0104	481	0.1972	548	0.4776	615	0.4339	682	0.1034	749	0.0129
415	0.0117	482	0.1962	549	0.4789	616	0.4306	683	0.1000	750	0.0124
416	0.0140	483	0.1977	550	0.4798	617	0.4277	684	0.0973	751	0.0120
417	0.0156	484	0.1985	551	0.4803	618	0.4216	685	0.0946	752	0.0117
418	0.0177	485	0.2010	552	0.4818	619	0.4170	686	0.0919	753	0.0114
419	0.0204	486	0.2027	553	0.4832	620	0.4122	687	0.0891	754	0.0111
420	0.0231	487	0.2064	554	0.4844	621	0.4073	688	0.0862	755	0.0106
421	0.0262	488	0.2090	555	0.4869	622	0.4035	689	0.0841	756	0.0104
422	0.0295	489	0.2116	556	0.4877	623	0.3963	690	0.0812	757	0.0101
423	0.0345	490	0.2165	557	0.4869	624	0.3923	691	0.0789	758	0.0098
424	0.0392	491	0.2206	558	0.4890	625	0.3863	692	0.0764	759	0.0094
425	0.0448	492	0.2274	559	0.4905	626	0.3805	693	0.0743	760	0.0092
426	0.0512	493	0.2325	560	0.4920	627	0.3752	694	0.0722	761	0.0089
427	0.0587	494	0.2404	561	0.4938	628	0.3700	695	0.0697	762	0.0086
428	0.0668	495	0.2486	562	0.4941	629	0.3643	696	0.0677	763	0.0085
429	0.0761	496	0.2578	563	0.4962	630	0.3586	697	0.0658	764	0.0081
430	0.0876	497	0.2663	564	0.4967	631	0.3522	698	0.0638	765	0.0080
431	0.0998	498	0.2756	565	0.4972	632	0.3467	699	0.0617	766	0.0079
432	0.1116	499	0.2848	566	0.4982	633	0.3403	700	0.0597	767	0.0075
433	0.1270	500	0.2946	567	0.5006	634	0.3351	701	0.0581	768	0.0074
434	0.1432	501	0.3042	568	0.5001	635	0.3296	702	0.0561	769	0.0070
435	0.1615	502	0.3139	569	0.5027	636	0.3231	703	0.0543	770	0.0069
436	0.1818	503	0.3224	570	0.5026	637	0.3168	704	0.0526	771	0.0065
437	0.2043	504	0.3316	571	0.5048	638	0.3112	705	0.0508	772	0.0064
438	0.2289	505	0.3390	572	0.5050	639	0.3056	706	0.0495	773	0.0062
439	0.2573	506	0.3484	573	0.5065	640	0.2984	707	0.0479	774	0.0059
440	0.2896	507	0.3560	574	0.5068	641	0.2938	708	0.0464	775	0.0058
441	0.3279	508	0.3622	575	0.5083	642	0.2881	709	0.0446	776	0.0057
442	0.3660	509	0.3714	576	0.5086	643	0.2816	710	0.0436	777	0.0055
443	0.4141	510	0.3768	577	0.5089	644	0.2757	711	0.0418	778	0.0052
444	0.4697	511	0.3834	578	0.5107	645	0.2707	712	0.0406	779	0.0054
445	0.5299	512	0.3908	579	0.5093	646	0.2637	713	0.0395	780	0.0054
446	0.6033	513	0.3958	580	0.5099	647	0.2583	714	0.0379	N/A	N/A

Goniophotometer Test Results (Test for 3500K):

Test Condition:

Test Ambient (°C)	Test Humidity (%)	Orientation	Stabilization Time (minute)	Test Time (minute)
25.2	50.4	Face Down	90	25

Electrical Data:

