

Photometric Test Report

Relevant Standards

- IES LM-79-2008
- ANSI C82.77:2014

Prepared For RAB Lighting Inc.

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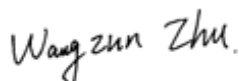
Test Date

2019/7/2

Issue Date

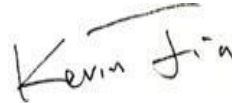
2019/7/8

Prepared By



Wangzun Zhu

Approved By



Kevin Jia

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1.0 Test Summary

DLC Technical Requirements v5.1

Indoor - Troffer/2x2 Luminaires for Ambient Lighting of Interior Commercial Spaces				
Luminaire Description:		SWISHFA2x2 / 29W / 3500K		
Input Control Signal Applied:		0%		
Requirement Category	Test Method	Requirements		Test value
Luminaire Output (lm) (Goniophotometer - Section 4.2)	IES LM-79-2008	2000		3677
Minimum Luminaire Efficacy (lm/W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Standard 110	Premium 125	123.0
Power (Input Wattage) (W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Wrost Case		29.9
Total Harmonic Distortion (A%) (THD & PF - section 4.3)	ANSI C82.77:2014	20.00%	120V	5.01%
		20.00%	277V	15.37%
Power Factor (THD & PF - section 4.3)	ANSI C82.77:2014	0.9	120V	0.998
		0.9	277V	0.975
Allowable CCTs* (K) (Integrating Sphere - Section 4.1)	IES LM-79-2008	7 step	3465±245	3401
		4 step	3465±124	
Minimum CRI (Integrating Sphere - Section 4.1)	IES LM-79-2008 CIE 13.3-1995	≥80		84
Minimum R9 (Integrating Sphere - Section 4.1)	IES LM-79-2008 CIE 13.3-1995	≥0		12
Minimum Rf (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-18	≥70		85
Minimum Rg (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-18	≥89		96
Minimum IES Rcs,h1 (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-18	-12% ≤ IES Rcs,h1 ≤ +23%		-12%
Zonal Lumen Requirement (0°-60°) (Goniophotometer - Section 4.2)	IES LM-79-2008	≥75%		76.39%
Corrected UGR (X=4H, Y=8H, 70/50/20%) (Goniophotometer - Section 4.2)	CIE 190-2010	<22		23.6
SC: 0-180° (Goniophotometer - Section 4.2)	IES LM-79-2008	1.0-2.0		1.32
SC: 90-270° (Goniophotometer - Section 4.2)	IES LM-79-2008	1.0-2.0		1.22
Input Voltage (V)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Wrost Case		277
(Goniophotometer - Section 4.2)		Non-Wrost Case		120
Input Current (A)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Wrost Case		0.111
(Goniophotometer - Section 4.2)		Non-Wrost Case		0.248
Power (Input Wattage - W)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Wrost Case		29.9
(Goniophotometer - Section 4.2)		Non-Wrost Case		29.7

Luminaire Description:		SWISHFA2x2 / 29W / 4000K		
Input Control Signal Applied:		50%		
Requirement Category	Test Method	Requirements		Test value
Luminaire Output (lm) (Goniophotometer - Section 4.2)	IES LM-79-2008	2000		3954
Minimum Luminaire Efficacy (lm/W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Standard 110	Premium 125	136.4
Power (Input Wattage) (W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Wrost Case		29.0
Total Harmonic Distortion (A%) (THD & PF - section 4.3)	ANSI C82.77:2014	20.00%	120V	4.65%
		20.00%	277V	16.05%
Power Factor (THD & PF - section 4.3)	ANSI C82.77:2014	0.9	120V	0.998
		0.9	277V	0.974
Allowable CCTs* (K) (Integrating Sphere - Section 4.1)	IES LM-79-2008	7 step	3985±275	4100
		4 step	3985±154	
Minimum CRI (Integrating Sphere - Section 4.1)	IES LM-79-2008 CIE 13.3-1995	≥80		85
Minimum R9 (Integrating Sphere - Section 4.1)	IES LM-79-2008 CIE 13.3-1995	≥0		19
Minimum Rf (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-18	≥70		85
Minimum Rg (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-18	≥89		95
Minimum IES Rcs,h1 (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-18	-12% ≤ IES Rcs,h1 ≤ +23%		-11%
Zonal Lumen Requirement (0°-60°) (Goniophotometer - Section 4.2)	IES LM-79-2008	≥75%		76.33%
Corrected UGR (X=4H, Y=8H, 70/50/20%) (Goniophotometer - Section 4.2)	CIE 190-2010	<22		23.8
SC: 0-180° (Goniophotometer - Section 4.2)	IES LM-79-2008	1.0-2.0		1.32
SC: 90-270° (Goniophotometer - Section 4.2)	IES LM-79-2008	1.0-2.0		1.22
Input Voltage (V)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Wrost Case		277
(Goniophotometer - Section 4.2)		Non-Wrost Case		120
Input Current (A)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Wrost Case		0.108
(Goniophotometer - Section 4.2)		Non-Wrost Case		0.239
Power (Input Wattage - W)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Wrost Case		29.0
(Goniophotometer - Section 4.2)		Non-Wrost Case		28.6

Luminaire Description:		SWISHFA2x2 / 29W / 5000K		
Input Control Signal Applied:		100%		
Requirement Category	Test Method	Requirements	Test value	
Luminaire Output (lm) (Goniophotometer - Section 4.2)	IES LM-79-2008	2000	3816	
Minimum Luminaire Efficacy (lm/W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Standard 110	Premium 125	127.6
Power (Input Wattage) (W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Wrost Case	29.9	
Total Harmonic Distortion (A%) (THD & PF - section 4.3)	ANSI C82.77:2014	20.00%	120V	4.95%
		20.00%	277V	15.34%
Power Factor (THD & PF - section 4.3)	ANSI C82.77:2014	0.9	120V	0.998
		0.9	277V	0.975
Allowable CCTs* (K) (Integrating Sphere - Section 4.1)	IES LM-79-2008	7 step	5029±355	5020
		4 step	5029±220	
Minimum CRI (Integrating Sphere - Section 4.1)	IES LM-79-2008 CIE 13.3-1995	≥80	84	
Minimum R9 (Integrating Sphere - Section 4.1)	IES LM-79-2008 CIE 13.3-1995	≥0	10	
Minimum Rf (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-18	≥70	84	
Minimum Rg (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-18	≥89	95	
Minimum IES Rcs,h1 (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-18	-12% ≤ IES Rcs,h1 ≤ +23%	-12%	
Zonal Lumen Requirement (0°-60°) (Goniophotometer - Section 4.2)	IES LM-79-2008	≥75%	76.32%	
Corrected UGR (X=4H, Y=8H, 70/50/20%) (Goniophotometer - Section 4.2)	CIE 190-2010	<22	23.5	
SC: 0-180° (Goniophotometer - Section 4.2)	IES LM-79-2008	1.0-2.0	1.30	
SC: 90-270° (Goniophotometer - Section 4.2)	IES LM-79-2008	1.0-2.0	1.22	
Input Voltage (V)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Wrost Case	277	
(Goniophotometer - Section 4.2)		Non-Wrost Case	120	
Input Current (A)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Wrost Case	0.111	
(Goniophotometer - Section 4.2)		Non-Wrost Case	0.249	
Power (Input Wattage - W)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Wrost Case	29.9	
(Goniophotometer - Section 4.2)		Non-Wrost Case	29.8	

2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2019/7/2	SWISHFA2x2 / 29W / 3500K	B1
			SWISHFA2x2 / 29W / 4000K	B1
			SWISHFA2x2 / 29W / 5000K	B1
2	Goniophotometer Test	2019/7/2	SWISHFA2x2 / 29W / 3500K	B1
			SWISHFA2x2 / 29W / 4000K	B1
			SWISHFA2x2 / 29W / 5000K	B1
3	THD and PF Test	2019/7/2	SWISHFA2x2 / 29W / 3500K	B1
			SWISHFA2x2 / 29W / 4000K	B1
			SWISHFA2x2 / 29W / 5000K	B1

Remark(If any)

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

3.0 Production Description

Luminaire Description: SWISHFA2x2 / 29W / 3500K
SWISHFA2x2 / 29W / 4000K
SWISHFA2x2 / 29W / 5000K

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

Photos of Luminaire Characteristics



4.0 LM-79 Measurement and Test Results

4.1 Integrating Sphere Test

Model No.	SWISHFA2x2 / 29W / 3500K	Sample ID.	B1
Operate time (Min.)	90	Stabilization time (Min.)	45
Temperature (°C)	25.2	Humidity (%RH)	54.0

Test Method

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

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

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

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

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

Test Result

Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
119.96	60	0.248	29.7	0.998
277.00	60	0.111	29.9	0.975

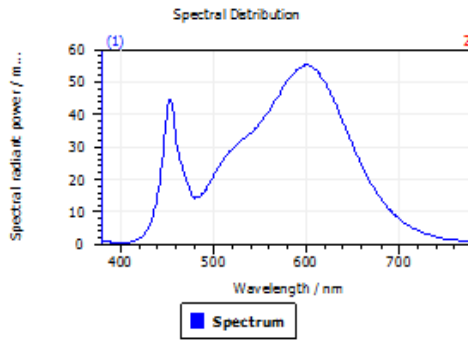
Test Result

CCT (K)	CRI	R9	Duv
3401	84	12	0.0023

Rf	Rg	IES Rcs,h1
85	96	-12%

4.1 Integrating Sphere Test

Results



Spectral values

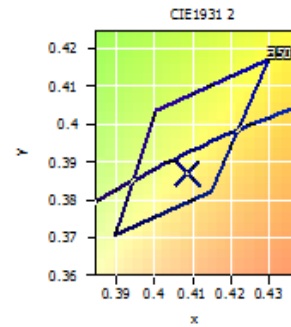
DominantWavelength	582.23 nm
Purity	0.388
PeakWavelength	600.11 nm
Radiant Power	8.874 W
Width50%	140.02 nm

Color Coordinates

Correlated Color Temperature 3401 K

x: 0.4085 u: 0.2393 u': 0.2393
y: 0.3871 v: 0.3402 v': 0.5102

ResultsCRICRI01	82.6	ResultsCRICRI09	11.5
ResultsCRICRI02	92.1	ResultsCRICRI10	81.2
ResultsCRICRI03	95.9	ResultsCRICRI11	80.5
ResultsCRICRI04	81.4	ResultsCRICRI12	69.4
ResultsCRICRI05	83.0	ResultsCRICRI13	85.1
ResultsCRICRI06	89.3	ResultsCRICRI14	98.5
ResultsCRICRI07	83.4	ResultsCRICRI15	76.2
ResultsCRICRI08	62.0	ResultsCRICRI16	73.4
ResultsCRI	83.7		



