

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):

P4-30W DXYYZZ

Representative (Tested) Model:

P4-30W DXYYZZ (0%, 3500K)

P4-30W DXYYZZ (50%, 4000K)

P4-30W DXYYZZ (100%, 5000K)

Model Difference: N/A

Prepare by:



Engineer: Alan Wang

Date: 2021-04-30

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:	P4-30W DXYYZZ
Product Type:	2x2 Luminaires for Ambient Lighting of Interior Commercial Spaces
Rating Input:	120-277Vac, 50/60Hz, 20/25/30W
Declared CCT:	3500K/4000K/5000K
Declared Light Output:	3900 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-380075-065050-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:	2021-04-26
Quantity of Receipt Samples:	1 pc
Sample Number:	210426005-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.:	NTCLR21040251
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	2021-04-28
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:
<p>1. Photometric and Electrical Measurements – Light Distribution Method:</p> <p>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.</p>
<p>2. Photometric and Electrical Measurements – Integrating Sphere Method:</p> <p>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.</p>
<p>3. THD and PF Measurements:</p> <p>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.</p>

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	0.2216	28.50	0.9967
4000K	120.0	60	0.2460	29.32	0.9934
5000K	120.0	60	0.2481	29.58	0.9937

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	3528	84.2	13	85	97	-11%	(0.4029, 0.3876)	(0.2354, 0.5096)	-0.0009
4000K	4080	85.2	20	84	96	-11%	(0.3646, 0.3642)	(0.2196, 0.4936)	-0.0010
5000K	5227	84.0	15	84	96	-12%	(0.3393, 0.3500)	(0.2081, 0.4830)	0.0016

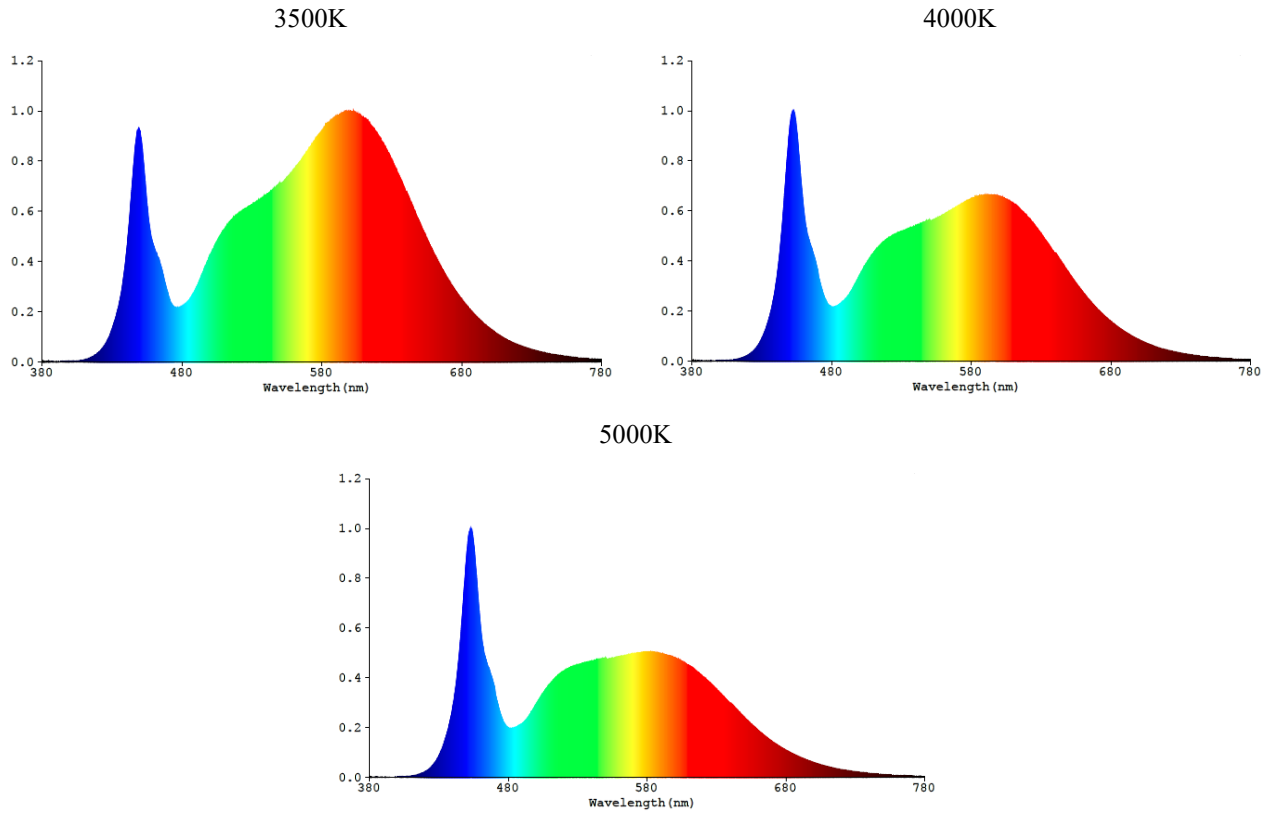
Specify Color Rendering

Rated CCT	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
3500K	83	90	96	84	83	87	85	65	13	77	84	69	85	98	76
4000K	84	91	94	84	84	86	88	70	20	77	83	60	86	97	80
5000K	83	89	92	84	83	84	88	70	15	73	83	59	85	96	78

Output Data:

Rated CCT (K)	Light output (lm)	Efficacy (lm/W)
3500K	3705.6	130.02
4000K	4156.3	141.76
5000K	4043.3	136.69

Spectrum Diagram:



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

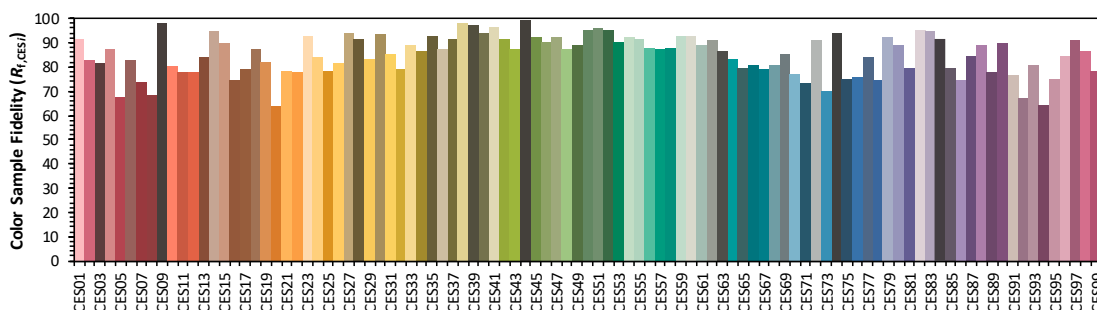
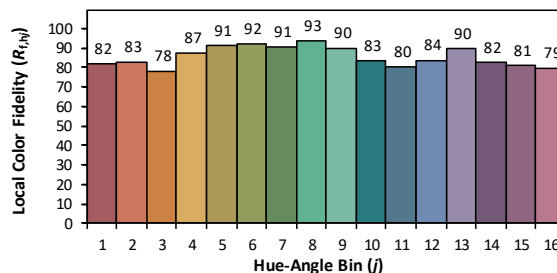
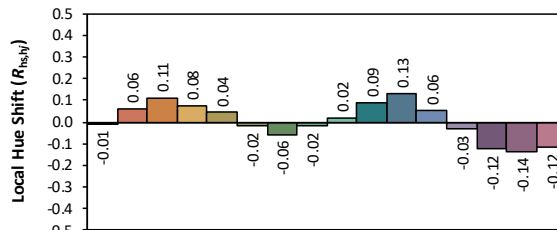
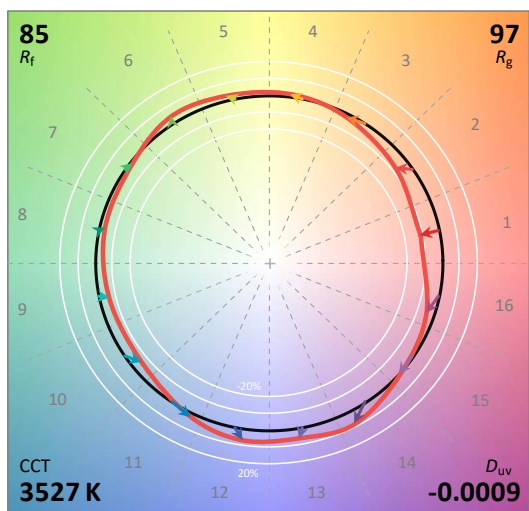
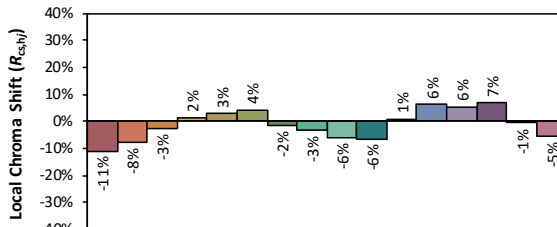
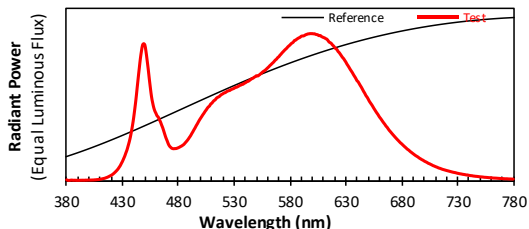
ANSI/IES TM-30-18 Color Rendition Report

Source: 1 CIE F1

Date: 2021/4/30

Manufacturer: VENAS Co., LIMITED

Model: P4-30W DXYYZZ



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

x 0.4029
 y 0.3875
 u' 0.2355
 v' 0.5095

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 3500K:

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	0.0057	447	0.8810	514	0.5585	581	0.9297	648	0.5781	715	0.0817
381	0.0024	448	0.9213	515	0.5646	582	0.9351	649	0.5677	716	0.0787
382	0.0017	449	0.9298	516	0.5685	583	0.9407	650	0.5550	717	0.0761
383	0.0024	450	0.9212	517	0.5732	584	0.9515	651	0.5403	718	0.0740
384	0.0037	451	0.8788	518	0.5813	585	0.9537	652	0.5287	719	0.0718
385	0.0035	452	0.8204	519	0.5862	586	0.9601	653	0.5178	720	0.0695
386	0.0025	453	0.7587	520	0.5903	587	0.9651	654	0.5061	721	0.0675
387	0.0030	454	0.6910	521	0.5958	588	0.9696	655	0.4927	722	0.0655
388	0.0027	455	0.6274	522	0.5976	589	0.9732	656	0.4809	723	0.0635
389	0.0020	456	0.5695	523	0.6033	590	0.9796	657	0.4686	724	0.0613
390	0.0022	457	0.5289	524	0.6072	591	0.9823	658	0.4574	725	0.0593
391	0.0019	458	0.4956	525	0.6108	592	0.9826	659	0.4467	726	0.0574
392	0.0027	459	0.4723	526	0.6121	593	0.9857	660	0.4338	727	0.0558
393	0.0027	460	0.4566	527	0.6175	594	0.9904	661	0.4240	728	0.0545
394	0.0031	461	0.4394	528	0.6209	595	0.9930	662	0.4135	729	0.0524
395	0.0029	462	0.4319	529	0.6240	596	0.9960	663	0.4022	730	0.0502
396	0.0028	463	0.4141	530	0.6271	597	0.9969	664	0.3917	731	0.0489
397	0.0036	464	0.3991	531	0.6327	598	0.9983	665	0.3820	732	0.0470
398	0.0032	465	0.3783	532	0.6339	599	0.9981	666	0.3705	733	0.0459
399	0.0040	466	0.3591	533	0.6376	600	0.9982	667	0.3623	734	0.0444
400	0.0039	467	0.3358	534	0.6415	601	0.9969	668	0.3512	735	0.0428
401	0.0039	468	0.3112	535	0.6469	602	0.9971	669	0.3408	736	0.0418
402	0.0041	469	0.2887	536	0.6490	603	0.9934	670	0.3322	737	0.0404
403	0.0044	470	0.2704	537	0.6535	604	0.9919	671	0.3231	738	0.0387
404	0.0046	471	0.2501	538	0.6547	605	0.9896	672	0.3141	739	0.0386
405	0.0054	472	0.2360	539	0.6612	606	0.9838	673	0.3056	740	0.0364
406	0.0058	473	0.2276	540	0.6641	607	0.9863	674	0.2968	741	0.0353
407	0.0068	474	0.2208	541	0.6698	608	0.9797	675	0.2886	742	0.0340
408	0.0074	475	0.2176	542	0.6733	609	0.9757	676	0.2802	743	0.0335
409	0.0080	476	0.2169	543	0.6763	610	0.9719	677	0.2725	744	0.0318
410	0.0093	477	0.2178	544	0.6823	611	0.9693	678	0.2645	745	0.0309
411	0.0111	478	0.2181	545	0.6880	612	0.9641	679	0.2566	746	0.0298
412	0.0127	479	0.2206	546	0.6928	613	0.9607	680	0.2504	747	0.0292
413	0.0145	480	0.2236	547	0.6962	614	0.9519	681	0.2428	748	0.0284
414	0.0162	481	0.2272	548	0.7023	615	0.9417	682	0.2356	749	0.0274
415	0.0192	482	0.2316	549	0.7065	616	0.9370	683	0.2286	750	0.0263
416	0.0218	483	0.2355	550	0.7128	617	0.9318	684	0.2219	751	0.0257
417	0.0251	484	0.2409	551	0.7105	618	0.9219	685	0.2145	752	0.0250
418	0.0289	485	0.2465	552	0.7148	619	0.9148	686	0.2094	753	0.0242
419	0.0328	486	0.2553	553	0.7211	620	0.9050	687	0.2030	754	0.0230
420	0.0370	487	0.2639	554	0.7275	621	0.8959	688	0.1961	755	0.0226
421	0.0418	488	0.2728	555	0.7342	622	0.8911	689	0.1907	756	0.0221
422	0.0480	489	0.2830	556	0.7407	623	0.8779	690	0.1846	757	0.0213
423	0.0548	490	0.2944	557	0.7455	624	0.8702	691	0.1789	758	0.0205
424	0.0624	491	0.3053	558	0.7513	625	0.8596	692	0.1731	759	0.0199
425	0.0704	492	0.3191	559	0.7584	626	0.8483	693	0.1680	760	0.0198
426	0.0794	493	0.3318	560	0.7657	627	0.8372	694	0.1636	761	0.0190
427	0.0908	494	0.3458	561	0.7728	628	0.8289	695	0.1583	762	0.0178
428	0.1022	495	0.3583	562	0.7812	629	0.8172	696	0.1525	763	0.0175
429	0.1173	496	0.3730	563	0.7878	630	0.8056	697	0.1481	764	0.0172
430	0.1315	497	0.3855	564	0.7958	631	0.7917	698	0.1431	765	0.0168
431	0.1492	498	0.3997	565	0.8023	632	0.7803	699	0.1394	766	0.0161
432	0.1666	499	0.4127	566	0.8111	633	0.7680	700	0.1345	767	0.0155
433	0.1882	500	0.4245	567	0.8195	634	0.7550	701	0.1300	768	0.0150
434	0.2084	501	0.4361	568	0.8255	635	0.7436	702	0.1266	769	0.0145
435	0.2352	502	0.4480	569	0.8354	636	0.7318	703	0.1223	770	0.0141
436	0.2627	503	0.4585	570	0.8414	637	0.7181	704	0.1175	771	0.0136
437	0.2948	504	0.4708	571	0.8513	638	0.7062	705	0.1147	772	0.0131
438	0.3345	505	0.4806	572	0.8592	639	0.6937	706	0.1107	773	0.0126
439	0.3775	506	0.4924	573	0.8685	640	0.6790	707	0.1071	774	0.0127
440	0.4279	507	0.5011	574	0.8762	641	0.6717	708	0.1026	775	0.0123
441	0.4870	508	0.5076	575	0.8846	642	0.6587	709	0.0999	776	0.0115
442	0.5490	509	0.5204	576	0.8919	643	0.6458	710	0.0964	777	0.0115
443	0.6212	510	0.5258	577	0.8987	644	0.6337	711	0.0933	778	0.0113
444	0.6928	511	0.5356	578	0.9077	645	0.6196	712	0.0904	779	0.0108
445	0.7620	512	0.5438	579	0.9148	646	0.6053	713	0.0866	780	0.0108
446	0.8280	513	0.5486	580	0.9213	647	0.5931	714	0.0843	N/A	N/A