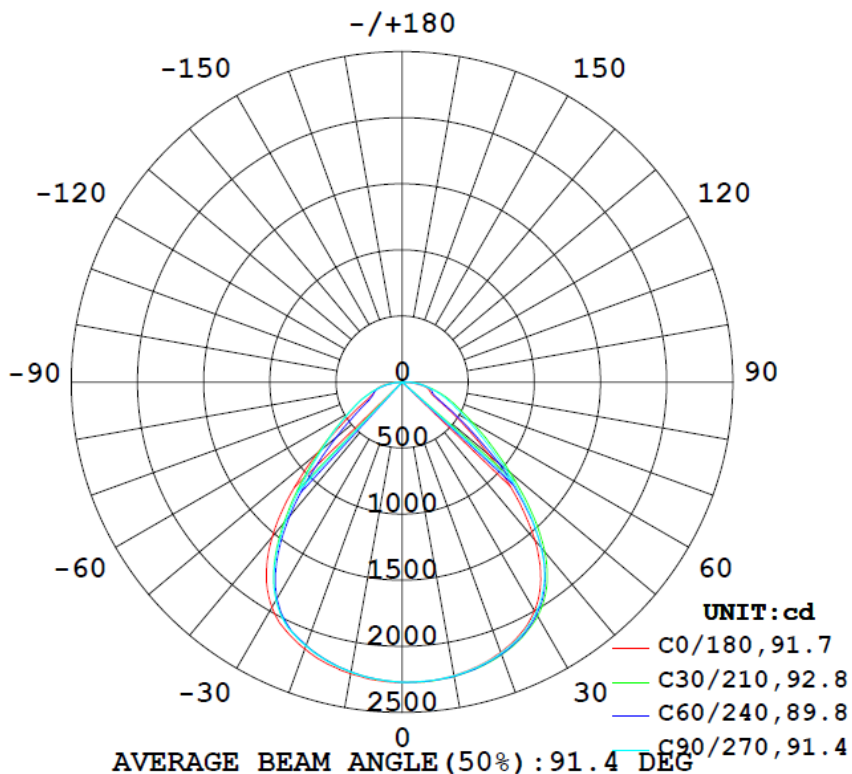
Voltage (V)	Frequency (Hz)	Current (A)	Wattage (W)	Power Factor
120.0	60	0.3341	39.97	0.9969

Goniophotometer Data:

Parameter	Results	
Total Luminous (lm)	5035.6	
Luminous Efficacy (lm/w)	125.98	
Zonal Lumens Distribution (0-60°)	86.8%	
Beam Angle (°)	91.4	
Spacing Criterion	0-180°	90-270°
	1.30	1.32
UGR	Viewed Crosswise	Viewed Endwise
	19.3	20.0

Luminous Intensity Distribution Diagram:

LUMINOUS INTENSITY DISTRIBUTION DIAGRAM

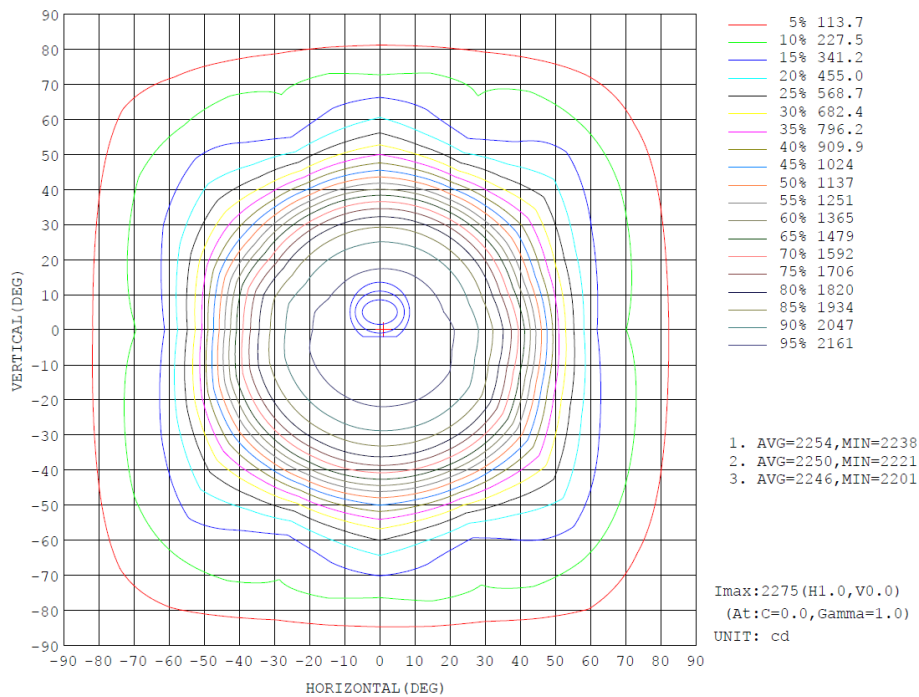


Zonal Flux Diagram:

ZONAL FLUX DIAGRAM:

γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	Φ zone	Φ total	%lum,lamp
10	2255	2259	2257	2251	2241	2225	2228	2237	0~ 10	215.5	215.5	4.28,4.28
20	2176	2194	2182	2173	2150	2119	2126	2141	10~ 20	624.1	839.6	16.7,16.7
30	1999	2039	2020	2008	1970	1894	1906	1929	20~ 30	959.2	1799	35.7,35.7
40	1559	1657	1637	1613	1529	1346	1364	1383	30~ 40	1105	2904	57.7,57.7
50	857.2	990.8	1025	942.9	836.9	710.6	789.3	722.3	40~ 50	908.7	3813	75.7,75.7
60	392.1	504.2	569.4	463.8	375.6	375.8	464.4	378.3	50~ 60	559.1	4372	86.8,86.8
70	228.4	317.5	343.7	290.4	224.2	264.9	269.8	274.0	60~ 70	346.5	4718	93.7,93.7
80	151.0	194.4	173.0	179.7	139.7	117.9	129.6	126.8	70~ 80	233.5	4952	98.3,98.3
90	6.011	16.91	12.20	7.514	0.2357	0.2595	0.2642	0.2478	80~ 90	78.31	5030	99.9,99.9
100	0.2183	0.1702	0.1862	0.1719	0.3742	0.3610	0.3845	0.3471	90~100	0.9703	5031	99.9,99.9
110	0.3427	0.2444	0.2887	0.2562	0.5227	0.4637	0.4920	0.4521	100~110	0.3383	5032	99.9,99.9
120	0.5370	0.3891	0.4439	0.4147	0.7391	0.7077	0.7128	0.6754	110~120	0.4571	5032	99.9,99.9
130	0.7896	0.6560	0.6673	0.6696	1.117	1.149	1.166	1.129	120~130	0.6573	5033	99.9,99.9
140	1.016	0.9181	0.9738	0.9280	1.364	1.389	1.470	1.358	130~140	0.8115	5033	100,100
150	1.236	1.105	1.114	1.113	1.603	1.629	1.561	1.594	140~150	0.7937	5034	100,100
160	1.510	1.284	1.221	1.380	1.862	1.794	1.748	1.731	150~160	0.6762	5035	100,100
170	1.678	1.552	1.529	1.639	1.996	2.060	1.910	1.820	160~170	0.4709	5035	100,100
180	1.970	2.055	1.943	1.974	1.985	2.011	1.952	1.950	170~180	0.1774	5036	100,100
DEG	LUMINOUS INTENSITY:cd									UNIT:lm		

Isocandela Diagram:



Uncorrected UGR Table:

UGR Table - Uncorrected

Reflectances										
Ceiling Cavity	70	70	50	50	30	70	70	50	50	30
Walls	50	30	50	30	30	50	30	50	30	30
Floor Cavity	20	20	20	20	20	20	20	20	20	20
Room Size	UGR Viewed Crosswise					UGR Viewed Endwise				
X=2H Y=2H	9.5	11.0	9.8	11.3	11.6	9.5	11.0	9.9	11.3	11.6
3H	10.8	12.2	11.2	12.5	12.8	11.3	12.6	11.7	12.9	13.3
4H	11.5	12.8	11.9	13.1	13.5	12.2	13.4	12.6	13.8	14.1
6H	12.2	13.3	12.6	13.7	14.1	12.9	14.1	13.3	14.4	14.8
8H	12.4	13.5	12.9	13.9	14.3	13.2	14.3	13.7	14.7	15.1
12H	12.6	13.6	13.0	14.0	14.4	13.5	14.6	14.0	15.0	15.4
4H 2H	9.9	11.1	10.3	11.5	11.9	10.0	11.2	10.4	11.6	12.0
3H	11.8	12.8	12.2	13.2	13.6	11.9	12.9	12.3	13.3	13.7
4H	12.6	13.6	13.1	14.0	14.4	13.0	13.9	13.4	14.3	14.7
6H	13.4	14.2	13.9	14.7	15.1	14.0	14.8	14.4	15.2	15.7
8H	13.7	14.5	14.2	14.9	15.4	14.4	15.1	14.9	15.6	16.1
12H	13.9	14.6	14.4	15.1	15.5	14.8	15.5	15.3	15.9	16.4
8H 4H	13.0	13.8	13.5	14.2	14.7	13.4	14.2	13.9	14.6	15.1
6H	14.0	14.6	14.5	15.1	15.6	14.5	15.2	15.0	15.7	16.1
8H	14.3	14.9	14.9	15.4	15.9	15.1	15.6	15.6	16.2	16.6
12H	14.6	15.1	15.1	15.6	16.2	15.6	16.1	16.1	16.6	17.2
12H 4H	13.1	13.7	13.5	14.2	14.7	13.5	14.1	13.9	14.6	15.1
6H	14.1	14.6	14.6	15.1	15.7	14.7	15.2	15.2	15.7	16.2
8H	14.5	15.0	15.0	15.5	16.1	15.3	15.8	15.8	16.3	16.8