PlanckDistance 2.3E-003

4.1 Integrating Sphere Test

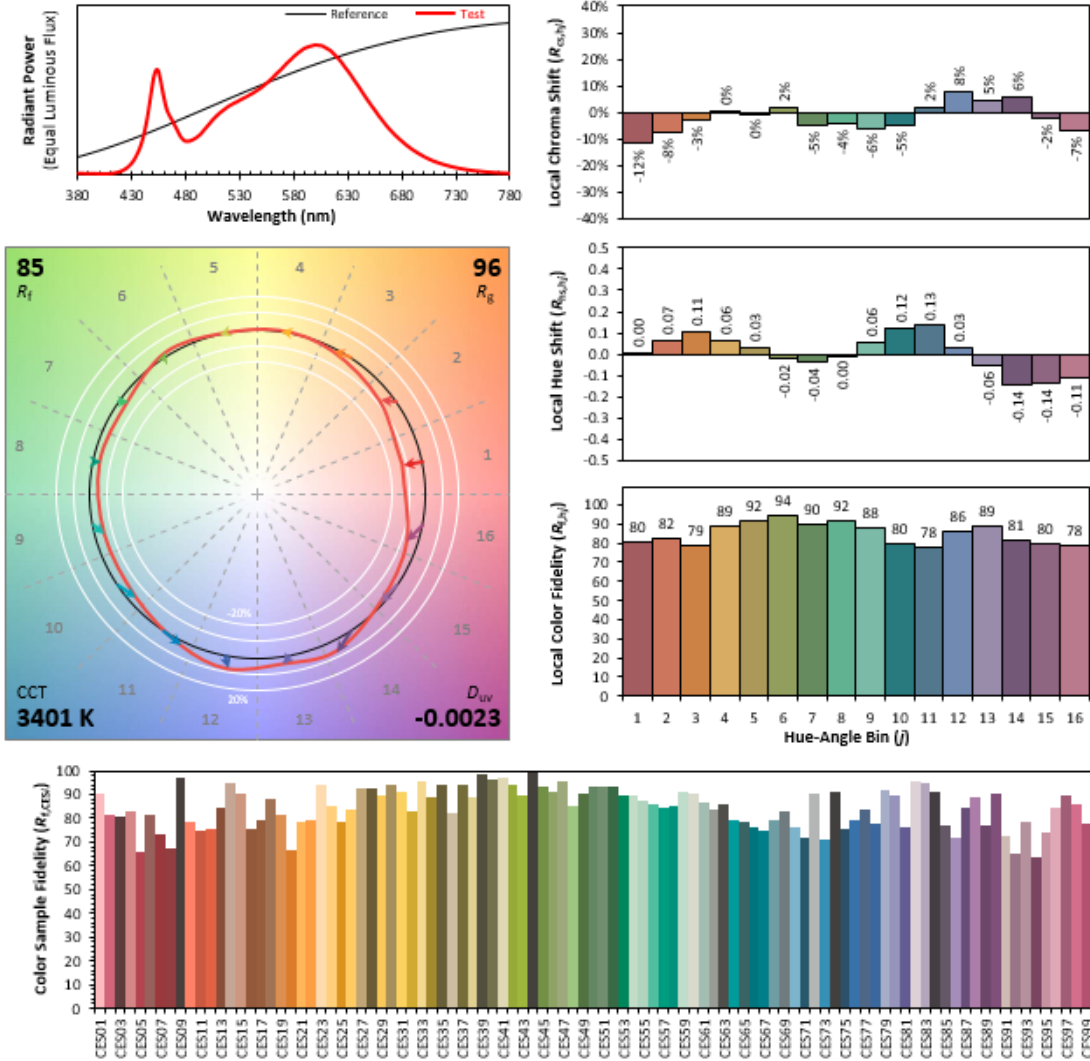
IES TM-30-18 Color Rendition Report

Source: DLF1907103-2aREV2

Manufacturer: RAB Lighting Inc.

Date: 2019/7/2

Model: SWISHFA2x2 / 29W / 3500K



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

x 0.4085
 y 0.3871
 u' 0.2393
 v' 0.5102

CIE 13.3-1995 (CRI)	
R_a	84
R_g	15

SPD Table

Wavel Length (mm)	Spectral Power (W/nm)	Wavel Length (mm)	Spectral Power (W/nm)	Wavel Length (mm)	Spectral Power (W/nm)	Wavel Length (mm)	Spectral Power (W/nm)	Wavel Length (mm)	Spectral Power (W/nm)
380	6.94E-04	421	1.90E-03	461	2.97E-02	501	2.15E-02	541	3.46E-02
381	6.70E-04	422	2.14E-03	462	2.80E-02	502	2.20E-02	542	3.49E-02
382	6.75E-04	423	2.40E-03	463	2.67E-02	503	2.26E-02	543	3.52E-02
383	6.84E-04	424	2.69E-03	464	2.58E-02	504	2.31E-02	544	3.55E-02
384	6.65E-04	425	3.01E-03	465	2.49E-02	505	2.37E-02	545	3.57E-02
385	6.47E-04	426	3.38E-03	466	2.41E-02	506	2.41E-02	546	3.60E-02
386	6.35E-04	427	3.78E-03	467	2.33E-02	507	2.46E-02	547	3.64E-02
387	6.41E-04	428	4.23E-03	468	2.25E-02	508	2.50E-02	548	3.66E-02
388	6.42E-04	429	4.75E-03	469	2.16E-02	509	2.55E-02	549	3.70E-02
389	6.20E-04	430	5.31E-03	470	2.07E-02	510	2.59E-02	550	3.73E-02
390	6.08E-04	431	5.93E-03	471	1.98E-02	511	2.63E-02	551	3.77E-02
391	6.00E-04	432	6.64E-03	472	1.88E-02	512	2.67E-02	552	3.81E-02
392	6.01E-04	433	7.44E-03	473	1.79E-02	513	2.70E-02	553	3.85E-02
393	6.06E-04	434	8.30E-03	474	1.70E-02	514	2.74E-02	554	3.88E-02
394	5.93E-04	435	9.23E-03	475	1.62E-02	515	2.78E-02	555	3.92E-02
395	5.71E-04	436	1.03E-02	476	1.56E-02	516	2.81E-02	556	3.96E-02
396	5.59E-04	437	1.14E-02	477	1.51E-02	517	2.85E-02	557	4.00E-02
397	5.51E-04	438	1.26E-02	478	1.47E-02	518	2.88E-02	558	4.04E-02
398	5.41E-04	439	1.41E-02	479	1.45E-02	519	2.91E-02	559	4.09E-02
399	5.24E-04	440	1.57E-02	480	1.44E-02	520	2.94E-02	560	4.13E-02
400	5.09E-04	441	1.76E-02	481	1.44E-02	521	2.97E-02	561	4.18E-02
401	5.04E-04	442	1.96E-02	482	1.44E-02	522	2.99E-02	562	4.22E-02
402	5.02E-04	443	2.18E-02	483	1.45E-02	523	3.02E-02	563	4.27E-02
403	5.09E-04	444	2.43E-02	484	1.46E-02	524	3.05E-02	564	4.32E-02
404	5.14E-04	445	2.70E-02	485	1.48E-02	525	3.07E-02	565	4.36E-02
405	5.14E-04	446	3.00E-02	486	1.50E-02	526	3.09E-02	566	4.41E-02
406	5.29E-04	447	3.31E-02	487	1.52E-02	527	3.11E-02	567	4.45E-02
407	5.44E-04	448	3.61E-02	488	1.55E-02	528	3.14E-02	568	4.49E-02
408	5.62E-04	449	3.91E-02	489	1.58E-02	529	3.16E-02	569	4.54E-02
409	5.89E-04	450	4.16E-02	490	1.61E-02	530	3.19E-02	570	4.59E-02
410	6.23E-04	451	4.34E-02	491	1.65E-02	531	3.21E-02	571	4.64E-02
411	6.66E-04	452	4.45E-02	492	1.68E-02	532	3.24E-02	572	4.69E-02
412	7.22E-04	453	4.49E-02	493	1.72E-02	533	3.26E-02	573	4.74E-02
413	7.93E-04	454	4.45E-02	494	1.77E-02	534	3.28E-02	574	4.78E-02
414	8.68E-04	455	4.30E-02	495	1.83E-02	535	3.31E-02	575	4.82E-02
415	9.72E-04	456	4.09E-02	496	1.88E-02	536	3.33E-02	576	4.87E-02
416	1.09E-03	457	3.86E-02	497	1.94E-02	537	3.36E-02	577	4.91E-02
417	1.21E-03	458	3.61E-02	498	1.99E-02	538	3.39E-02	578	4.95E-02
418	1.35E-03	459	3.38E-02	499	2.04E-02	539	3.42E-02	579	5.00E-02
419	1.52E-03	460	3.17E-02	500	2.10E-02	540	3.44E-02	580	5.05E-02
420	1.69E-03								

Wavel Length (mm)	Spectral Power (W/nm)	Wavel Length (mm)	Spectral Power (W/nm)	Wavel Length (mm)	Spectral Power (W/nm)	Wavel Length (mm)	Spectral Power (W/nm)	Wavel Length (mm)	Spectral Power (W/nm)
581	5.08E-02	621	4.95E-02	661	2.37E-02	701	7.71E-03	741	2.21E-03
582	5.12E-02	622	4.90E-02	662	2.31E-02	702	7.46E-03	742	2.15E-03
583	5.16E-02	623	4.84E-02	663	2.25E-02	703	7.22E-03	743	2.09E-03
584	5.20E-02	624	4.78E-02	664	2.19E-02	704	7.00E-03	744	2.02E-03
585	5.24E-02	625	4.72E-02	665	2.13E-02	705	6.78E-03	745	1.96E-03
586	5.27E-02	626	4.66E-02	666	2.07E-02	706	6.57E-03	746	1.90E-03
587	5.30E-02	627	4.59E-02	667	2.02E-02	707	6.38E-03	747	1.84E-03
588	5.34E-02	628	4.53E-02	668	1.97E-02	708	6.17E-03	748	1.79E-03
589	5.37E-02	629	4.47E-02	669	1.92E-02	709	5.99E-03	749	1.73E-03
590	5.39E-02	630	4.41E-02	670	1.87E-02	710	5.83E-03	750	1.68E-03
591	5.41E-02	631	4.35E-02	671	1.82E-02	711	5.65E-03	751	1.63E-03
592	5.43E-02	632	4.28E-02	672	1.77E-02	712	5.47E-03	752	1.59E-03
593	5.44E-02	633	4.22E-02	673	1.73E-02	713	5.31E-03	753	1.54E-03
594	5.46E-02	634	4.15E-02	674	1.68E-02	714	5.15E-03	754	1.49E-03
595	5.48E-02	635	4.08E-02	675	1.64E-02	715	4.99E-03	755	1.44E-03
596	5.49E-02	636	4.01E-02	676	1.60E-02	716	4.84E-03	756	1.41E-03
597	5.50E-02	637	3.95E-02	677	1.55E-02	717	4.70E-03	757	1.37E-03
598	5.51E-02	638	3.88E-02	678	1.51E-02	718	4.57E-03	758	1.33E-03
599	5.52E-02	639	3.81E-02	679	1.47E-02	719	4.42E-03	759	1.29E-03
600	5.53E-02	640	3.74E-02	680	1.43E-02	720	4.28E-03	760	1.25E-03
601	5.52E-02	641	3.67E-02	681	1.39E-02	721	4.15E-03	761	1.21E-03
602	5.52E-02	642	3.60E-02	682	1.35E-02	722	4.04E-03	762	1.18E-03
603	5.51E-02	643	3.53E-02	683	1.31E-02	723	3.91E-03	763	1.14E-03
604	5.51E-02	644	3.46E-02	684	1.27E-02	724	3.78E-03	764	1.10E-03
605	5.50E-02	645	3.39E-02	685	1.24E-02	725	3.66E-03	765	1.07E-03
606	5.49E-02	646	3.32E-02	686	1.20E-02	726	3.55E-03	766	1.04E-03
607	5.47E-02	647	3.26E-02	687	1.17E-02	727	3.46E-03	767	1.01E-03
608	5.44E-02	648	3.19E-02	688	1.13E-02	728	3.35E-03	768	9.80E-04
609	5.41E-02	649	3.13E-02	689	1.10E-02	729	3.24E-03	769	9.49E-04
610	5.39E-02	650	3.06E-02	690	1.07E-02	730	3.13E-03	770	9.15E-04
611	5.36E-02	651	2.99E-02	691	1.04E-02	731	3.04E-03	771	8.90E-04
612	5.33E-02	652	2.93E-02	692	1.01E-02	732	2.94E-03	772	8.73E-04
613	5.31E-02	653	2.87E-02	693	9.82E-03	733	2.85E-03	773	8.49E-04
614	5.27E-02	654	2.80E-02	694	9.53E-03	734	2.77E-03	774	8.15E-04
615	5.23E-02	655	2.74E-02	695	9.24E-03	735	2.69E-03	775	7.87E-04
616	5.19E-02	656	2.68E-02	696	8.97E-03	736	2.60E-03	776	7.70E-04
617	5.13E-02	657	2.61E-02	697	8.71E-03	737	2.52E-03	777	7.51E-04
618	5.09E-02	658	2.54E-02	698	8.45E-03	738	2.45E-03	778	7.25E-04
619	5.04E-02	659	2.48E-02	699	8.19E-03	739	2.37E-03	779	7.04E-04
620	5.00E-02	660	2.42E-02	700	7.94E-03	740	2.29E-03	780	6.81E-04

4.0 LM-79 Measurement and Test Results

4.1 Integrating Sphere Test

Model No.	SWISHFA2x2 / 29W / 4000K	Sample ID.	B1
Operate time (Min.)	90	Stabilization time (Min.)	45
Temperature (°C)	25.4	Humidity (%RH)	55.0

Test Method

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

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

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

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

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

Test Result

Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
120.02	60	0.240	28.8	0.998
276.99	60	0.107	29.0	0.974

