



**UL Verification Services**

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## Integrating Sphere Test Report

Relevant Standards

IES LM-79-2008

ANSI C78.377-2008, ANSI C82.77

CIE 13.3-1995, CIE 15-2004

Prepared For

**TC Millwork**

Leo Couchara

3433 Marshall LN

PO Box 826

Bensalem, PA 19020

Catalog Number

**LED Spot**

Project Number

**10011087**

Test Number

**182670**

Test Date

2013-05-08

Prepared By

Handwritten signature of Kyle Spaziani in black ink.

Kyle Spaziani, Project Coordinator

Approved By

Handwritten signature of Zachary Mooney in black ink.

Zachary Mooney, Project Coordinator

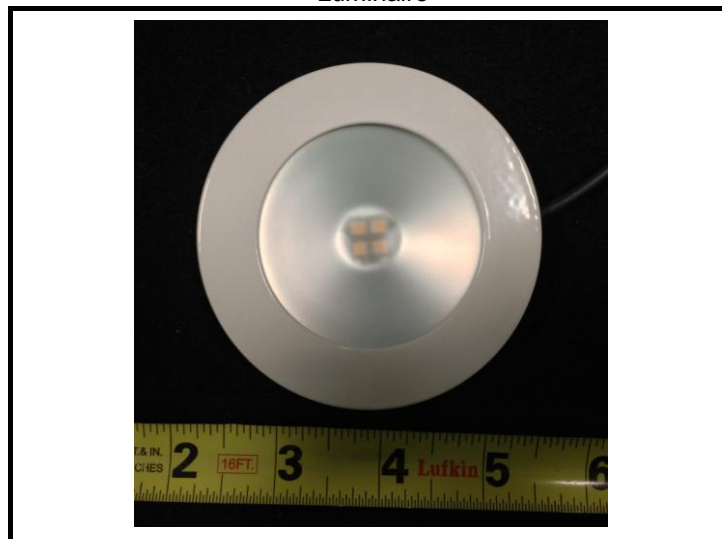
The results contained in this report pertain only to the tested sample.

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Luminaire Description: Black steel backing, internal semi specular reflector, frosted plastic enclosure, lower white steel trim  
Catalog Number: LED Spot  
Lamp: Four white LEDs  
Mounting: Recessed

Luminaire



**Summary of Results**

Radiant Flux: 725.0 mW  
Luminous Flux: 211.4 Lumens  
Luminaire Efficacy: 70.7 Lumens/Watt  
CCT: 3501 K  
CRI (Ra): 93.5  
Chromaticity (x): 0.4021  
Chromaticity (y): 0.3824  
Chromaticity (u): 0.2370  
Chromaticity (v): 0.3382  
Duv: -0.0032

**Test Conditions**

Test Temperature: 24.1 °C  
Voltage: 24.00 VDC  
Current: 0.1247 A  
Power: 2.992 W

Testing was performed in a 1-meter integrating sphere using the 4π geometry method.

Absorption correction was employed for this measurement.