Maximum UGR = 17.2

Corrected UGR Table:

UGR Table - Corrected

Reflectances										
Ceiling Cavity	70	70	50	50	30	70	70	50	50	30
Walls	50	30	50	30	30	50	30	50	30	30
Floor Cavity	20	20	20	20	20	20	20	20	20	20
Room Size	UGR Viewed Crosswise					UGR Viewed Endwise				
X=2H Y=2H	15.1	16.6	15.4	16.9	17.2	15.1	16.6	15.5	16.9	17.2
3H	16.4	17.8	16.8	18.1	18.4	16.9	18.2	17.3	18.5	18.9
4H	17.1	18.4	17.5	18.7	19.1	17.8	19.0	18.2	19.4	19.7
6H	17.8	18.9	18.2	19.3	19.7	18.5	19.7	18.9	20.0	20.4
8H	18.0	19.1	18.5	19.5	19.9	18.8	19.9	19.3	20.3	20.7
12H	18.2	19.2	18.6	19.6	20.0	19.1	20.2	19.6	20.6	21.0
4H 2H	15.5	16.7	15.9	17.1	17.5	15.6	16.8	16.0	17.2	17.6
3H	17.4	18.4	17.8	18.8	19.2	17.5	18.5	17.9	18.9	19.3
4H	18.2	19.2	18.7	19.6	20.0	18.6	19.5	19.0	19.9	20.3
6H	19.0	19.8	19.5	20.3	20.7	19.6	20.4	20.0	20.8	21.3
8H	19.3	20.1	19.8	20.5	21.0	20.0	20.7	20.5	21.2	21.7
12H	19.5	20.2	20.0	20.7	21.1	20.4	21.1	20.9	21.5	22.0
8H 4H	18.6	19.4	19.1	19.8	20.3	19.0	19.8	19.5	20.2	20.7
6H	19.6	20.2	20.1	20.7	21.2	20.1	20.8	20.6	21.3	21.7
8H	19.9	20.5	20.5	21.0	21.5	20.7	21.2	21.2	21.8	22.2
12H	20.2	20.7	20.7	21.2	21.8	21.2	21.7	21.7	22.2	22.8
12H 4H	18.7	19.3	19.1	19.8	20.3	19.1	19.7	19.5	20.2	20.7
6H	19.7	20.2	20.2	20.7	21.3	20.3	20.8	20.8	21.3	21.8
8H	20.1	20.6	20.6	21.1	21.7	20.9	21.4	21.4	21.9	22.4

Maximum UGR = 22.8

Luminous Distribution Intensity Data:

Table--1

UNIT: cd

C (DEG)	0	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270
0	2273	2272	2272	2268	2271	2269	2270	2270	2270	2270	2271	2269	2273	2272	2272	2268	2271	2269	2270
5	2271	2270	2271	2271	2272	2270	2268	2269	2268	2268	2266	2264	2264	2265	2256	2255	2255	2254	2256
10	2255	2254	2261	2259	2259	2258	2257	2256	2253	2251	2249	2247	2241	2240	2229	2225	2227	2228	2228
15	2224	2224	2237	2234	2232	2229	2229	2226	2224	2221	2218	2217	2205	2203	2183	2181	2184	2186	2187
20	2176	2176	2195	2194	2191	2185	2182	2179	2176	2173	2172	2170	2150	2149	2122	2119	2122	2123	2126
25	2106	2107	2136	2131	2128	2121	2118	2113	2110	2107	2104	2105	2077	2079	2041	2037	2038	2041	2048
30	1999	2001	2047	2039	2031	2025	2020	2014	2008	2008	2006	2006	1970	1970	1904	1894	1892	1899	1906
35	1825	1830	1902	1893	1880	1872	1869	1862	1852	1853	1856	1856	1791	1791	1687	1664	1655	1667	1678
40	1559	1568	1679	1657	1638	1636	1637	1623	1606	1613	1627	1629	1529	1530	1394	1346	1323	1347	1364
45	1211	1240	1377	1337	1304	1315	1326	1301	1269	1291	1328	1330	1188	1208	1081	1004	961	1004	1046
50	857	910	1064	991	946	972	1025	957	904	943	1006	995	837	889	816	711	652	721	789
55	579	653	809	702	626	682	753	672	597	661	753	701	559	636	613	503	441	523	600
60	392	475	616	504	418	484	569	482	398	464	561	491	376	460	467	376	311	399	464
65	278	366	473	383	296	371	439	370	281	348	430	363	268	352	364	310	251	328	363
70	228	300	369	317	245	317	344	310	236	290	339	296	224	285	275	265	226	274	270
75	206	240	271	267	227	268	251	256	220	247	254	247	198	223	192	199	185	206	191
80	151	159	181	194	176	191	173	180	165	180	180	178	140	151	124	118	115	126	130
85	68.8	73.9	110	106	98.1	109	108	102	91.9	96.6	106	100	61.8	69.2	35.7	31.8	32.7	36.7	39.4
90	6.01	6.70	19.8	16.9	15.0	14.7	12.2	10.1	7.79	7.51	8.16	8.08	0.24	0.27	0.28	0.26	0.25	0.25	0.26
95	0.16	0.15	0.15	0.15	0.14	0.14	0.15	0.15	0.14	0.15	0.15	0.15	0.28	0.29	0.32	0.31	0.29	0.30	0.32
100	0.22	0.19	0.17	0.17	0.17	0.17	0.19	0.17	0.17	0.17	0.18	0.19	0.37	0.36	0.38	0.36	0.35	0.36	0.38
105	0.28	0.23	0.20	0.20	0.20	0.20	0.23	0.22	0.21	0.21	0.21	0.24	0.46	0.43	0.43	0.42	0.41	0.42	0.44
110	0.34	0.31	0.24	0.24	0.25	0.26	0.29	0.28	0.26	0.26	0.26	0.30	0.52	0.50	0.48	0.46	0.46	0.48	0.49
115	0.43	0.38	0.31	0.30	0.30	0.34	0.35	0.35	0.33	0.32	0.34	0.39	0.61	0.58	0.57	0.56	0.55	0.57	0.57
120	0.54	0.46	0.40	0.39	0.40	0.43	0.44	0.44	0.43	0.41	0.44	0.47	0.74	0.69	0.74	0.71	0.72	0.72	0.71
125	0.67	0.60	0.54	0.51	0.55	0.52	0.55	0.56	0.55	0.54	0.58	0.60	0.92	0.88	0.91	0.89	0.94	0.94	0.94
130	0.79	0.73	0.66	0.66	0.68	0.65	0.67	0.67	0.68	0.67	0.69	0.71	1.12	1.09	1.08	1.15	1.16	1.17	1.17
135	0.91	0.86	0.78	0.80	0.81	0.81	0.81	0.80	0.81	0.80	0.78	0.82	1.26	1.24	1.28	1.32	1.38	1.36	1.32
140	1.02	0.96	0.91	0.92	0.96	0.98	0.97	0.97	0.95	0.93	0.93	0.96	1.36	1.35	1.40	1.53	1.47	1.49	1.47
145	1.13	1.08	1.02	0.97	1.05	1.05	1.07	1.06	1.05	0.99	1.02	1.05	1.48	1.44	1.50	1.53	1.50	1.51	1.52
150	1.24	1.19	1.13	1.11	1.07	1.11	1.11	1.13	1.09	1.11	1.11	1.13	1.60	1.51	1.60	1.63	1.62	1.59	1.56
155	1.37	1.35	1.28	1.21	1.17	1.19	1.16	1.20	1.24	1.26	1.25	1.22	1.69	1.68	1.69	1.74	1.73	1.72	1.64
160	1.51	1.51	1.40	1.28	1.26	1.28	1.22	1.34	1.35	1.38	1.40	1.44	1.86	1.85	1.83	1.79	1.85	1.83	1.75
165	1.56	1.58	1.47	1.44	1.35	1.39	1.34	1.47	1.52	1.56	1.51	1.56	1.91	1.91	1.97	1.96	1.91	1.92	1.84
170	1.68	1.68	1.60	1.55	1.53	1.54	1.53	1.60	1.63	1.64	1.69	1.69	2.00	2.00	2.06	2.06	2.05	2.02	1.91
175	1.89	1.91	1.74	1.75	1.68	1.71	1.68	1.70	1.76	1.79	1.80	1.80	2.08	2.08	2.08	2.08	2.08	2.10	2.05
180	1.97	2.04	2.03	2.06	2.00	1.99	1.94	1.93	2.00	1.97	1.98	1.98	1.99	1.99	1.98	2.01	2.02	1.98	1.90