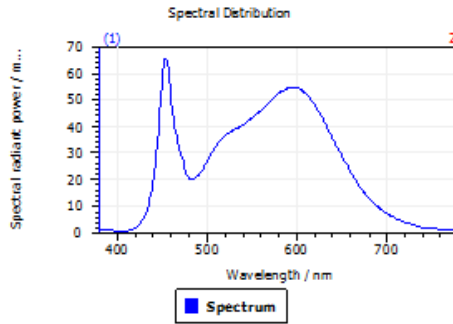
Test Result

CCT (K)	CRI	R9	Duv
4100	85	19	0.0012

Rf	Rg	IES Rcs,h1
85	95	-11%

4.1 Integrating Sphere Test

Results



Spectral values

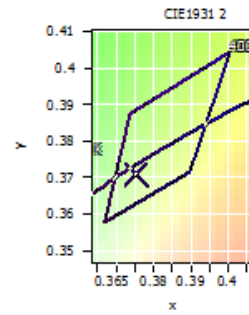
DominantWavelength	579.45 nm
Purity	0.240
PeakWavelength	453.57 nm
Radiant Power	9.828 W
Width50%	24.10 nm

Color Coordinates

Correlated Color Temperaturu 4100 K

x: 0.3754 u: 0.2241 u': 0.2241
y: 0.3709 v: 0.3322 v': 0.4982

ResultsCRICRI01	84.5	ResultsCRICRI09	18.7
ResultsCRICRI02	92.8	ResultsCRICRI10	82.0
ResultsCRICRI03	96.2	ResultsCRICRI11	82.4
ResultsCRICRI04	83.1	ResultsCRICRI12	64.0
ResultsCRICRI05	84.4	ResultsCRICRI13	87.0
ResultsCRICRI06	88.8	ResultsCRICRI14	98.6
ResultsCRICRI07	85.9	ResultsCRICRI15	79.0
ResultsCRICRI08	67.3	ResultsCRICRI16	75.1
ResultsCRI	85.4		



PlankDistance 1.2E-003

4.1 Integrating Sphere Test

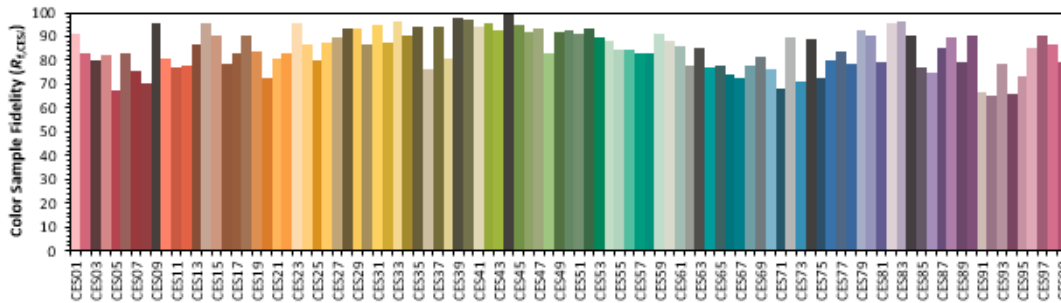
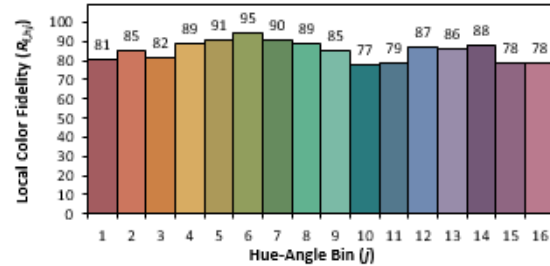
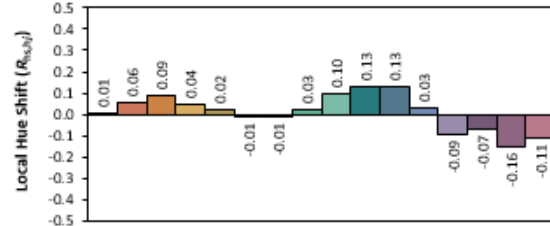
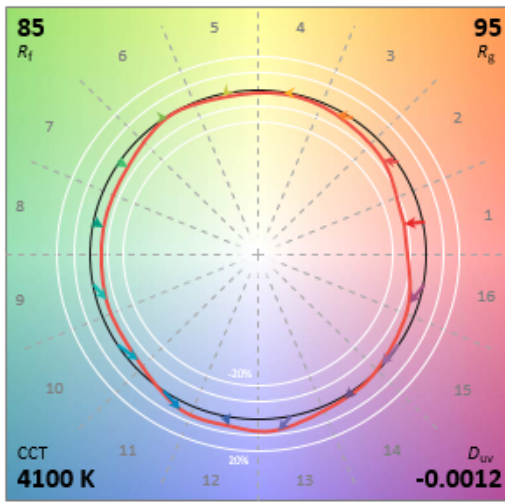
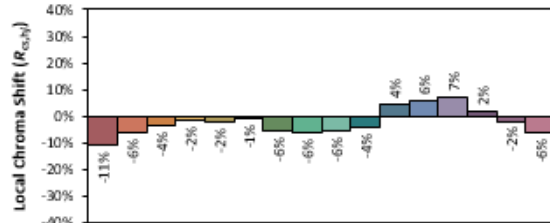
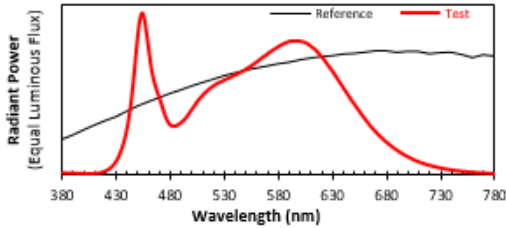
IES TM-30-18 Color Rendition Report

Source: DLF1907103-2aREV2

Manufacturer: RAB Lighting Inc.

Date: 2019/7/2

Model: SWISHFA2x2 / 29W / 4000K



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

x **0.3754**
 y **0.3709**
 u' **0.2241**
 v' **0.4982**

CIE 13.3-1995 (CRI)	
R_a	86
R_3	23

SPD Table

Wavel Length (mm)	Spectral Power (W/nm)	Wavel Length (mm)	Spectral Power (W/nm)	Wavel Length (mm)	Spectral Power (W/nm)	Wavel Length (mm)	Spectral Power (W/nm)	Wavel Length (mm)	Spectral Power (W/nm)
380	8.76E-04	421	1.99E-03	461	4.65E-02	501	2.76E-02	541	4.09E-02
381	8.54E-04	422	2.25E-03	462	4.35E-02	502	2.83E-02	542	4.12E-02
382	8.53E-04	423	2.54E-03	463	4.11E-02	503	2.89E-02	543	4.15E-02
383	8.63E-04	424	2.88E-03	464	3.91E-02	504	2.96E-02	544	4.17E-02
384	8.47E-04	425	3.27E-03	465	3.74E-02	505	3.02E-02	545	4.19E-02
385	8.17E-04	426	3.69E-03	466	3.59E-02	506	3.08E-02	546	4.21E-02
386	8.14E-04	427	4.18E-03	467	3.45E-02	507	3.12E-02	547	4.24E-02
387	8.31E-04	428	4.76E-03	468	3.32E-02	508	3.18E-02	548	4.26E-02
388	8.39E-04	429	5.36E-03	469	3.19E-02	509	3.22E-02	549	4.29E-02
389	8.23E-04	430	6.06E-03	470	3.07E-02	510	3.27E-02	550	4.32E-02
390	7.98E-04	431	6.88E-03	471	2.94E-02	511	3.32E-02	551	4.35E-02
391	7.77E-04	432	7.77E-03	472	2.80E-02	512	3.36E-02	552	4.37E-02
392	7.58E-04	433	8.80E-03	473	2.67E-02	513	3.39E-02	553	4.40E-02
393	7.51E-04	434	9.94E-03	474	2.53E-02	514	3.44E-02	554	4.43E-02
394	7.35E-04	435	1.12E-02	475	2.40E-02	515	3.48E-02	555	4.46E-02
395	7.12E-04	436	1.26E-02	476	2.30E-02	516	3.51E-02	556	4.49E-02
396	7.14E-04	437	1.41E-02	477	2.20E-02	517	3.55E-02	557	4.52E-02
397	7.18E-04	438	1.58E-02	478	2.12E-02	518	3.58E-02	558	4.55E-02
398	6.96E-04	439	1.78E-02	479	2.07E-02	519	3.62E-02	559	4.59E-02
399	6.63E-04	440	2.01E-02	480	2.03E-02	520	3.65E-02	560	4.62E-02
400	6.33E-04	441	2.27E-02	481	2.01E-02	521	3.67E-02	561	4.65E-02
401	6.38E-04	442	2.56E-02	482	1.99E-02	522	3.70E-02	562	4.69E-02
402	6.42E-04	443	2.88E-02	483	1.99E-02	523	3.72E-02	563	4.72E-02
403	6.31E-04	444	3.25E-02	484	1.99E-02	524	3.75E-02	564	4.75E-02
404	6.23E-04	445	3.65E-02	485	2.01E-02	525	3.77E-02	565	4.79E-02
405	6.19E-04	446	4.10E-02	486	2.04E-02	526	3.79E-02	566	4.82E-02
406	6.17E-04	447	4.56E-02	487	2.06E-02	527	3.80E-02	567	4.85E-02
407	6.24E-04	448	5.02E-02	488	2.09E-02	528	3.83E-02	568	4.87E-02
408	6.37E-04	449	5.47E-02	489	2.12E-02	529	3.85E-02	569	4.90E-02
409	6.60E-04	450	5.88E-02	490	2.15E-02	530	3.88E-02	570	4.94E-02
410	6.90E-04	451	6.20E-02	491	2.19E-02	531	3.90E-02	571	4.98E-02
411	7.25E-04	452	6.43E-02	492	2.23E-02	532	3.92E-02	572	5.01E-02
412	7.76E-04	453	6.56E-02	493	2.28E-02	533	3.94E-02	573	5.04E-02
413	8.38E-04	454	6.59E-02	494	2.33E-02	534	3.95E-02	574	5.07E-02
414	9.06E-04	455	6.46E-02	495	2.39E-02	535	3.97E-02	575	5.10E-02
415	1.01E-03	456	6.24E-02	496	2.45E-02	536	4.00E-02	576	5.12E-02
416	1.13E-03	457	5.95E-02	497	2.51E-02	537	4.02E-02	577	5.15E-02
417	1.25E-03	458	5.64E-02	498	2.57E-02	538	4.05E-02	578	5.18E-02
418	1.40E-03	459	5.31E-02	499	2.64E-02	539	4.07E-02	579	5.21E-02
419	1.57E-03	460	4.97E-02	500	2.70E-02	540	4.08E-02	580	5.24E-02
420	1.76E-03								