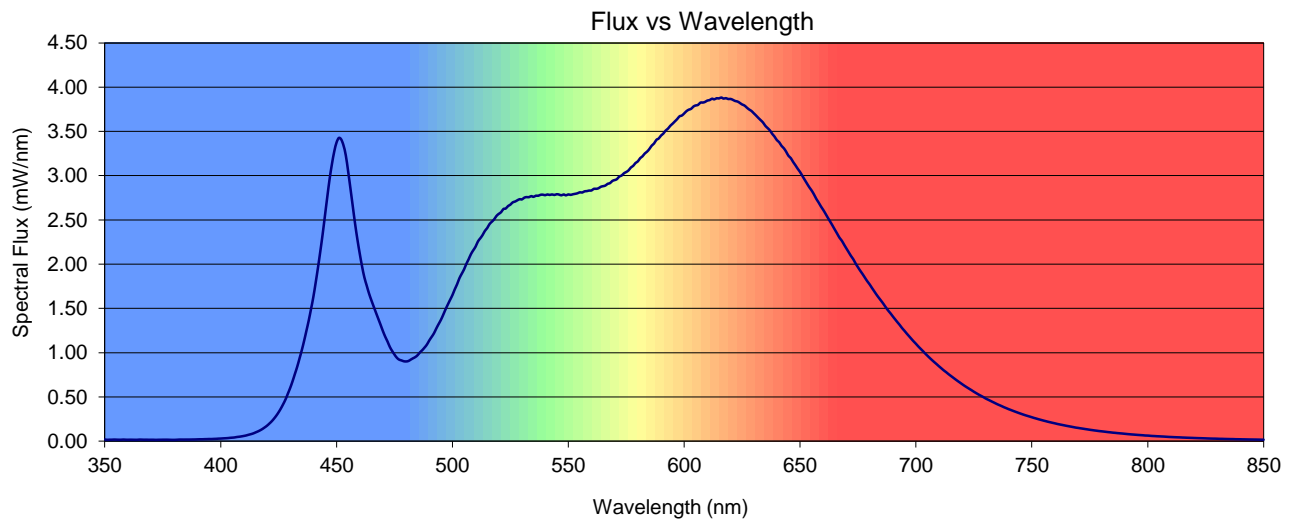
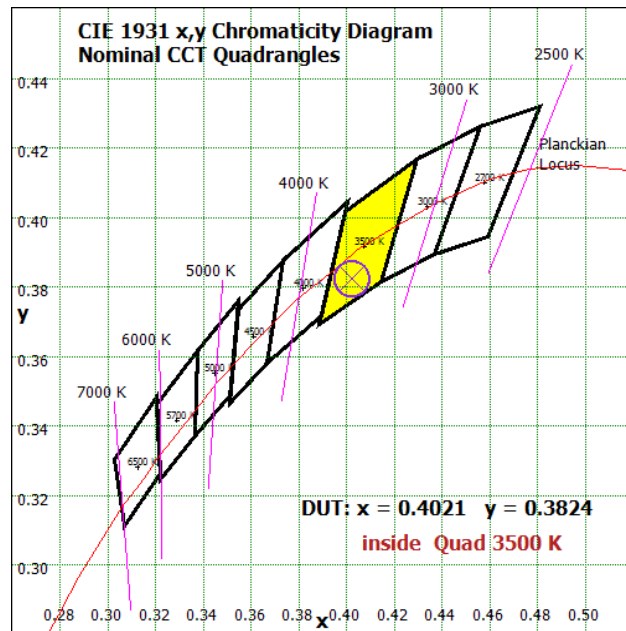
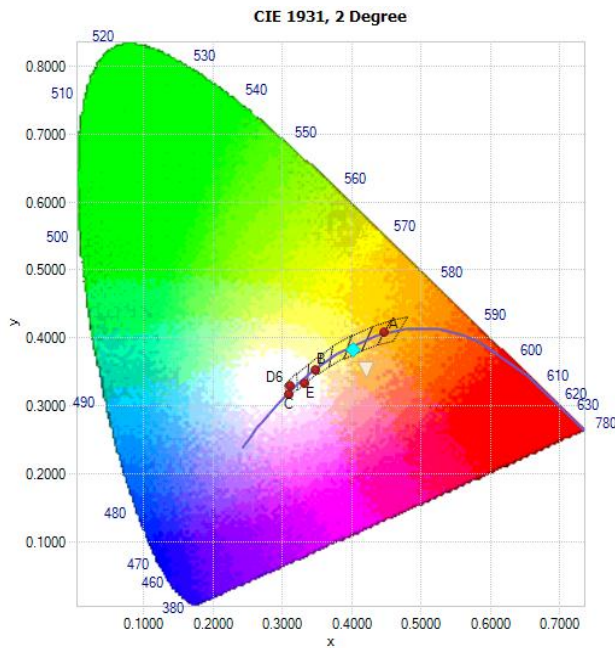


**Chromaticity Coordinates**

x	y	u	v	u'	v'	Duv
0.4021	0.3824	0.2370	0.3382	0.2370	0.5073	-0.0032

**Color Rendering Index Detail**

Ra (CRI)	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14
93.5	95.8	95.7	93.9	94.3	95.0	93.7	93.4	86.5	66.1	88.4	93.8	78.1	96.0	95.8