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

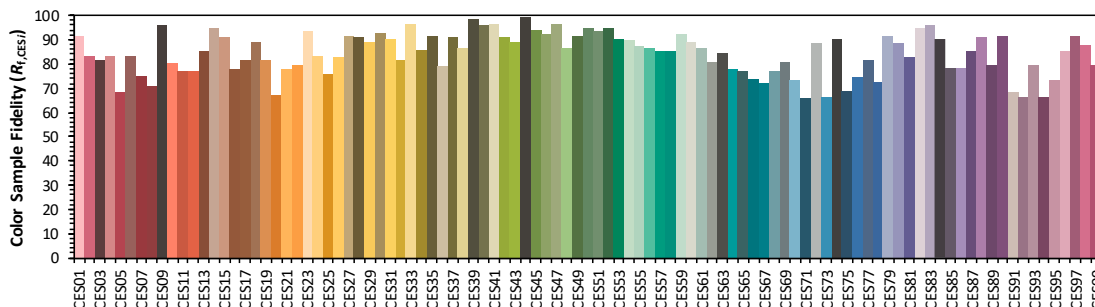
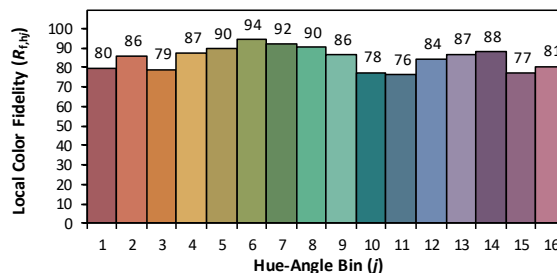
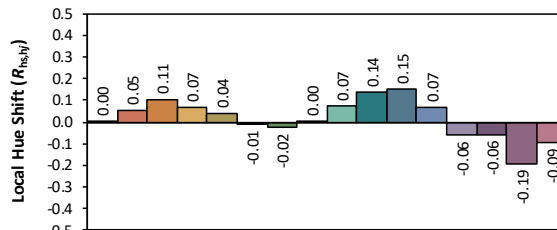
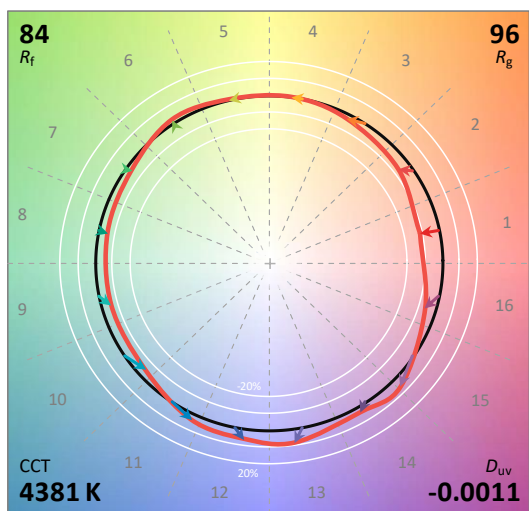
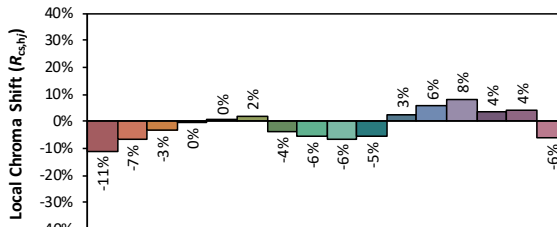
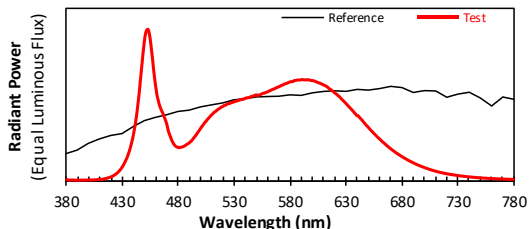
ANSI/IES TM-30-18 Color Rendition Report