Wavel Length (mm)	Spectral Power (W/nm)	Wavel Length (mm)	Spectral Power (W/nm)	Wavel Length (mm)	Spectral Power (W/nm)	Wavel Length (mm)	Spectral Power (W/nm)	Wavel Length (mm)	Spectral Power (W/nm)
581	5.26E-02	621	4.75E-02	661	2.22E-02	701	7.17E-03	741	2.04E-03
582	5.29E-02	622	4.69E-02	662	2.16E-02	702	6.93E-03	742	1.99E-03
583	5.31E-02	623	4.63E-02	663	2.11E-02	703	6.71E-03	743	1.93E-03
584	5.34E-02	624	4.57E-02	664	2.05E-02	704	6.51E-03	744	1.87E-03
585	5.35E-02	625	4.51E-02	665	1.99E-02	705	6.30E-03	745	1.81E-03
586	5.37E-02	626	4.44E-02	666	1.94E-02	706	6.11E-03	746	1.76E-03
587	5.39E-02	627	4.38E-02	667	1.89E-02	707	5.92E-03	747	1.71E-03
588	5.41E-02	628	4.33E-02	668	1.85E-02	708	5.74E-03	748	1.66E-03
589	5.42E-02	629	4.27E-02	669	1.80E-02	709	5.57E-03	749	1.61E-03
590	5.44E-02	630	4.20E-02	670	1.75E-02	710	5.41E-03	750	1.56E-03
591	5.45E-02	631	4.14E-02	671	1.70E-02	711	5.24E-03	751	1.51E-03
592	5.45E-02	632	4.07E-02	672	1.66E-02	712	5.07E-03	752	1.47E-03
593	5.45E-02	633	4.01E-02	673	1.62E-02	713	4.92E-03	753	1.43E-03
594	5.45E-02	634	3.94E-02	674	1.57E-02	714	4.77E-03	754	1.39E-03
595	5.46E-02	635	3.87E-02	675	1.53E-02	715	4.62E-03	755	1.35E-03
596	5.45E-02	636	3.80E-02	676	1.49E-02	716	4.48E-03	756	1.31E-03
597	5.45E-02	637	3.74E-02	677	1.45E-02	717	4.35E-03	757	1.26E-03
598	5.46E-02	638	3.67E-02	678	1.41E-02	718	4.21E-03	758	1.23E-03
599	5.46E-02	639	3.61E-02	679	1.37E-02	719	4.08E-03	759	1.19E-03
600	5.44E-02	640	3.54E-02	680	1.33E-02	720	3.97E-03	760	1.16E-03
601	5.43E-02	641	3.47E-02	681	1.30E-02	721	3.84E-03	761	1.12E-03
602	5.42E-02	642	3.40E-02	682	1.26E-02	722	3.73E-03	762	1.09E-03
603	5.41E-02	643	3.34E-02	683	1.22E-02	723	3.62E-03	763	1.06E-03
604	5.40E-02	644	3.27E-02	684	1.19E-02	724	3.50E-03	764	1.02E-03
605	5.38E-02	645	3.20E-02	685	1.16E-02	725	3.40E-03	765	9.87E-04
606	5.36E-02	646	3.14E-02	686	1.12E-02	726	3.29E-03	766	9.62E-04
607	5.33E-02	647	3.07E-02	687	1.09E-02	727	3.20E-03	767	9.30E-04
608	5.30E-02	648	3.01E-02	688	1.06E-02	728	3.10E-03	768	9.03E-04
609	5.27E-02	649	2.95E-02	689	1.03E-02	729	3.00E-03	769	8.74E-04
610	5.23E-02	650	2.88E-02	690	9.98E-03	730	2.92E-03	770	8.48E-04
611	5.20E-02	651	2.82E-02	691	9.69E-03	731	2.82E-03	771	8.29E-04
612	5.17E-02	652	2.76E-02	692	9.40E-03	732	2.73E-03	772	8.07E-04
613	5.14E-02	653	2.69E-02	693	9.12E-03	733	2.64E-03	773	7.84E-04
614	5.10E-02	654	2.63E-02	694	8.85E-03	734	2.56E-03	774	7.65E-04
615	5.05E-02	655	2.57E-02	695	8.58E-03	735	2.48E-03	775	7.41E-04
616	5.00E-02	656	2.51E-02	696	8.33E-03	736	2.41E-03	776	7.13E-04
617	4.95E-02	657	2.45E-02	697	8.08E-03	737	2.34E-03	777	6.89E-04
618	4.89E-02	658	2.39E-02	698	7.87E-03	738	2.24E-03	778	6.69E-04
619	4.84E-02	659	2.33E-02	699	7.64E-03	739	2.18E-03	779	6.49E-04
620	4.80E-02	660	2.27E-02	700	7.41E-03	740	2.11E-03	780	6.29E-04

4.0 LM-79 Measurement and Test Results

4.1 Integrating Sphere Test

Model No.	SWISHFA2x2 / 29W / 5000K	Sample ID.	B1
Operate time (Min.)	90	Stabilization time (Min.)	45
Temperature (°C)	25.4	Humidity (%RH)	57.0

Test Method

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

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

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

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

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

Test Result

Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
120.03	60	0.249	29.8	0.998
276.99	60	0.111	29.9	0.975

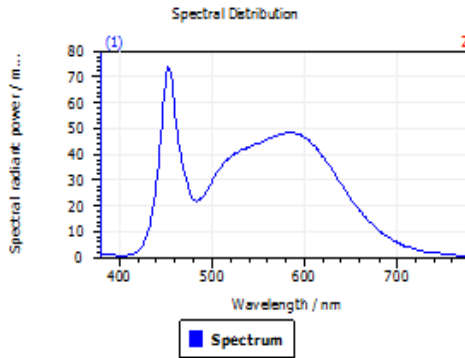
Test Result

CCT (K)	CRI	R9	Duv
5020	84	10	0.0022

Rf	Rg	IES Rcs,h1
84	95	-12%

4.1 Integrating Sphere Test

Results



Spectral values

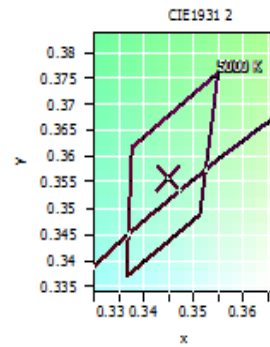
DominantWavelength	570.36 nm
Purity	0.103
PeakWavelength	452.74 nm
Radiant Power	9.573 W
Width50%	25.52 nm

Color Coordinates

Correlated Color Temperature 5020 K

x: 0.3450 u: 0.2097 u': 0.2097
y: 0.3559 v: 0.3245 v': 0.4867

ResultsCRICRI01	82.2	ResultsCRICRI09	10.0
ResultsCRICRI02	90.1	ResultsCRICRI10	76.1
ResultsCRICRI03	94.4	ResultsCRICRI11	81.9
ResultsCRICRI04	82.7	ResultsCRICRI12	63.9
ResultsCRICRI05	82.9	ResultsCRICRI13	84.5
ResultsCRICRI06	85.8	ResultsCRICRI14	97.3
ResultsCRICRI07	86.6	ResultsCRICRI15	76.6
ResultsCRICRI08	67.1	ResultsCRICRI16	74.1
ResultsCRI	84.0		



PlanckDistance 2.2E-003

4.1 Integrating Sphere Test

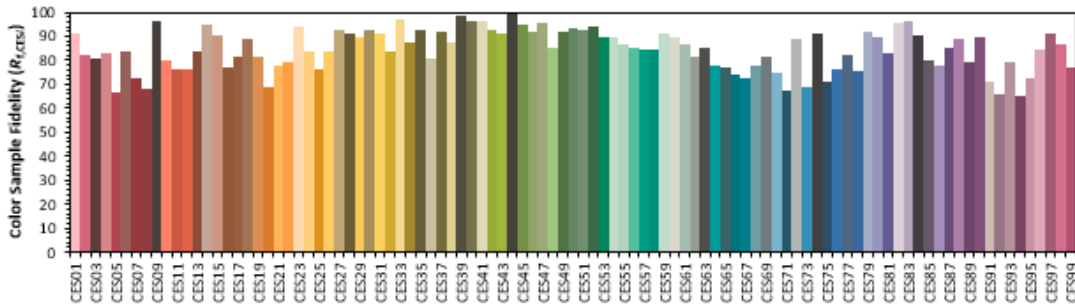
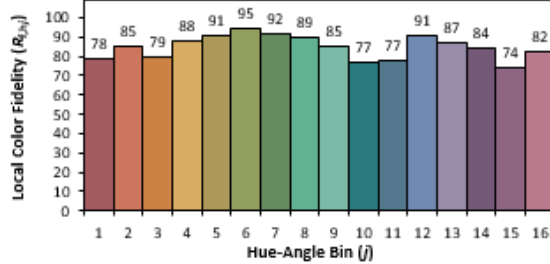
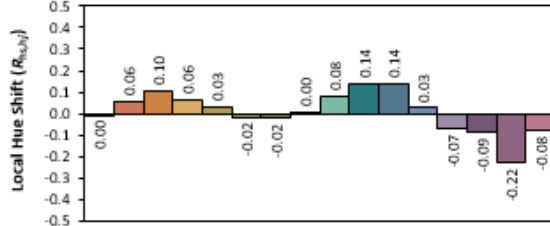
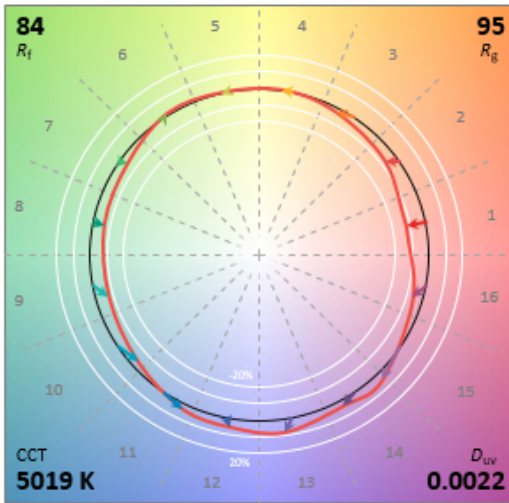
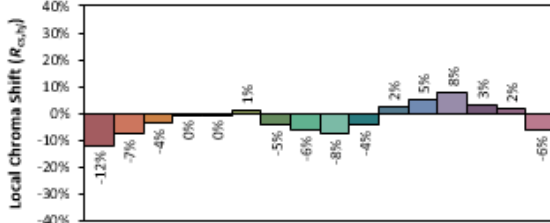
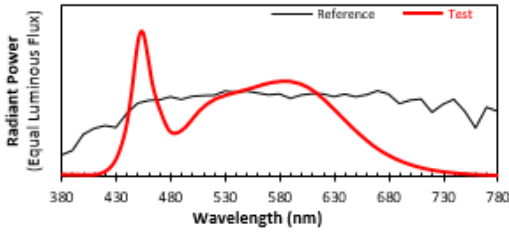
IES TM-30-18 Color Rendition Report

Source: DLF1907103-2aREV2

Manufacturer: RAB Lighting Inc.

Date: 2019/7/2

Model: SWISHFA2x2 / 29W / 5000K



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

x 0.3450
 y 0.3559
 z' 0.2097
 v' 0.4867

CIE 13.3-1995 (CRI)	
R_a	85
R_3	16

SPD Table

Wavel Length (mm)	Spectral Power (W/nm)	Wavel Length (mm)	Spectral Power (W/nm)	Wavel Length (mm)	Spectral Power (W/nm)	Wavel Length (mm)	Spectral Power (W/nm)	Wavel Length (mm)	Spectral Power (W/nm)
380	9.76E-04	421	3.15E-03	461	5.21E-02	501	3.03E-02	541	4.28E-02
381	9.63E-04	422	3.59E-03	462	4.90E-02	502	3.09E-02	542	4.30E-02
382	9.56E-04	423	4.07E-03	463	4.61E-02	503	3.15E-02	543	4.32E-02
383	9.60E-04	424	4.62E-03	464	4.38E-02	504	3.23E-02	544	4.34E-02
384	9.47E-04	425	5.24E-03	465	4.17E-02	505	3.29E-02	545	4.35E-02
385	9.37E-04	426	5.91E-03	466	3.97E-02	506	3.34E-02	546	4.37E-02
386	9.38E-04	427	6.68E-03	467	3.79E-02	507	3.39E-02	547	4.38E-02
387	9.40E-04	428	7.56E-03	468	3.62E-02	508	3.44E-02	548	4.39E-02
388	9.38E-04	429	8.53E-03	469	3.46E-02	509	3.49E-02	549	4.41E-02
389	9.24E-04	430	9.61E-03	470	3.32E-02	510	3.54E-02	550	4.43E-02
390	9.14E-04	431	1.09E-02	471	3.17E-02	511	3.59E-02	551	4.45E-02
391	9.03E-04	432	1.22E-02	472	3.03E-02	512	3.64E-02	552	4.46E-02
392	8.96E-04	433	1.37E-02	473	2.89E-02	513	3.68E-02	553	4.47E-02
393	8.77E-04	434	1.54E-02	474	2.75E-02	514	3.72E-02	554	4.49E-02
394	8.50E-04	435	1.72E-02	475	2.63E-02	515	3.75E-02	555	4.51E-02
395	8.37E-04	436	1.91E-02	476	2.52E-02	516	3.79E-02	556	4.52E-02
396	8.36E-04	437	2.12E-02	477	2.42E-02	517	3.82E-02	557	4.54E-02
397	8.25E-04	438	2.36E-02	478	2.34E-02	518	3.85E-02	558	4.56E-02
398	8.04E-04	439	2.63E-02	479	2.28E-02	519	3.89E-02	559	4.57E-02
399	7.88E-04	440	2.94E-02	480	2.24E-02	520	3.93E-02	560	4.59E-02
400	7.71E-04	441	3.28E-02	481	2.21E-02	521	3.95E-02	561	4.61E-02
401	7.54E-04	442	3.66E-02	482	2.20E-02	522	3.97E-02	562	4.63E-02
402	7.60E-04	443	4.05E-02	483	2.19E-02	523	3.99E-02	563	4.65E-02
403	7.62E-04	444	4.48E-02	484	2.19E-02	524	4.01E-02	564	4.66E-02
404	7.63E-04	445	4.94E-02	485	2.21E-02	525	4.03E-02	565	4.68E-02
405	7.68E-04	446	5.42E-02	486	2.23E-02	526	4.05E-02	566	4.69E-02
406	7.82E-04	447	5.87E-02	487	2.25E-02	527	4.06E-02	567	4.70E-02
407	8.05E-04	448	6.30E-02	488	2.28E-02	528	4.08E-02	568	4.71E-02
408	8.36E-04	449	6.69E-02	489	2.32E-02	529	4.11E-02	569	4.73E-02
409	8.90E-04	450	7.02E-02	490	2.36E-02	530	4.13E-02	570	4.74E-02
410	9.51E-04	451	7.23E-02	491	2.41E-02	531	4.15E-02	571	4.75E-02
411	1.01E-03	452	7.35E-02	492	2.46E-02	532	4.16E-02	572	4.77E-02
412	1.11E-03	453	7.38E-02	493	2.50E-02	533	4.17E-02	573	4.78E-02
413	1.22E-03	454	7.32E-02	494	2.56E-02	534	4.19E-02	574	4.78E-02
414	1.35E-03	455	7.12E-02	495	2.63E-02	535	4.20E-02	575	4.79E-02
415	1.52E-03	456	6.86E-02	496	2.69E-02	536	4.22E-02	576	4.80E-02
416	1.70E-03	457	6.56E-02	497	2.76E-02	537	4.24E-02	577	4.80E-02
417	1.92E-03	458	6.23E-02	498	2.82E-02	538	4.26E-02	578	4.81E-02
418	2.17E-03	459	5.90E-02	499	2.89E-02	539	4.27E-02	579	4.83E-02
419	2.46E-03	460	5.56E-02	500	2.96E-02	540	4.28E-02	580	4.83E-02
420	2.77E-03								