Table--2

UNIT: cd

C (DEG)	285	300	315	330	345														
0	2270	2270	2270	2271	2269														
5	2258	2260	2260	2259	2259														
10	2232	2235	2237	2237	2238														
15	2190	2194	2196	2200	2202														
20	2131	2135	2141	2144	2146														
25	2051	2058	2060	2067	2072														
30	1911	1916	1929	1942	1948														
35	1680	1686	1703	1728	1740														
40	1357	1351	1383	1431	1444														
45	1005	973	1028	1112	1106														
50	710	647	722	841	803														
55	506	432	508	638	576														
60	388	305	378	492	421														
65	325	246	314	388	330														
70	275	225	274	296	273														
75	207	191	212	201	210														
80	129	122	127	129	130														
85	39.1	37.4	37.6	43.4	42.1														
90	0.25	0.24	0.25	0.26	0.25														
95	0.29	0.28	0.29	0.30	0.29														
100	0.35	0.33	0.35	0.36	0.36														
105	0.40	0.39	0.40	0.40	0.42														
110	0.48	0.44	0.45	0.45	0.49														
115	0.57	0.53	0.54	0.54	0.58														
120	0.70	0.71	0.68	0.69	0.71														
125	0.91	0.92	0.89	0.86	0.89														
130	1.14	1.12	1.13	1.06	1.09														
135	1.31	1.30	1.30	1.25	1.26														
140	1.40	1.43	1.36	1.37	1.36														
145	1.47	1.44	1.50	1.49	1.43														
150	1.54	1.54	1.59	1.63	1.56														
155	1.64	1.64	1.65	1.76	1.74														
160	1.71	1.70	1.73	1.76	1.84														
165	1.82	1.79	1.72	1.79	1.88														
170	1.86	1.88	1.82	1.91	1.92														
175	1.98	1.99	1.95	1.98	1.99														
180	1.91	1.90	1.95	1.96	1.96														

THD and PF Measurement Test Results:

Electrical Measurement:

Rated CCT	Voltage (V)	Frequency (Hz)	Current (A)	Wattage (W)	Power Factor	iTHD(%)
3500K	277.0	60	0.1439	39.21	0.9835	11.13
4000K	277.0	60	0.1429	38.96	0.9844	10.87
5000K	277.0	60	0.1457	39.55	0.9797	11.03

Annex:

ANSI CCT Quadrangle (omit any outside product range)/Worst-Case Value	Actual CCT (K)	Power Consumption (W)	Lumen Output (lm)	Efficacy (lm/W)	Input Control Signal Applied
3500K	3504	39.97	5035.6	125.98	Set Switch 0% to 3500K
4000K	4139	38.87	5316.2	136.77	Set Switch 50% to 4000K
5000K	5166	39.96	5248.3	131.34	Set Switch 100% to 5000K
Lowest Efficacy	125.63 lm/W (@ 5000K)				
Maximum Power	39.97 W				

Photo of Sample:



Equipment List:

Equipment ID	Equipment Name	Last Cal.	Due Cal.
NTC-F01-001	Goniophotometer System	2020-11-12	2021-11-11
NTC-F01-006	2.0 meter Integrating Sphere	2020-11-12	2021-11-11
NTC-F01-012	Standard Lamp	2020-11-12	2021-11-11
NTC-F01-013	Standard Lamp	2020-11-12	2021-11-11
NTC-F01-031	Digital Power Meter	2020-08-22	2021-08-21
NTC-F01-019	Temperature & Humidity Meter	2020-11-13	2021-11-12

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