Source: 1 CIE F1

Manufacturer: VENAS Co., LIMITED

Date: 2021/4/30

Model: P4-30W DXYYZZ



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

x 0.3646
 y 0.3641
 u' 0.2196
 v' 0.4935

CIE 13.3-1995
(CRI)
 R_a 85
 R_9 20

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	0.0050	447	0.7337	514	0.4593	581	0.6514	648	0.3668	715	0.0525
381	0.0048	448	0.8096	515	0.4649	582	0.6521	649	0.3596	716	0.0506
382	0.0008	449	0.8806	516	0.4714	583	0.6539	650	0.3513	717	0.0493
383	0.0020	450	0.9418	517	0.4751	584	0.6589	651	0.3428	718	0.0477
384	0.0032	451	0.9787	518	0.4811	585	0.6588	652	0.3352	719	0.0465
385	0.0033	452	0.9939	519	0.4854	586	0.6611	653	0.3269	720	0.0449
386	0.0020	453	0.9955	520	0.4887	587	0.6628	654	0.3194	721	0.0432
387	0.0024	454	0.9678	521	0.4946	588	0.6620	655	0.3115	722	0.0421
388	0.0017	455	0.9210	522	0.4960	589	0.6624	656	0.3041	723	0.0409
389	0.0016	456	0.8577	523	0.5002	590	0.6647	657	0.2967	724	0.0396
390	0.0019	457	0.7927	524	0.5042	591	0.6646	658	0.2894	725	0.0384
391	0.0013	458	0.7216	525	0.5073	592	0.6641	659	0.2820	726	0.0374
392	0.0021	459	0.6604	526	0.5072	593	0.6630	660	0.2752	727	0.0363
393	0.0025	460	0.6060	527	0.5125	594	0.6640	661	0.2683	728	0.0350
394	0.0020	461	0.5577	528	0.5139	595	0.6627	662	0.2611	729	0.0338
395	0.0022	462	0.5286	529	0.5164	596	0.6637	663	0.2540	730	0.0324
396	0.0023	463	0.4984	530	0.5192	597	0.6636	664	0.2477	731	0.0318
397	0.0028	464	0.4786	531	0.5215	598	0.6612	665	0.2416	732	0.0304
398	0.0025	465	0.4601	532	0.5225	599	0.6594	666	0.2349	733	0.0296
399	0.0030	466	0.4451	533	0.5259	600	0.6587	667	0.2281	734	0.0288
400	0.0031	467	0.4255	534	0.5283	601	0.6575	668	0.2223	735	0.0279
401	0.0032	468	0.4074	535	0.5305	602	0.6554	669	0.2162	736	0.0272
402	0.0033	469	0.3861	536	0.5331	603	0.6514	670	0.2102	737	0.0261
403	0.0036	470	0.3621	537	0.5353	604	0.6495	671	0.2046	738	0.0254
404	0.0035	471	0.3275	538	0.5347	605	0.6463	672	0.1987	739	0.0245
405	0.0039	472	0.3058	539	0.5388	606	0.6428	673	0.1939	740	0.0240
406	0.0044	473	0.2873	540	0.5418	607	0.6411	674	0.1882	741	0.0232
407	0.0051	474	0.2661	541	0.5443	608	0.6372	675	0.1824	742	0.0223
408	0.0055	475	0.2521	542	0.5457	609	0.6336	676	0.1776	743	0.0218
409	0.0058	476	0.2392	543	0.5462	610	0.6300	677	0.1729	744	0.0209
410	0.0068	477	0.2297	544	0.5495	611	0.6266	678	0.1678	745	0.0204
411	0.0074	478	0.2235	545	0.5526	612	0.6237	679	0.1636	746	0.0198
412	0.0082	479	0.2203	546	0.5548	613	0.6189	680	0.1586	747	0.0190
413	0.0097	480	0.2164	547	0.5559	614	0.6135	681	0.1537	748	0.0183
414	0.0113	481	0.2172	548	0.5603	615	0.6065	682	0.1500	749	0.0181
415	0.0127	482	0.2181	549	0.5623	616	0.6013	683	0.1453	750	0.0174
416	0.0146	483	0.2200	550	0.5644	617	0.5968	684	0.1410	751	0.0167
417	0.0171	484	0.2223	551	0.5609	618	0.5900	685	0.1362	752	0.0164
418	0.0191	485	0.2252	552	0.5625	619	0.5858	686	0.1326	753	0.0158
419	0.0216	486	0.2299	553	0.5644	620	0.5771	687	0.1291	754	0.0154
420	0.0246	487	0.2345	554	0.5680	621	0.5722	688	0.1248	755	0.0150
421	0.0281	488	0.2397	555	0.5716	622	0.5673	689	0.1217	756	0.0144
422	0.0320	489	0.2436	556	0.5749	623	0.5593	690	0.1177	757	0.0140
423	0.0368	490	0.2497	557	0.5762	624	0.5544	691	0.1142	758	0.0134
424	0.0418	491	0.2562	558	0.5784	625	0.5465	692	0.1104	759	0.0134
425	0.0476	492	0.2633	559	0.5825	626	0.5384	693	0.1073	760	0.0129
426	0.0540	493	0.2721	560	0.5840	627	0.5311	694	0.1040	761	0.0124
427	0.0621	494	0.2820	561	0.5884	628	0.5240	695	0.1005	762	0.0120
428	0.0704	495	0.2909	562	0.5919	629	0.5166	696	0.0977	763	0.0116
429	0.0805	496	0.3010	563	0.5950	630	0.5094	697	0.0944	764	0.0113
430	0.0920	497	0.3119	564	0.5990	631	0.5007	698	0.0918	765	0.0108
431	0.1045	498	0.3224	565	0.6020	632	0.4926	699	0.0889	766	0.0108
432	0.1181	499	0.3327	566	0.6041	633	0.4845	700	0.0863	767	0.0104
433	0.1339	500	0.3443	567	0.6089	634	0.4770	701	0.0833	768	0.0099
434	0.1496	501	0.3551	568	0.6114	635	0.4696	702	0.0809	769	0.0096
435	0.1700	502	0.3636	569	0.6155	636	0.4613	703	0.0784	770	0.0093
436	0.1912	503	0.3751	570	0.6175	637	0.4528	704	0.0756	771	0.0091
437	0.2156	504	0.3841	571	0.6218	638	0.4436	705	0.0730	772	0.0088
438	0.2440	505	0.3919	572	0.6247	639	0.4360	706	0.0709	773	0.0085
439	0.2736	506	0.4020	573	0.6288	640	0.4269	707	0.0686	774	0.0083
440	0.3114	507	0.4100	574	0.6308	641	0.4270	708	0.0661	775	0.0081
441	0.3526	508	0.4178	575	0.6357	642	0.4182	709	0.0645	776	0.0079
442	0.3984	509	0.4264	576	0.6377	643	0.4096	710	0.0618	777	0.0075
443	0.4517	510	0.4339	577	0.6399	644	0.4022	711	0.0598	778	0.0074
444	0.5152	511	0.4410	578	0.6435	645	0.3932	712	0.0577	779	0.0070
445	0.5807	512	0.4489	579	0.6467	646	0.3844	713	0.0559	780	0.0070
446	0.6586	513	0.4534	580	0.6498	647	0.3760	714	0.0539	N/A	N/A