Wavel Length (mm)	Spectral Power (W/nm)	Wavel Length (mm)	Spectral Power (W/nm)	Wavel Length (mm)	Spectral Power (W/nm)	Wavel Length (mm)	Spectral Power (W/nm)	Wavel Length (mm)	Spectral Power (W/nm)
581	4.83E-02	621	3.87E-02	661	1.76E-02	701	5.75E-03	741	1.69E-03
582	4.83E-02	622	3.81E-02	662	1.71E-02	702	5.57E-03	742	1.64E-03
583	4.84E-02	623	3.76E-02	663	1.67E-02	703	5.39E-03	743	1.60E-03
584	4.84E-02	624	3.71E-02	664	1.62E-02	704	5.23E-03	744	1.54E-03
585	4.83E-02	625	3.65E-02	665	1.58E-02	705	5.07E-03	745	1.49E-03
586	4.83E-02	626	3.59E-02	666	1.54E-02	706	4.93E-03	746	1.45E-03
587	4.83E-02	627	3.54E-02	667	1.50E-02	707	4.78E-03	747	1.42E-03
588	4.83E-02	628	3.48E-02	668	1.46E-02	708	4.63E-03	748	1.38E-03
589	4.83E-02	629	3.43E-02	669	1.42E-02	709	4.50E-03	749	1.34E-03
590	4.82E-02	630	3.38E-02	670	1.39E-02	710	4.37E-03	750	1.30E-03
591	4.80E-02	631	3.32E-02	671	1.35E-02	711	4.23E-03	751	1.25E-03
592	4.79E-02	632	3.27E-02	672	1.31E-02	712	4.10E-03	752	1.22E-03
593	4.78E-02	633	3.21E-02	673	1.28E-02	713	3.98E-03	753	1.19E-03
594	4.77E-02	634	3.15E-02	674	1.25E-02	714	3.85E-03	754	1.15E-03
595	4.75E-02	635	3.10E-02	675	1.22E-02	715	3.74E-03	755	1.12E-03
596	4.73E-02	636	3.04E-02	676	1.18E-02	716	3.64E-03	756	1.08E-03
597	4.72E-02	637	2.99E-02	677	1.15E-02	717	3.53E-03	757	1.05E-03
598	4.71E-02	638	2.93E-02	678	1.12E-02	718	3.42E-03	758	1.02E-03
599	4.69E-02	639	2.88E-02	679	1.09E-02	719	3.33E-03	759	9.96E-04
600	4.66E-02	640	2.82E-02	680	1.06E-02	720	3.23E-03	760	9.71E-04
601	4.64E-02	641	2.76E-02	681	1.03E-02	721	3.13E-03	761	9.40E-04
602	4.61E-02	642	2.71E-02	682	1.01E-02	722	3.04E-03	762	9.07E-04
603	4.59E-02	643	2.65E-02	683	9.76E-03	723	2.94E-03	763	8.80E-04
604	4.56E-02	644	2.60E-02	684	9.47E-03	724	2.86E-03	764	8.59E-04
605	4.54E-02	645	2.54E-02	685	9.21E-03	725	2.78E-03	765	8.36E-04
606	4.51E-02	646	2.49E-02	686	8.94E-03	726	2.69E-03	766	8.12E-04
607	4.47E-02	647	2.44E-02	687	8.69E-03	727	2.61E-03	767	7.86E-04
608	4.43E-02	648	2.39E-02	688	8.45E-03	728	2.53E-03	768	7.60E-04
609	4.40E-02	649	2.34E-02	689	8.21E-03	729	2.46E-03	769	7.40E-04
610	4.36E-02	650	2.29E-02	690	7.97E-03	730	2.39E-03	770	7.23E-04
611	4.32E-02	651	2.23E-02	691	7.74E-03	731	2.31E-03	771	7.03E-04
612	4.28E-02	652	2.18E-02	692	7.51E-03	732	2.24E-03	772	6.85E-04
613	4.25E-02	653	2.13E-02	693	7.28E-03	733	2.17E-03	773	6.65E-04
614	4.20E-02	654	2.09E-02	694	7.09E-03	734	2.11E-03	774	6.43E-04
615	4.15E-02	655	2.04E-02	695	6.88E-03	735	2.04E-03	775	6.26E-04
616	4.11E-02	656	1.99E-02	696	6.68E-03	736	1.98E-03	776	6.08E-04
617	4.06E-02	657	1.94E-02	697	6.50E-03	737	1.92E-03	777	5.94E-04
618	4.01E-02	658	1.89E-02	698	6.31E-03	738	1.86E-03	778	5.79E-04
619	3.96E-02	659	1.84E-02	699	6.12E-03	739	1.81E-03	779	5.61E-04
620	3.91E-02	660	1.80E-02	700	5.93E-03	740	1.75E-03	780	5.43E-04

4.0 LM-79 Measurement and Test Results

4.2 Goniophotometer Test

Model No.	SWISHFA2x2 / 29W / 3500K	Sample ID.	B1
Operate time (Min.)	90	Stabilization time (Min.)	45
Temperature (°C)	25.3	Humidity (%RH)	54.0

Test Method

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

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

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

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

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

Test Conditions

Condition	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
WROST CASE	276.94	60	0.111	29.9	0.975
NON-WROST CASE	120.00	60	0.248	29.7	0.998

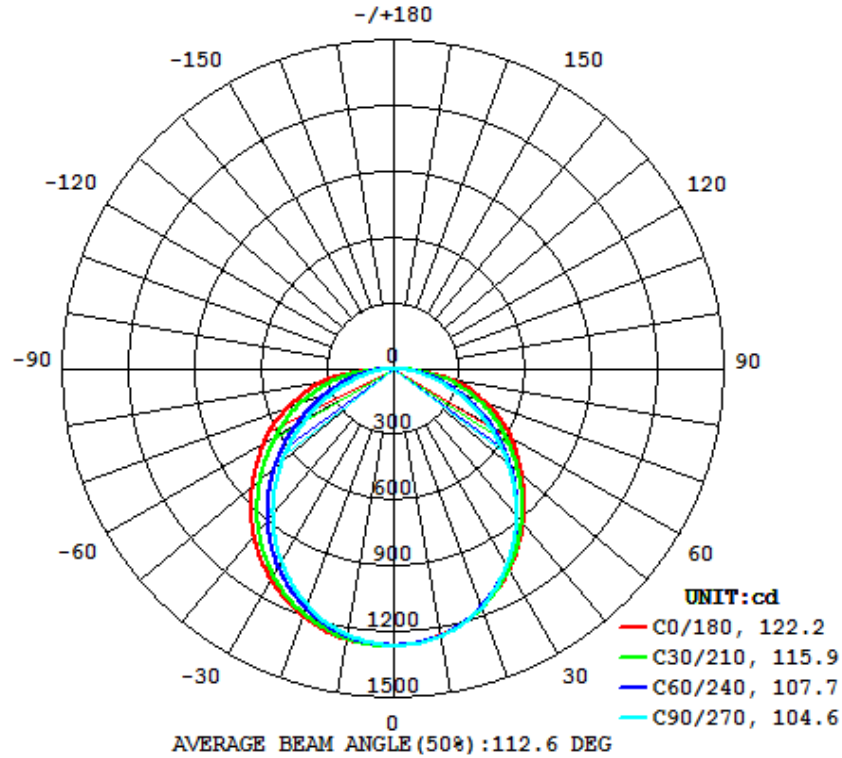
Test Result

Flux (lm)	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
	C0-180	C90-270	C0-180	C90-270	
3677	168.4	158.4	122.2	104.6	123.0

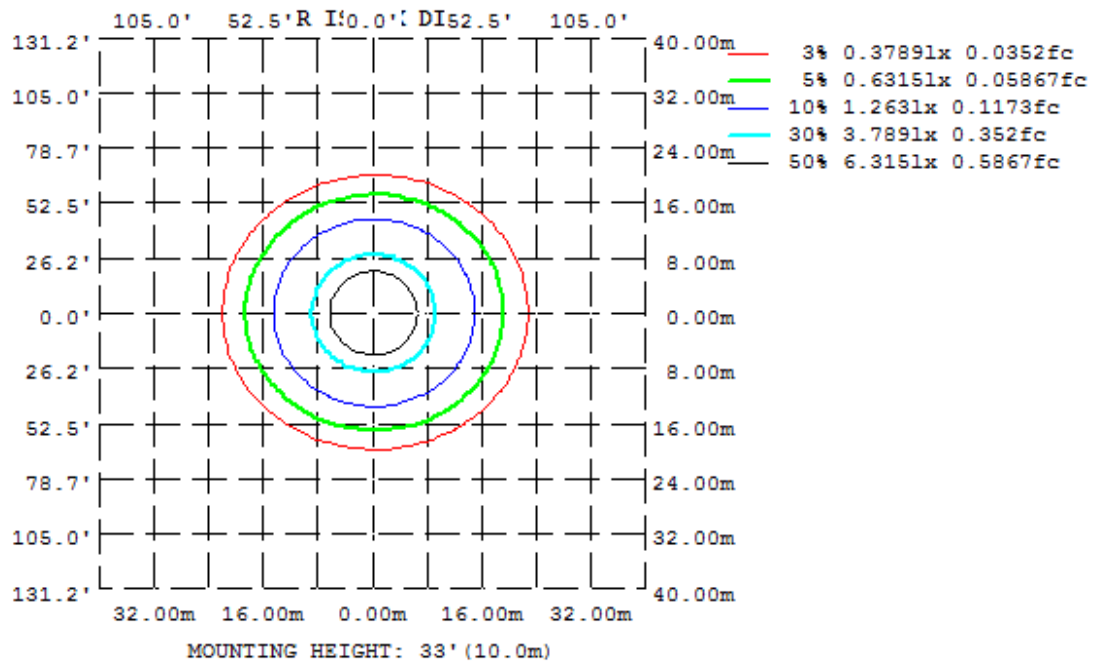
Zonal Lumen Requirement (0°-60°)	UGR (X=4H, Y=8H, 70/50/20%)	SC:0-180°	SC:90°-270°
76.39%	23.6	1.32	1.22

4.3 Goniophotometer Test

Light Distribution Curve



Isolux Plot



4.3 Goniophotometer Test

Zonal Lumen Summary

γ	LUMINOUS INTENSITY:cd									
	C0	C45	C90	C135	C180	C225	C270	C315		
10	1252	1242	1231	1228	1231	1232	1238	1246		
20	1203	1177	1149	1150	1162	1155	1159	1185		
30	1113	1068	1019	1031	1054	1041	1034	1080		
40	988.2	921.6	853.7	879.8	918.9	891.8	872.6	937.3		
50	838.7	751.1	665.8	707.4	766.3	719.0	687.0	768.0		
60	682.7	567.8	467.9	527.2	614.7	538.9	490.2	587.4		
70	513.1	389.5	275.7	357.0	442.4	367.4	297.9	411.4		
80	324.5	201.2	103.9	178.3	246.2	189.0	123.6	225.1		
90	0	0	0	0	0	0	0	0		
100	0	0	0	0	0	0	0	0		
110	0	0	0	0	0	0	0	0		
120	0	0	0	0	0	0	0	0		
130	0	0	0	0	0	0	0	0		
140	0	0	0	0	0	0	0	0		
150	0	0	0	0	0	0	0	0		
160	0	0	0	0	0	0	0	0		
170	0	0	0	0	0	0	0	0		
180	0	0	0	0	0	0	0	0		

4.3 Goniophotometer Test

ZONAL LUMEN SUMMARY

	Zonal (lm)		Total (lm)	Percent
0-10	119.30	0 - 10	119.30	3.24%
10-20	340.89	0 - 20	460.19	12.51%
20-30	514.33	0 - 30	974.52	26.50%
30-40	616.40	0 - 40	1590.92	43.26%
40-50	636.88	0 - 50	2227.80	60.58%
50-60	581.06	0 - 60	2808.86	76.39%
60-70	466.98	0 - 70	3275.84	89.09%
70-80	306.94	0 - 80	3582.78	97.43%
80-90	94.42	0 - 90	3677.20	100.00%
90-100	0.00	0 - 100	3677.20	100.00%
100-110	0.00	0 - 110	3677.20	100.00%
110-120	0.00	0 - 120	3677.20	100.00%
120-130	0.00	0 - 130	3677.20	100.00%
130-140	0.00	0 - 140	3677.20	100.00%
140-150	0.00	0 - 150	3677.20	100.00%
150-160	0.00	0 - 160	3677.20	100.00%
160-170	0.00	0 - 170	3677.20	100.00%
170-180	0.00	0 - 180	3677.20	100.00%

4.3 Goniophotometer Test

UGR Table - Corrected

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	17.3	19.0	17.7	19.3	19.6	15.4	17.1	15.8	17.4	17.7	
	3H	19.8	21.3	20.1	21.6	22.0	17.0	18.6	17.4	18.9	19.2	
	4H	20.9	22.3	21.2	22.6	23.0	17.6	19.1	18.0	19.4	19.8	
	6H	21.9	23.2	22.3	23.6	24.0	18.0	19.3	18.4	19.7	20.1	
	8H	22.3	23.6	22.7	24.0	24.4	18.1	19.4	18.6	19.8	20.2	
	12H	22.5	23.8	23.0	24.2	24.6	18.2	19.4	18.6	19.8	20.2	
4H	2H	17.8	19.3	18.2	19.6	20.0	16.3	17.7	16.7	18.1	18.4	
	3H	20.6	21.8	21.0	22.2	22.6	18.2	19.4	18.6	19.8	20.2	
	4H	21.8	22.9	22.3	23.3	23.8	18.9	20.0	19.3	20.4	20.8	
	6H	23.1	24.1	23.5	24.5	24.9	19.4	20.3	19.8	20.8	21.2	
	8H	23.6	24.5	24.0	24.9	25.4	19.5	20.4	20.0	20.9	21.3	
	12H	23.9	24.7	24.4	25.2	25.6	19.6	20.4	20.1	20.9	21.3	
8H	4H	22.1	23.0	22.6	23.5	23.9	19.5	20.4	20.0	20.8	21.3	
	6H	23.6	24.3	24.1	24.8	25.3	20.2	20.9	20.6	21.4	21.9	
	8H	24.1	24.8	24.7	25.3	25.8	20.3	21.0	20.8	21.5	22.0	
	12H	24.6	25.2	25.1	25.7	26.2	20.4	21.0	20.9	21.5	22.1	
12H	4H	22.1	23.0	22.6	23.4	23.9	19.6	20.5	20.1	20.9	21.4	
	6H	23.6	24.3	24.1	24.8	25.3	20.3	21.0	20.9	21.5	22.0	
	8H	24.3	24.9	24.8	25.4	25.9	20.6	21.2	21.1	21.7	22.2	
Maximum UGR = 26.2												

4.3 Goniophotometer Test

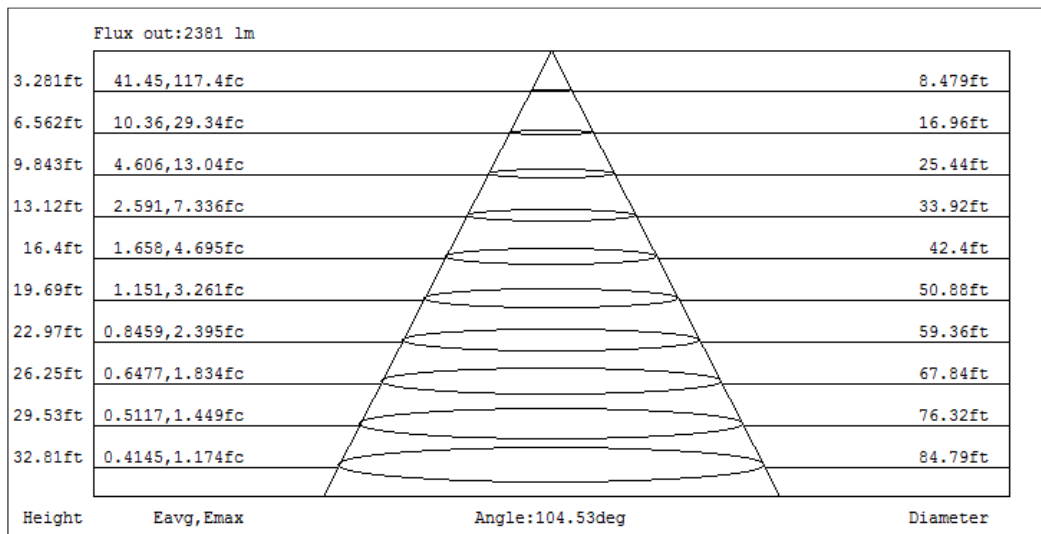
COEFFICIENTS OF UTILIZATION - ZONAL CAVITY METHOD

Coefficients Of Utilization - Zonal Cavity Method

Effective Floor Cavity Reflectance 0.20

RC	80				70				50			30			10			0
Rw	70	50	30	10	70	50	30	10	50	30	10	50	30	10	50	30	10	0
0	119	119	119	119	116	116	116	116	111	111	111	106	106	106	102	102	102	100
1	108	103	99	95	105	101	97	93	97	93	90	93	90	87	89	87	85	83
2	98	89	82	76	95	88	81	75	84	78	74	81	76	72	78	74	70	68
3	89	78	70	63	87	77	69	63	74	67	61	71	65	60	68	63	59	57
4	82	69	60	53	79	68	59	53	65	58	52	63	57	51	61	55	51	49
5	75	62	53	46	73	61	52	46	58	51	45	56	50	45	55	49	44	42
6	69	56	46	40	67	55	46	40	53	45	39	51	44	39	49	43	39	37
7	64	50	41	35	62	50	41	35	48	40	35	47	40	35	45	39	34	32
8	60	46	37	31	58	45	37	31	44	36	31	43	36	31	41	35	31	29
9	56	42	34	28	54	42	34	28	40	33	28	39	33	28	38	32	28	26
10	52	39	31	26	51	38	31	26	37	30	25	36	30	25	36	30	25	23

CONE OF LIGHT DIAGRAM



4.0 LM-79 Measurement and Test Results

4.2 Goniophotometer Test

Model No.	SWISHFA2x2 / 29W / 4000K	Sample ID.	B1
Operate time (Min.)	90	Stabilization time (Min.)	45
Temperature (°C)	25.4	Humidity (%RH)	56.0

Test Method

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

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

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

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

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

Test Conditions

Condition	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
WROST CASE	276.92	60	0.108	29.0	0.974
NON-WROST CASE	120.00	60	0.239	28.6	0.998

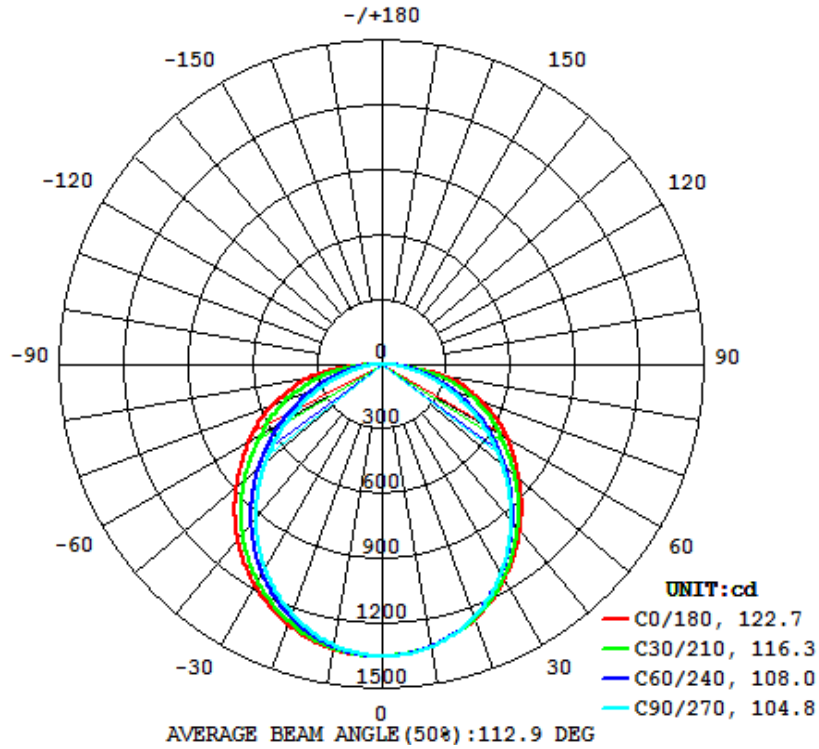
Test Result

Flux (lm)	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
	C0-180	C90-270	C0-180	C90-270	
3954	168.4	158.6	122.7	104.8	136.4

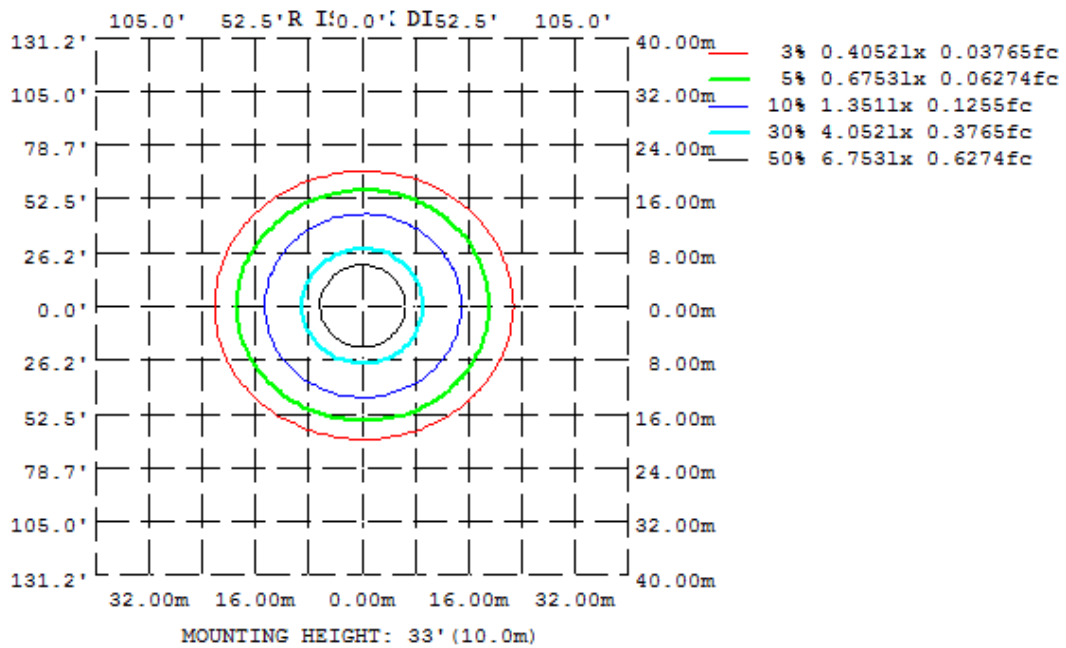
Zonal Lumen Requirement (0°-60°)	UGR (X=4H, Y=8H, 70/50/20%)	SC:0-180°	SC:90°-270°
76.33%	23.8	1.32	1.22