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

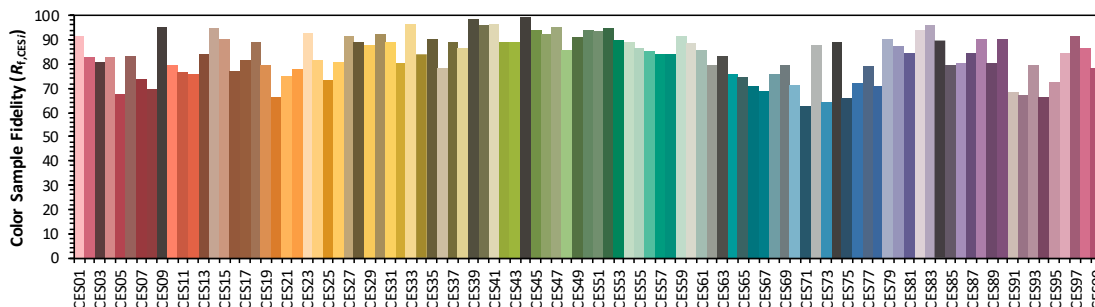
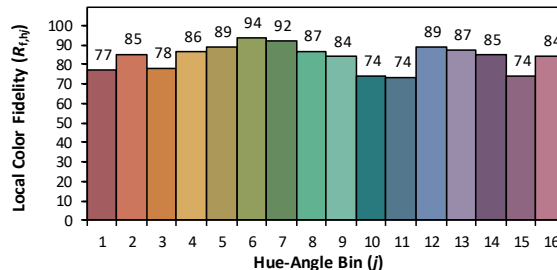
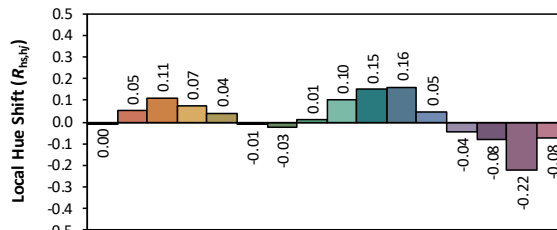
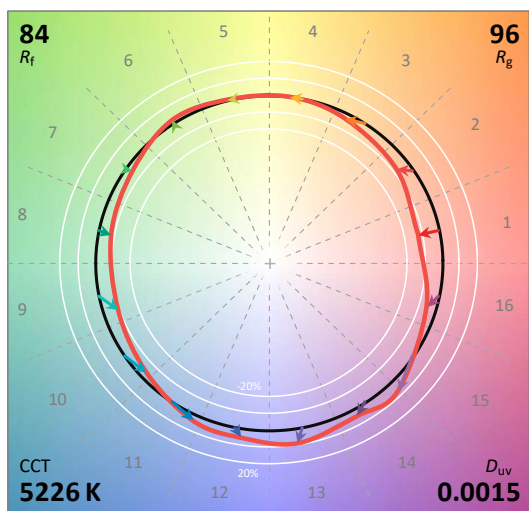
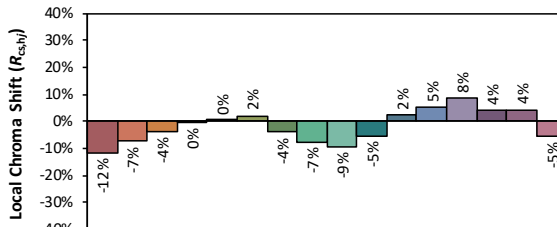
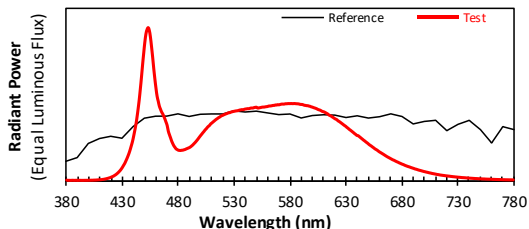
ANSI/IES TM-30-18 Color Rendition Report

Source: 1 CIE F1

Manufacturer: VENAS Co., LIMITED

Date: 2021/4/30

Model: P4-30W DXYYZZ



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

x 0.3392
 y 0.3498
 u' 0.2081
 v' 0.4829

CIE 13.3-1995
(CRI)
 R_a 84
 R_9 15

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	0.0037	447	0.6772	514	0.4011	581	0.5039	648	0.2530	715	0.0367
381	0.0023	448	0.7586	515	0.4059	582	0.5033	649	0.2477	716	0.0357
382	0.0024	449	0.8340	516	0.4115	583	0.5034	650	0.2419	717	0.0347
383	0.0021	450	0.9054	517	0.4153	584	0.5039	651	0.2353	718	0.0338
384	0.0021	451	0.9589	518	0.4208	585	0.5031	652	0.2304	719	0.0327
385	0.0027	452	0.9874	519	0.4249	586	0.5024	653	0.2254	720	0.0317
386	0.0024	453	0.9997	520	0.4276	587	0.5021	654	0.2197	721	0.0309
387	0.0022	454	0.9819	521	0.4315	588	0.5010	655	0.2146	722	0.0299
388	0.0025	455	0.9385	522	0.4344	589	0.4989	656	0.2086	723	0.0292
389	0.0024	456	0.8751	523	0.4375	590	0.4979	657	0.2042	724	0.0280
390	0.0019	457	0.8063	524	0.4401	591	0.4977	658	0.1997	725	0.0273
391	0.0025	458	0.7313	525	0.4437	592	0.4951	659	0.1943	726	0.0263
392	0.0024	459	0.6634	526	0.4441	593	0.4925	660	0.1887	727	0.0257
393	0.0022	460	0.6026	527	0.4475	594	0.4915	661	0.1845	728	0.0247
394	0.0022	461	0.5509	528	0.4497	595	0.4900	662	0.1799	729	0.0241
395	0.0022	462	0.5191	529	0.4517	596	0.4897	663	0.1754	730	0.0233
396	0.0024	463	0.4870	530	0.4532	597	0.4873	664	0.1709	731	0.0225
397	0.0024	464	0.4676	531	0.4548	598	0.4857	665	0.1660	732	0.0220
398	0.0025	465	0.4490	532	0.4560	599	0.4823	666	0.1614	733	0.0212
399	0.0025	466	0.4363	533	0.4569	600	0.4806	667	0.1568	734	0.0204
400	0.0029	467	0.4201	534	0.4590	601	0.4775	668	0.1528	735	0.0200
401	0.0027	468	0.4025	535	0.4613	602	0.4751	669	0.1489	736	0.0195
402	0.0032	469	0.3818	536	0.4626	603	0.4726	670	0.1448	737	0.0190
403	0.0031	470	0.3607	537	0.4641	604	0.4695	671	0.1408	738	0.0182
404	0.0036	471	0.3242	538	0.4633	605	0.4655	672	0.1367	739	0.0176
405	0.0039	472	0.3012	539	0.4660	606	0.4629	673	0.1339	740	0.0171
406	0.0041	473	0.2807	540	0.4680	607	0.4605	674	0.1300	741	0.0165
407	0.0047	474	0.2594	541	0.4689	608	0.4564	675	0.1263	742	0.0161
408	0.0053	475	0.2426	542	0.4704	609	0.4522	676	0.1229	743	0.0156
409	0.0057	476	0.2280	543	0.4701	610	0.4505	677	0.1197	744	0.0151
410	0.0064	477	0.2176	544	0.4721	611	0.4474	678	0.1159	745	0.0146
411	0.0070	478	0.2078	545	0.4743	612	0.4434	679	0.1129	746	0.0140
412	0.0080	479	0.2033	546	0.4746	613	0.4392	680	0.1094	747	0.0138
413	0.0090	480	0.1991	547	0.4749	614	0.4347	681	0.1067	748	0.0134
414	0.0104	481	0.1979	548	0.4778	615	0.4284	682	0.1037	749	0.0129
415	0.0120	482	0.1974	549	0.4788	616	0.4248	683	0.1002	750	0.0124
416	0.0138	483	0.1988	550	0.4798	617	0.4212	684	0.0974	751	0.0120
417	0.0157	484	0.1993	551	0.4746	618	0.4159	685	0.0946	752	0.0118
418	0.0181	485	0.2017	552	0.4751	619	0.4112	686	0.0920	753	0.0113
419	0.0202	486	0.2036	553	0.4768	620	0.4059	687	0.0899	754	0.0113
420	0.0236	487	0.2073	554	0.4782	621	0.4019	688	0.0870	755	0.0107
421	0.0268	488	0.2103	555	0.4801	622	0.3983	689	0.0845	756	0.0104
422	0.0301	489	0.2135	556	0.4807	623	0.3911	690	0.0820	757	0.0101
423	0.0349	490	0.2167	557	0.4808	624	0.3870	691	0.0796	758	0.0099
424	0.0396	491	0.2215	558	0.4825	625	0.3818	692	0.0767	759	0.0097
425	0.0455	492	0.2274	559	0.4835	626	0.3762	693	0.0750	760	0.0093
426	0.0521	493	0.2338	560	0.4847	627	0.3708	694	0.0727	761	0.0089
427	0.0595	494	0.2417	561	0.4874	628	0.3650	695	0.0701	762	0.0088
428	0.0676	495	0.2490	562	0.4878	629	0.3597	696	0.0681	763	0.0085
429	0.0772	496	0.2575	563	0.4886	630	0.3546	697	0.0662	764	0.0082
430	0.0883	497	0.2664	564	0.4901	631	0.3478	698	0.0640	765	0.0079
431	0.1008	498	0.2761	565	0.4917	632	0.3427	699	0.0620	766	0.0077
432	0.1130	499	0.2858	566	0.4918	633	0.3359	700	0.0599	767	0.0075
433	0.1288	500	0.2952	567	0.4946	634	0.3307	701	0.0584	768	0.0073
434	0.1450	501	0.3042	568	0.4941	635	0.3249	702	0.0564	769	0.0072
435	0.1632	502	0.3135	569	0.4964	636	0.3191	703	0.0549	770	0.0068
436	0.1827	503	0.3219	570	0.4954	637	0.3131	704	0.0530	771	0.0064
437	0.2059	504	0.3316	571	0.4973	638	0.3068	705	0.0512	772	0.0065
438	0.2314	505	0.3389	572	0.4992	639	0.3015	706	0.0498	773	0.0061
439	0.2577	506	0.3482	573	0.5005	640	0.2954	707	0.0478	774	0.0060
440	0.2915	507	0.3554	574	0.5000	641	0.2942	708	0.0463	775	0.0059
441	0.3282	508	0.3615	575	0.5007	642	0.2884	709	0.0450	776	0.0057
442	0.3667	509	0.3710	576	0.5024	643	0.2826	710	0.0436	777	0.0056
443	0.4151	510	0.3766	577	0.5025	644	0.2764	711	0.0420	778	0.0056
444	0.4700	511	0.3831	578	0.5032	645	0.2706	712	0.0405	779	0.0054
445	0.5305	512	0.3890	579	0.5037	646	0.2645	713	0.0395	780	0.0054
446	0.6009	513	0.3952	580	0.5032	647	0.2593	714	0.0380	N/A	N/A