4.3 Goniophotometer Test

Light Distribution Curve



Isolux Plot



4.3 Goniophotometer Test

Zonal Lumen Summary

γ DEG	LUMINOUS INTENSITY: cd										
	C0	C45	C90	C135	C180	C225	C270	C315			
10	1337	1330	1318	1318	1321	1321	1323	1331			
20	1282	1256	1230	1236	1256	1250	1249	1272			
30	1184	1139	1092	1112	1146	1128	1113	1157			
40	1049	982.5	915.0	951.3	1002	968.2	940.1	1003			
50	887.2	797.7	713.5	766.7	838.4	783.4	739.9	820.7			
60	719.7	603.0	504.5	577.6	675.9	590.3	529.0	625.0			
70	542.0	412.0	297.3	393.8	488.2	405.2	322.0	435.3			
80	342.3	212.2	112.1	197.3	270.8	209.4	134.3	237.2			
90	0	0	0	0	0	0	0	0			
100	0	0	0	0	0	0	0	0			
110	0	0	0	0	0	0	0	0			
120	0	0	0	0	0	0	0	0			
130	0	0	0	0	0	0	0	0			
140	0	0	0	0	0	0	0	0			
150	0	0	0	0	0	0	0	0			
160	0	0	0	0	0	0	0	0			
170	0	0	0	0	0	0	0	0			
180	0	0	0	0	0	0	0	0			

4.3 Goniophotometer Test

ZONAL LUMEN SUMMARY

	Zonal (lm)		Total (lm)	Percent
0-10	127.71	0 - 10	127.71	3.23%
10-20	365.45	0 - 20	493.16	12.47%
20-30	552.50	0 - 30	1045.66	26.44%
30-40	662.54	0 - 40	1708.20	43.20%
40-50	684.82	0 - 50	2393.02	60.52%
50-60	625.13	0 - 60	3018.15	76.33%
60-70	503.51	0 - 70	3521.66	89.06%
70-80	331.07	0 - 80	3852.73	97.43%
80-90	101.60	0 - 90	3954.33	100.00%
90-100	0.00	0 - 100	3954.33	100.00%
100-110	0.00	0 - 110	3954.33	100.00%
110-120	0.00	0 - 120	3954.33	100.00%
120-130	0.00	0 - 130	3954.33	100.00%
130-140	0.00	0 - 140	3954.33	100.00%
140-150	0.00	0 - 150	3954.33	100.00%
150-160	0.00	0 - 160	3954.33	100.00%
160-170	0.00	0 - 170	3954.33	100.00%
170-180	0.00	0 - 180	3954.33	100.00%

4.3 Goniophotometer Test

UGR Table - Corrected

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	17.5	19.2	17.8	19.5	19.8	15.7	17.4	16.1	17.7	18.0
	3H	19.9	21.5	20.3	21.8	22.1	17.4	18.9	17.7	19.2	19.6
	4H	21.0	22.5	21.4	22.8	23.2	18.0	19.4	18.3	19.7	20.1
	6H	22.1	23.4	22.5	23.8	24.2	18.3	19.7	18.8	20.0	20.4
	8H	22.5	23.8	22.9	24.1	24.5	18.5	19.7	18.9	20.1	20.5
	12H	22.7	24.0	23.2	24.3	24.8	18.5	19.7	18.9	20.1	20.5
4H	2H	18.0	19.5	18.4	19.8	20.2	16.6	18.0	17.0	18.4	18.7
	3H	20.7	21.9	21.1	22.3	22.7	18.5	19.7	18.9	20.1	20.5
	4H	22.0	23.1	22.4	23.5	23.9	19.2	20.3	19.6	20.7	21.1
	6H	23.3	24.2	23.7	24.7	25.1	19.7	20.7	20.1	21.1	21.6
	8H	23.8	24.7	24.2	25.1	25.6	19.8	20.7	20.3	21.2	21.6
	12H	24.1	24.9	24.6	25.4	25.8	19.9	20.7	20.4	21.2	21.7
8H	4H	22.3	23.2	22.8	23.6	24.1	19.8	20.7	20.3	21.2	21.6
	6H	23.7	24.5	24.2	25.0	25.5	20.5	21.2	21.0	21.7	22.2
	8H	24.3	25.0	24.8	25.5	26.0	20.7	21.3	21.2	21.8	22.3
	12H	24.8	25.4	25.3	25.9	26.4	20.8	21.4	21.3	21.9	22.4
12H	4H	22.3	23.1	22.8	23.6	24.1	20.0	20.8	20.4	21.3	21.7
	6H	23.8	24.5	24.3	24.9	25.5	20.7	21.4	21.2	21.8	22.3
	8H	24.4	25.0	24.9	25.5	26.1	20.9	21.5	21.4	22.0	22.6
Maximum UGR = 26.4											

4.3 Goniophotometer Test

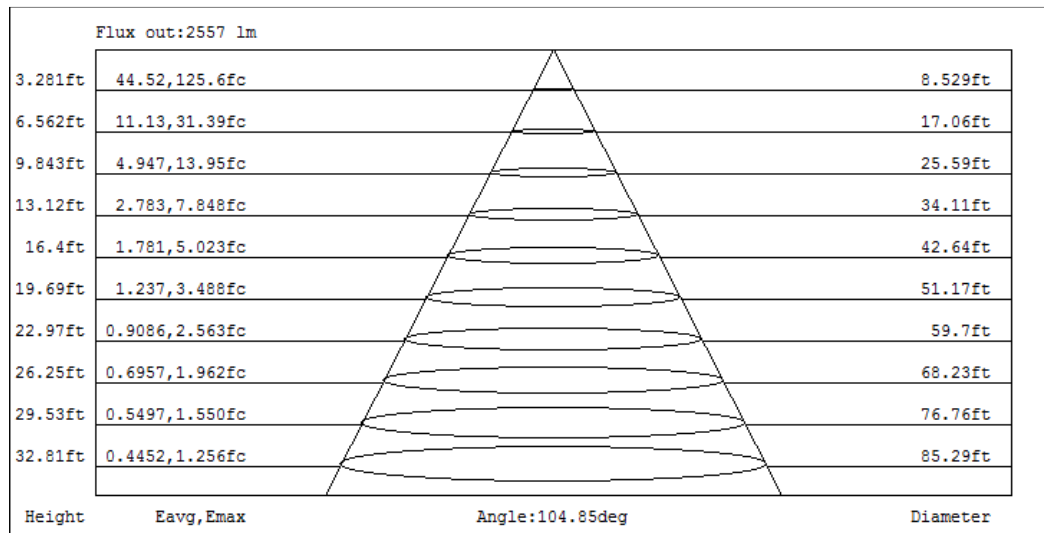
COEFFICIENTS OF UTILIZATION - ZONAL CAVITY METHOD

Coefficients Of Utilization - Zonal Cavity Method

Effective Floor Cavity Reflectance 0.20

RC	80				70				50			30			10			0
R/W	70	50	30	10	70	50	30	10	50	30	10	50	30	10	50	30	10	0
0	119	119	119	119	116	116	116	116	111	111	111	106	106	106	102	102	102	100
1	108	103	99	95	105	101	97	93	97	93	90	93	90	87	89	87	85	83
2	98	89	82	76	95	88	81	75	84	78	74	81	76	72	78	74	70	68
3	89	78	70	63	87	77	69	63	74	67	61	71	65	60	68	63	59	57
4	82	69	60	53	79	68	59	53	65	58	52	63	57	51	61	55	51	48
5	75	62	53	46	73	61	52	45	58	51	45	56	50	44	55	49	44	42
6	69	56	46	40	67	55	46	40	53	45	39	51	44	39	49	43	39	36
7	64	50	41	35	62	50	41	35	48	40	35	46	40	34	45	39	34	32
8	60	46	37	31	58	45	37	31	44	36	31	43	36	31	41	35	31	29
9	56	42	34	28	54	42	34	28	40	33	28	39	33	28	38	32	28	26
10	52	39	31	26	51	38	31	25	37	30	25	36	30	25	35	29	25	23

CONE OF LIGHT DIAGRAM



4.0 LM-79 Measurement and Test Results

4.2 Goniophotometer Test

Model No.	SWISHFA2x2 / 29W / 5000K	Sample ID.	B1
Operate time (Min.)	90	Stabilization time (Min.)	45
Temperature (°C)	25.4	Humidity (%RH)	57.0

Test Method

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

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

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

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

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

Test Conditions

Condition	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
WROST CASE	276.93	60	0.111	29.9	0.976
NON-WROST CASE	120.00	60	0.249	29.8	0.998

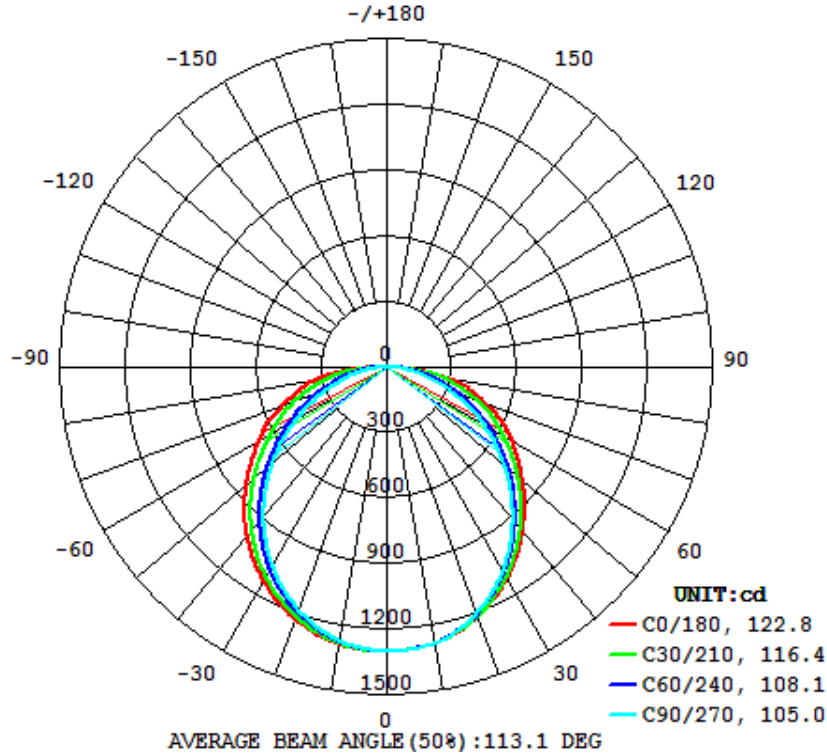
Test Result

Flux (lm)	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
	C0-180	C90-270	C0-180	C90-270	
3816	168.5	158.6	122.8	105.0	127.6

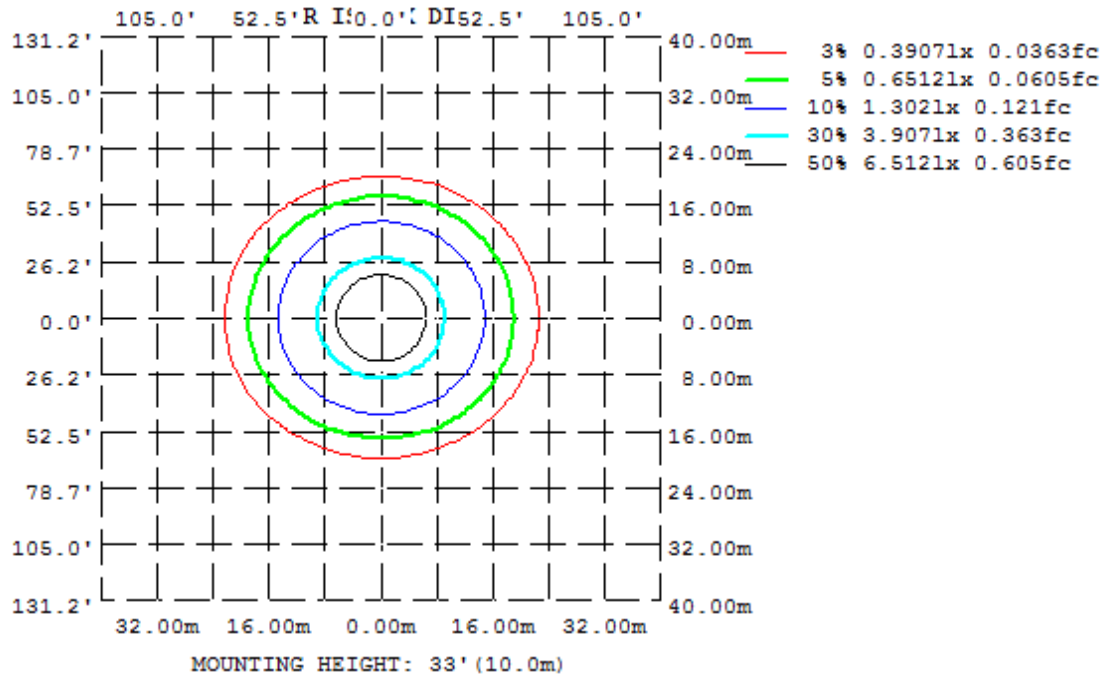
Zonal Lumen Requirement (0°-60°)	UGR (X=4H, Y=8H, 70/50/20%)	SC:0-180°	SC:90°-270°
76.32%	23.5	1.30	1.22

4.3 Goniophotometer Test

Light Distrubtion Curve



Isolux Plot



4.3 Goniophotometer Test

Zonal Lumen Summary

γ DEG	LUMINOUS INTENSITY:cd									
	C0	C45	C90	C135	C180	C225	C270	C315		
10	1286	1279	1271	1272	1282	1283	1283	1287		
20	1227	1208	1186	1197	1217	1210	1204	1222		
30	1133	1093	1053	1077	1114	1093	1075	1110		
40	1002	939.3	882.6	924.1	977.4	942.4	906.9	960.2		
50	844.4	761.2	688.5	747.5	821.1	765.2	714.3	784.3		
60	682.1	574.1	487.5	566.6	664.6	579.2	511.2	594.5		
70	512.3	389.3	287.8	388.6	482.3	399.2	310.7	412.2		
80	322.6	199.8	108.5	195.3	266.8	207.5	129.3	223.7		
90	0	0	0	0	0	0	0	0		
100	0	0	0	0	0	0	0	0		
110	0	0	0	0	0	0	0	0		
120	0	0	0	0	0	0	0	0		
130	0	0	0	0	0	0	0	0		
140	0	0	0	0	0	0	0	0		
150	0	0	0	0	0	0	0	0		
160	0	0	0	0	0	0	0	0		
170	0	0	0	0	0	0	0	0		
180	0	0	0	0	0	0	0	0		

4.3 Goniophotometer Test

ZONAL LUMEN SUMMARY

	Zonal (lm)		Total (lm)	Percent
0-10	123.21	0 - 10	123.21	3.23%
10-20	352.82	0 - 20	476.03	12.48%
20-30	532.65	0 - 30	1008.68	26.44%
30-40	638.98	0 - 40	1647.66	43.18%
40-50	660.68	0 - 50	2308.34	60.50%
50-60	603.59	0 - 60	2911.93	76.32%
60-70	486.21	0 - 70	3398.14	89.06%
70-80	319.52	0 - 80	3717.66	97.43%
80-90	97.91	0 - 90	3815.57	100.00%
90-100	0.00	0 - 100	3815.57	100.00%
100-110	0.00	0 - 110	3815.57	100.00%
110-120	0.00	0 - 120	3815.57	100.00%
120-130	0.00	0 - 130	3815.57	100.00%
130-140	0.00	0 - 140	3815.57	100.00%
140-150	0.00	0 - 150	3815.57	100.00%
150-160	0.00	0 - 160	3815.57	100.00%
160-170	0.00	0 - 170	3815.57	100.00%
170-180	0.00	0 - 180	3815.57	100.00%

4.3 Goniophotometer Test

UGR Table - Corrected

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	17.3	18.9	17.6	19.3	19.6	15.6	17.3	16.0	17.6	17.9	
	3H	19.7	21.2	20.1	21.5	21.9	17.3	18.8	17.7	19.1	19.5	
	4H	20.8	22.2	21.2	22.6	22.9	17.9	19.3	18.3	19.6	20.0	
	6H	21.8	23.2	22.3	23.5	23.9	18.3	19.6	18.7	20.0	20.3	
	8H	22.2	23.5	22.7	23.9	24.3	18.4	19.6	18.8	20.0	20.4	
	12H	22.5	23.7	22.9	24.1	24.5	18.4	19.6	18.8	20.0	20.4	
4H	2H	17.8	19.2	18.2	19.6	20.0	16.5	17.9	16.9	18.3	18.7	
	3H	20.5	21.7	20.9	22.1	22.5	18.4	19.6	18.8	20.0	20.4	
	4H	21.8	22.9	22.2	23.3	23.7	19.1	20.2	19.5	20.6	21.0	
	6H	23.0	24.0	23.5	24.4	24.9	19.6	20.6	20.1	21.0	21.5	
	8H	23.5	24.4	24.0	24.9	25.3	19.8	20.6	20.2	21.1	21.6	
	12H	23.8	24.7	24.3	25.1	25.6	19.8	20.6	20.3	21.1	21.6	
8H	4H	22.1	23.0	22.5	23.4	23.9	19.7	20.6	20.2	21.1	21.5	
	6H	23.5	24.2	24.0	24.7	25.2	20.4	21.1	20.9	21.6	22.1	
	8H	24.1	24.8	24.6	25.3	25.7	20.6	21.2	21.1	21.7	22.2	
	12H	24.5	25.1	25.0	25.6	26.2	20.7	21.3	21.2	21.8	22.3	
12H	4H	22.1	22.9	22.6	23.4	23.8	19.9	20.7	20.4	21.2	21.6	
	6H	23.5	24.2	24.1	24.7	25.2	20.6	21.3	21.1	21.7	22.3	
	8H	24.2	24.8	24.7	25.3	25.8	20.8	21.4	21.3	21.9	22.5	
Maximum UGR = 26.2												

4.3 Goniophotometer Test

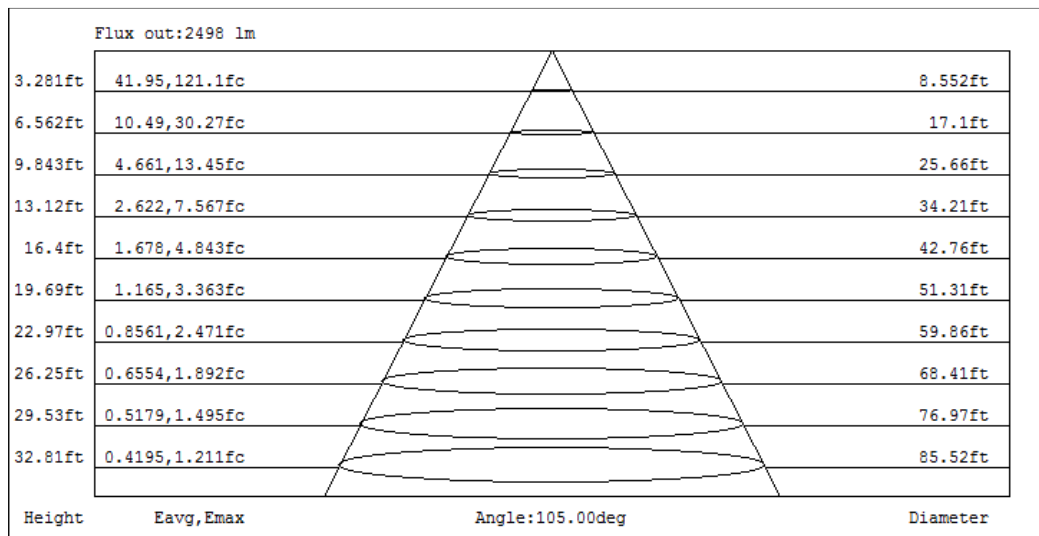
COEFFICIENTS OF UTILIZATION - ZONAL CAVITY METHOD

Coefficients Of Utilization - Zonal Cavity Method

Effective Floor Cavity Reflectance 0.20

RC	80				70				50			30			10			0
	R/W	70	50	30	10	70	50	30	10	50	30	10	50	30	10	50	30	10
0	119	119	119	119	116	116	116	116	111	111	111	106	106	106	102	102	102	100
1	108	103	99	95	105	101	97	93	97	93	90	93	90	87	89	87	85	82
2	98	89	82	76	95	87	81	75	84	78	74	81	76	72	78	74	70	68
3	89	78	70	63	87	77	69	62	74	67	61	71	65	60	68	63	59	57
4	82	69	60	53	79	68	59	53	65	58	52	63	57	51	61	55	51	48
5	75	62	53	46	73	61	52	45	58	51	45	56	50	44	55	49	44	42
6	69	56	46	40	67	55	46	40	53	45	39	51	44	39	49	43	39	36
7	64	50	41	35	62	49	41	35	48	40	35	46	40	34	45	39	34	32
8	60	46	37	31	58	45	37	31	44	36	31	43	36	31	41	35	31	29
9	56	42	34	28	54	42	34	28	40	33	28	39	33	28	38	32	28	26
10	52	39	31	26	51	38	31	25	37	30	25	36	30	25	35	29	25	23

CONE OF LIGHT DIAGRAM



4.0 LM-79 Measurement and Test Results

4.3 THD and PF Test

Model No.	SWISHFA2x2 / 29W / 3500K	Sample ID.	B1
Temperature (°C)	25.2	Humidity (%RH)	54.0

Test Method

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

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

The ambient temperature condition was maintained at 25° C ± 1° C. The sample measurements were made using a digital power meter and power supply. The sample was operated at rated voltage and was stabilized before measurement. The total harmonic distortion were calculated.

Test Results

Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD
119.96	60	0.248	29.7	0.998	5.01%
277.00	60	0.111	29.9	0.975	15.37%

4.0 LM-79 Measurement and Test Results

4.3 THD and PF Test

Model No.	SWISHFA2x2 / 29W / 4000K	Sample ID.	B1
Temperature (°C)	25.2	Humidity (%RH)	54.0

Test Method

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

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

The ambient temperature condition was maintained at 25° C ± 1° C. The sample measurements were made using a digital power meter and power supply. The sample was operated at rated voltage and was stabilized before measurement. The total harmonic distortion were calculated.

Test Results

Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD
120.02	60	0.240	28.8	0.998	4.65%
276.99	60	0.107	29.0	0.974	16.05%

4.0 LM-79 Measurement and Test Results

4.3 THD and PF Test

Model No.	SWISHFA2x2 / 29W / 5000K	Sample ID.	B1
Temperature (°C)	25.2	Humidity (%RH)	54.0

Test Method

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

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

The ambient temperature condition was maintained at 25° C ± 1° C. The sample measurements were made using a digital power meter and power supply. The sample was operated at rated voltage and was stabilized before measurement. The total harmonic distortion were calculated.

Test Results

Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD
120.03	60	0.249	29.8	0.998	4.95%
276.99	60	0.111	29.9	0.975	15.34%

6.0 Equipment Information

Test Equipment			
Equipment ID	Equipment Name	Last Calibration Date	Calibration Due Date
DLF107	Integrating Sphere System	2018/12/26	2019/12/25
DLF108	Auxiliary Lamp	2018/12/26	2019/12/25
DLF122	Measurement Standard Lamp Standard Lamp Type: 220 V, 0.4720 A, Tungsten, Omni-derectional	2018/12/26	2019/12/25
DLF116	AC Power Source	2018/12/26	2019/12/25
DLF113	Power Meter	2018/12/26	2019/12/25
DLF112	Temperature Recorder	2018/12/26	2019/12/25
DLF114	Temperature & Humidity Datalogger	2018/12/26	2019/12/25
DLF101	Goniophotometer	2018/12/26	2019/12/25
DLF125	Standard Lamp Standard Lamp Type: 76.58 V, 6.7875 A, Tungsten, Omni-derectional	2018/12/26	2019/12/25
DLF104	AC Power Source	2018/12/26	2019/12/25
DLF507	DC Power Source	2018/12/26	2019/12/25
DLF102	Power Meter	2018/12/26	2019/12/25
DLF111	Temperature & Humidity Datalogger	2018/12/26	2019/12/25
DLF119	Power Meter	2018/12/26	2019/12/25
DLF031	Temperature data logger	2018/12/26	2019/12/25
DLF022	Digital power meter	2018/12/26	2019/12/25
DLF003	Temperature & Humidity Datalogger	2018/12/26	2019/12/25

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