Goniophotometer Test Results (Test for 3500K):

Test Condition:

Test Ambient (°C)	Test Humidity (%)	Orientation	Stabilization Time (minute)	Test Time (minute)
24.9	50.2	Face Down	90	25

Electrical Data:

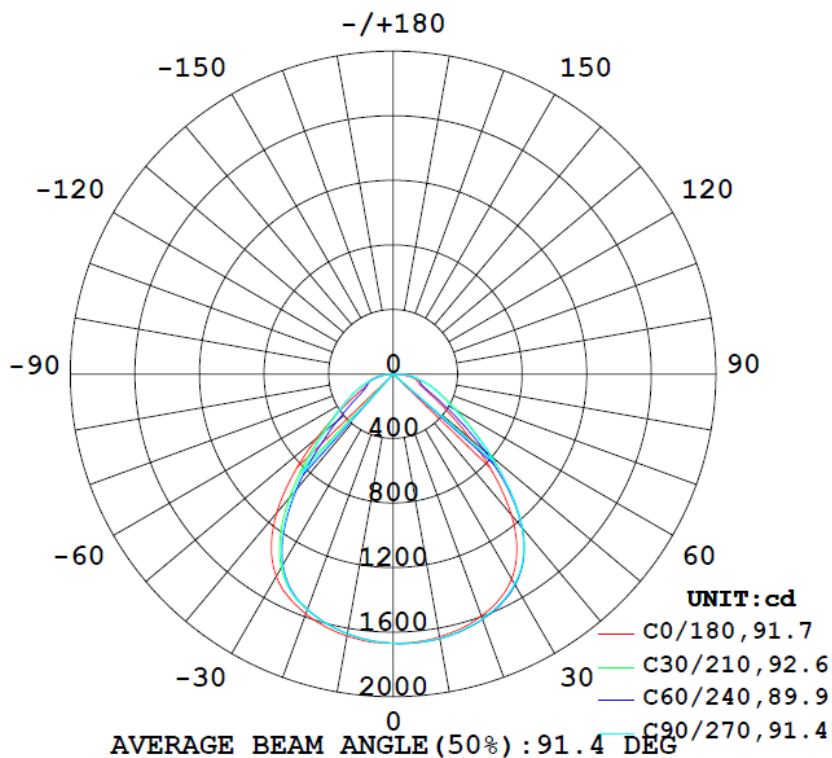
Voltage (V)	Frequency (Hz)	Current (A)	Wattage (W)	Power Factor
120.0	60	0.2216	28.50	0.9967

Goniophotometer Data:

Parameter	Results	
Total Luminous (lm)	3705.6	
Luminous Efficacy (lm/w)	130.02	
Zonal Lumens Distribution (0-60°)	86.7%	
Beam Angle (°)	91.4	
Spacing Criterion	0-180°	90-270°
	1.30	1.34
UGR	Viewed Crosswise	Viewed Endwise
	18.3	19.4

Luminous Intensity Distribution Diagram:

LUMINOUS INTENSITY DISTRIBUTION DIAGRAM

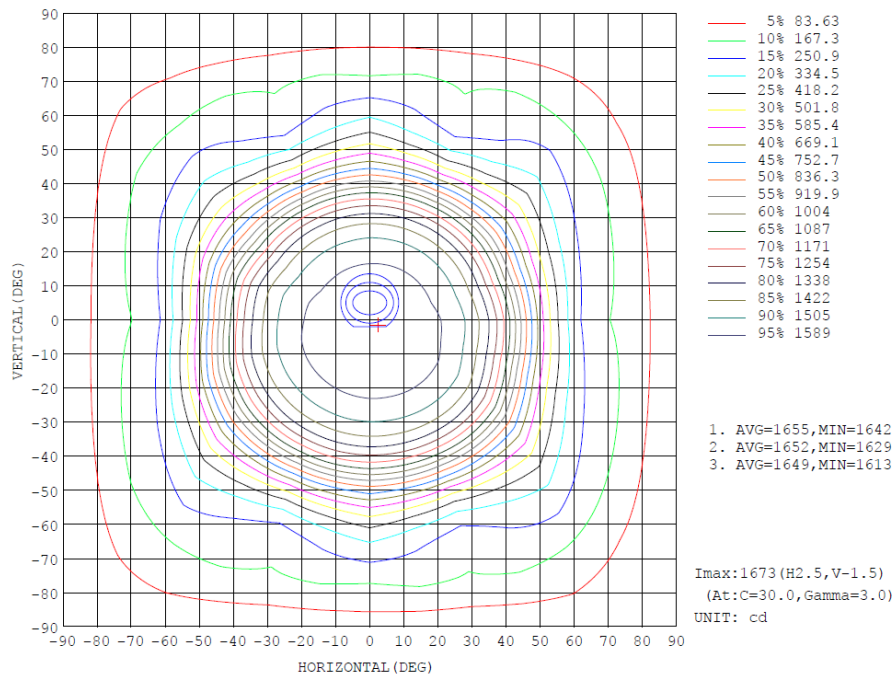


Zonal Flux Diagram:

ZONAL FLUX DIAGRAM:

γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	Φ zone	Φ total	Ilum, lamp
10	1654	1664	1662	1658	1649	1634	1634	1641	0- 10	158.4	158.4	4.27,4.27
20	1597	1619	1614	1605	1582	1552	1554	1567	10- 20	458.8	617.2	16.7,16.7
30	1466	1512	1503	1489	1449	1374	1374	1399	20- 30	704.6	1322	35.7,35.7
40	1140	1248	1243	1216	1125	953.6	954.8	979.0	30- 40	809.7	2132	57.5,57.5
50	628.2	764.6	785.1	728.9	617.7	496.6	549.9	503.6	40- 50	668.3	2800	75.6,75.6
60	289.3	390.9	442.4	360.6	278.7	266.6	325.7	268.5	50- 60	414.7	3214	86.7,86.7
70	168.9	239.5	266.0	218.7	166.1	188.5	186.0	195.7	60- 70	256.6	3471	93.7,93.7
80	110.9	151.2	136.7	140.0	102.9	77.85	83.97	83.85	70- 80	171.2	3642	98.3,98.3
90	4.423	21.24	22.84	13.85	0.1734	0.1961	0.2016	0.1873	80- 90	58.85	3701	99.9,99.9
100	0.1604	0.1223	0.1309	0.1235	0.2756	0.2725	0.2925	0.2617	90-100	1.253	3702	99.9,99.9
110	0.2515	0.1755	0.2040	0.1832	0.3850	0.3496	0.3717	0.3403	100-110	0.2496	3703	99.9,99.9
120	0.3929	0.2766	0.3119	0.2944	0.5453	0.5387	0.5524	0.5130	110-120	0.3384	3703	99.9,99.9
130	0.5782	0.4661	0.4744	0.4748	0.8235	0.8638	0.8822	0.8468	120-130	0.4871	3703	99.9,99.9
140	0.7441	0.6625	0.6721	0.6716	1.004	1.036	1.098	1.018	130-140	0.5963	3704	100,100
150	0.9052	0.7999	0.8150	0.8065	1.187	1.206	1.156	1.177	140-150	0.5832	3705	100,100
160	1.110	0.9351	0.8901	0.9992	1.372	1.333	1.300	1.276	150-160	0.4964	3705	100,100
170	1.233	1.120	1.100	1.194	1.468	1.521	1.427	1.364	160-170	0.3448	3705	100,100
180	1.398	1.398	1.398	1.398	1.397	1.397	1.397	1.397	170-180	0.1293	3706	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										
X=2H Y=2H	UGR Viewed Crosswise					UGR Viewed Endwise				
	9.5	11.0	9.8	11.3	11.6	10.0	11.5	10.4	11.8	12.1
3H	10.8	12.2	11.2	12.5	12.9	11.7	13.0	12.0	13.3	13.7
4H	11.5	12.8	11.9	13.1	13.5	12.5	13.8	12.9	14.1	14.5
6H	12.2	13.3	12.6	13.7	14.1	13.3	14.5	13.7	14.8	15.2
8H	12.4	13.5	12.9	13.9	14.3	13.6	14.7	14.1	15.1	15.5
12H	12.6	13.6	13.0	14.0	14.4	14.0	15.0	14.4	15.4	15.8
4H	2H	9.9	11.2	10.3	11.5	11.9	10.4	11.7	10.8	12.0
	3H	11.8	12.8	12.2	13.2	13.6	12.2	13.3	12.6	13.7
	4H	12.6	13.6	13.1	14.0	14.4	13.3	14.2	13.7	14.6
	6H	13.4	14.2	13.9	14.7	15.2	14.3	15.1	14.8	15.6
	8H	13.7	14.5	14.2	14.9	15.4	14.8	15.5	15.2	16.0
	12H	13.9	14.6	14.4	15.1	15.5	15.2	15.9	15.7	16.4
8H	4H	13.0	13.8	13.5	14.2	14.7	13.7	14.5	14.2	14.9
	6H	14.0	14.6	14.5	15.1	15.6	14.9	15.5	15.4	16.0
	8H	14.4	14.9	14.9	15.4	15.9	15.5	16.1	16.0	16.6
	12H	14.6	15.1	15.1	15.6	16.2	16.1	16.6	16.6	17.1
12H	4H	13.1	13.8	13.6	14.2	14.7	13.8	14.5	14.3	14.9
	6H	14.1	14.7	14.6	15.1	15.7	15.0	15.6	15.6	16.1
	8H	14.5	15.0	15.0	15.5	16.1	15.7	16.2	16.2	16.7

Maximum UGR = 17.6

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										
X=2H Y=2H	UGR Viewed Crosswise					UGR Viewed Endwise				
	14.1	15.6	14.4	15.9	16.2	14.6	16.1	15.0	16.4	16.7
3H	15.4	16.8	15.8	17.1	17.5	16.3	17.6	16.6	17.9	18.3
4H	16.1	17.4	16.5	17.7	18.1	17.1	18.4	17.5	18.7	19.1
6H	16.8	17.9	17.2	18.3	18.7	17.9	19.1	18.3	19.4	19.8
8H	17.0	18.1	17.5	18.5	18.9	18.2	19.3	18.7	19.7	20.1
12H	17.2	18.2	17.6	18.6	19.0	18.6	19.6	19.0	20.0	20.4
4H	2H	14.5	15.8	14.9	16.1	16.5	15.0	16.3	15.4	16.6
	3H	16.4	17.4	16.8	17.8	18.2	16.8	17.9	17.2	18.3
	4H	17.2	18.2	17.7	18.6	19.0	17.9	18.8	18.3	19.2
	6H	18.0	18.8	18.5	19.3	19.8	18.9	19.7	19.4	20.2
	8H	18.3	19.1	18.8	19.5	20.0	19.4	20.1	19.8	20.6
	12H	18.5	19.2	19.0	19.7	20.1	19.8	20.5	20.3	21.0
8H	4H	17.6	18.4	18.1	18.8	19.3	18.3	19.1	18.8	19.5
	6H	18.6	19.2	19.1	19.7	20.2	19.5	20.1	20.0	20.6
	8H	19.0	19.5	19.5	20.0	20.5	20.1	20.7	20.6	21.2
	12H	19.2	19.7	19.7	20.2	20.8	20.7	21.2	21.2	21.7
12H	4H	17.7	18.4	18.2	18.8	19.3	18.4	19.1	18.9	19.5
	6H	18.7	19.3	19.2	19.7	20.3	19.6	20.2	20.2	20.7
	8H	19.1	19.6	19.6	20.1	20.7	20.3	20.8	20.8	21.3

Maximum UGR = 22.2

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
γ (DEG)	0	1669	1669	1669	1669	1669	1669	1669	1669	1669	1669	1669	1669	1669	1669	1669	1669	1669	1669
5	1665	1671	1671	1672	1671	1671	1670	1670	1669	1669	1667	1666	1666	1661	1657	1657	1657	1656	1658
10	1654	1659	1663	1664	1665	1664	1662	1662	1660	1658	1656	1653	1649	1644	1636	1634	1634	1634	1634
15	1632	1638	1646	1648	1648	1646	1644	1643	1639	1637	1634	1630	1622	1615	1602	1600	1600	1600	1600
20	1597	1603	1616	1619	1618	1616	1614	1611	1608	1605	1601	1595	1582	1575	1556	1552	1551	1551	1554
25	1546	1553	1574	1576	1575	1572	1570	1565	1561	1558	1554	1548	1528	1522	1494	1486	1485	1485	1490
30	1466	1477	1510	1512	1510	1506	1503	1499	1492	1489	1485	1477	1449	1437	1387	1374	1367	1370	1374
35	1337	1354	1407	1411	1406	1404	1401	1394	1386	1382	1378	1367	1318	1301	1220	1194	1180	1185	1192
40	1140	1165	1247	1248	1242	1243	1243	1233	1218	1216	1216	1201	1125	1105	1000	954	928	940	955
45	886	924	1029	1020	1007	1017	1024	1005	981	987	1000	983	875	870	771	704	666	694	728
50	628	680	796	765	745	761	785	749	711	729	764	737	618	640	579	497	451	499	550
55	426	487	605	546	497	538	587	529	475	514	569	520	414	459	435	353	308	364	419
60	289	354	461	391	332	379	442	376	316	361	422	364	279	333	332	267	221	282	326
65	205	271	353	293	232	285	340	284	220	267	321	269	199	256	260	223	182	234	253
70	169	222	277	240	186	239	266	235	178	219	254	218	166	207	196	189	164	193	186
75	152	178	206	202	171	205	198	197	166	187	193	183	146	161	136	138	128	140	131
80	111	121	139	151	138	152	137	143	130	140	137	133	103	107	85.8	77.9	74.8	80.8	84.0
85	50.5	57.9	85.5	86.6	82.6	91.7	91.2	86.9	78.0	80.4	83.8	75.9	45.5	46.7	20.5	15.7	14.4	14.9	15.4
90	4.42	6.21	21.3	21.2	21.5	23.7	22.8	19.9	15.6	13.9	12.5	9.21	0.17	0.19	0.21	0.20	0.19	0.19	0.20
95	0.11	0.11	0.11	0.11	0.12	0.11	0.11	0.11	0.10	0.10	0.11	0.11	0.21	0.22	0.24	0.23	0.22	0.23	0.25
100	0.16	0.14	0.12	0.12	0.12	0.12	0.13	0.12	0.12	0.12	0.13	0.14	0.28	0.26	0.28	0.27	0.26	0.27	0.29
105	0.20	0.17	0.14	0.15	0.15	0.15	0.16	0.15	0.15	0.15	0.15	0.15	0.17	0.34	0.32	0.32	0.31	0.31	0.32
110	0.25	0.22	0.17	0.18	0.18	0.18	0.20	0.19	0.19	0.18	0.19	0.22	0.38	0.37	0.36	0.35	0.35	0.36	0.37
115	0.32	0.27	0.22	0.21	0.21	0.24	0.25	0.24	0.23	0.23	0.24	0.28	0.45	0.43	0.43	0.43	0.43	0.44	0.44
120	0.39	0.33	0.29	0.28	0.28	0.30	0.31	0.31	0.30	0.29	0.32	0.35	0.55	0.51	0.55	0.54	0.55	0.56	0.55
125	0.49	0.43	0.39	0.36	0.39	0.37	0.39	0.40	0.39	0.38	0.42	0.44	0.68	0.66	0.68	0.68	0.72	0.72	0.72
130	0.58	0.53	0.48	0.47	0.48	0.46	0.47	0.48	0.48	0.47	0.50	0.52	0.82	0.81	0.81	0.86	0.89	0.88	0.88
135	0.67	0.62	0.57	0.58	0.58	0.57	0.57	0.58	0.58	0.58	0.57	0.60	0.93	0.92	0.95	0.98	1.03	1.03	1.01
140	0.74	0.70	0.67	0.66	0.69	0.69	0.67	0.69	0.69	0.67	0.68	0.70	1.00	1.00	1.03	1.04	1.08	1.11	1.10
145	0.83	0.79	0.74	0.71	0.76	0.77	0.78	0.77	0.76	0.72	0.74	0.77	1.10	1.06	1.11	1.13	1.12	1.12	1.12
150	0.91	0.86	0.82	0.80	0.79	0.81	0.81	0.83	0.80	0.81	0.81	0.83	1.19	1.13	1.18	1.21	1.21	1.19	1.16
155	1.01	0.98	0.92	0.88	0.85	0.86	0.84	0.87	0.90	0.91	0.90	0.90	1.24	1.24	1.25	1.29	1.29	1.28	1.23
160	1.11	1.09	1.01	0.94	0.92	0.92	0.89	0.96	0.98	1.00	1.02	1.05	1.37	1.36	1.35	1.33	1.37	1.36	1.30
165	1.15	1.14	1.06	1.02	0.97	0.99	0.96	1.05	1.08	1.12	1.11	1.13	1.41	1.41	1.45	1.46	1.42	1.41	1.36
170	1.23	1.21	1.16	1.12	1.11	1.11	1.10	1.15	1.19	1.19	1.22	1.24	1.47	1.47	1.50	1.52	1.51	1.50	1.43
175	1.39	1.31	1.26	1.23	1.21	1.22	1.20	1.22	1.25	1.28	1.30	1.31	1.53	1.53	1.52	1.52	1.52	1.52	1.49
180	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40

Table--2

UNIT: cd

C (DEG)	285	300	315	330	345														
γ (DEG)	0	1669	1669	1669	1669														
5	1658	1659	1660	1661	1662														
10	1637	1639	1641	1643	1645														
15	1603	1607	1610	1614	1618														
20	1557	1561	1567	1572	1577														
25	1493	1499	1506	1514	1521														
30	1378	1385	1399	1414	1426														
35	1195	1202	1222	1249	1269														
40	948	947	979	1026	1049														
45	693	672	719	792	802														
50	490	446	504	596	583														
55	353	300	356	451	419														
60	275	216	268	349	308														
65	232	179	226	277	241														
70	194	164	196	210	199														
75	142	133	147	143	152														
80	83.1	79.6	83.9	89.3	92.7														
85	16.0	16.8	19.0	24.8	27.9														
90	0.19	0.18	0.19	0.19	0.18														
95	0.22	0.21	0.22	0.23	0.22														
100	0.26	0.25	0.26	0.27	0.26														
105	0.31	0.29	0.30	0.30	0.31														
110	0.36	0.34	0.34	0.34	0.36														
115	0.43	0.41	0.41	0.40	0.43														
120	0.55	0.55	0.51	0.52	0.53														
125	0.71	0.70	0.69	0.65	0.66														
130	0.86	0.85	0.85	0.79	0.79														
135	0.98	0.98	0.94	0.93	0.91														
140	1.04	1.04	1.02	1.02	0.98														
145	1.09	1.08	1.11	1.10	1.03														
150	1.14	1.15	1.18	1.20	1.12														
155	1.22	1.20	1.23	1.30	1.25														
160	1.27	1.27	1.28	1.31	1.31														
165	1.34	1.31	1.29	1.34	1.33														
170	1.40	1.39	1.36	1.41	1.35														
175	1.46	1.44	1.45	1.45	1.41														
180	1.40	1.40	1.40	1.40	1.40														

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	0.1018	28.00	0.9931	12.90
4000K	277.0	60	0.1058	29.01	0.9902	11.66
5000K	277.0	60	0.1064	29.12	0.9879	12.04

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	3528	28.50	3705.6	130.02	Set Switch 0% to 3500K
4000K	4080	29.32	4156.3	141.76	Set Switch 50% to 4000K
5000K	5227	29.58	4043.3	136.69	Set Switch 100% to 5000K
Lowest Efficacy	130.02 lm/W (@ 3500K)				
Maximum Power	29.58 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*******