Spectral Power Distribution

$\lambda$ (nm)	mW/nm	$\lambda$ (nm)	mW/nm	$\lambda$ (nm)	mW/nm	$\lambda$ (nm)	mW/nm	$\lambda$ (nm)	mW/nm	$\lambda$ (nm)	mW/nm	$\lambda$ (nm)	mW/nm
350	0.0195	422	0.224	494	1.32	566	2.89	638	3.47	710	0.845	782	0.106
351	0.0158	423	0.255	495	1.37	567	2.91	639	3.44	711	0.823	783	0.103
352	0.0170	424	0.289	496	1.43	568	2.92	640	3.40	712	0.800	784	0.0999
353	0.0171	425	0.327	497	1.49	569	2.94	641	3.38	713	0.781	785	0.0966
354	0.0185	426	0.371	498	1.54	570	2.95	642	3.34	714	0.759	786	0.0945
355	0.0177	427	0.420	499	1.60	571	2.96	643	3.31	715	0.739	787	0.0916
356	0.0167	428	0.473	500	1.65	572	2.99	644	3.27	716	0.720	788	0.0892
357	0.0167	429	0.537	501	1.72	573	3.00	645	3.22	717	0.700	789	0.0870
358	0.0185	430	0.602	502	1.77	574	3.03	646	3.20	718	0.680	790	0.0841
359	0.0172	431	0.676	503	1.84	575	3.04	647	3.15	719	0.662	791	0.0815
360	0.0166	432	0.758	504	1.89	576	3.06	648	3.12	720	0.643	792	0.0790
361	0.0170	433	0.839	505	1.94	577	3.09	649	3.08	721	0.625	793	0.0768
362	0.0168	434	0.932	506	2.00	578	3.11	650	3.04	722	0.609	794	0.0748
363	0.0161	435	1.03	507	2.06	579	3.14	651	3.00	723	0.592	795	0.0727
364	0.0163	436	1.13	508	2.11	580	3.16	652	2.95	724	0.576	796	0.0707
365	0.0183	437	1.25	509	2.16	581	3.20	653	2.91	725	0.559	797	0.0688
366	0.0176	438	1.36	510	2.20	582	3.22	654	2.87	726	0.544	798	0.0670
367	0.0169	439	1.50	511	2.26	583	3.25	655	2.83	727	0.528	799	0.0645
368	0.0172	440	1.63	512	2.29	584	3.27	656	2.79	728	0.514	800	0.0635
369	0.0163	441	1.79	513	2.33	585	3.30	657	2.74	729	0.500	801	0.0615
370	0.0165	442	1.96	514	2.38	586	3.34	658	2.70	730	0.484	802	0.0591
371	0.0163	443	2.15	515	2.41	587	3.36	659	2.65	731	0.471	803	0.0582
372	0.0152	444	2.34	516	2.45	588	3.40	660	2.61	732	0.458	804	0.0561
373	0.0162	445	2.55	517	2.48	589	3.42	661	2.57	733	0.445	805	0.0551
374	0.0164	446	2.76	518	2.51	590	3.45	662	2.52	734	0.432	806	0.0536
375	0.0170	447	2.96	519	2.54	591	3.48	663	2.48	735	0.419	807	0.0523
376	0.0171	448	3.13	520	2.57	592	3.51	664	2.44	736	0.408	808	0.0506
377	0.0172	449	3.27	521	2.59	593	3.53	665	2.39	737	0.396	809	0.0487
378	0.0161	450	3.38	522	2.62	594	3.56	666	2.35	738	0.384	810	0.0475
379	0.0154	451	3.43	523	2.63	595	3.59	667	2.30	739	0.373	811	0.0462
380	0.0153	452	3.41	524	2.66	596	3.61	668	2.27	740	0.362	812	0.0450
381	0.0164	453	3.34	525	2.67	597	3.64	669	2.22	741	0.353	813	0.0440
382	0.0181	454	3.23	526	2.70	598	3.67	670	2.18	742	0.342	814	0.0431
383	0.0186	455	3.05	527	2.71	599	3.68	671	2.13	743	0.332	815	0.0416
384	0.0182	456	2.85	528	2.72	600	3.70	672	2.09	744	0.322	816	0.0407
385	0.0187	457	2.65	529	2.73	601	3.73	673	2.05	745	0.313	817	0.0393
386	0.0185	458	2.46	530	2.73	602	3.75	674	2.01	746	0.304	818	0.0385
387	0.0188	459	2.28	531	2.75	603	3.75	675	1.96	747	0.295	819	0.0375
388	0.0194	460	2.12	532	2.76	604	3.78	676	1.92	748	0.287	820	0.0365
389	0.0198	461	1.98	533	2.76	605	3.79	677	1.89	749	0.279	821	0.0356
390	0.0210	462	1.85	534	2.77	606	3.80	678	1.85	750	0.271	822	0.0345
391	0.0218	463	1.76	535	2.76	607	3.83	679	1.81	751	0.263	823	0.0340
392	0.0218	464	1.67	536	2.77	608	3.83	680	1.77	752	0.255	824	0.0331
393	0.0230	465	1.59	537	2.77	609	3.83	681	1.73	753	0.247	825	0.0320
394	0.0238	466	1.52	538	2.78	610	3.85	682	1.69	754	0.241	826	0.0310
395	0.0249	467	1.45	539	2.79	611	3.85	683	1.66	755	0.233	827	0.0301
396	0.0245	468	1.38	540	2.78	612	3.87	684	1.62	756	0.227	828	0.0295
397	0.0263	469	1.32	541	2.79	613	3.86	685	1.59	757	0.220	829	0.0290
398	0.0270	470	1.24	542	2.78	614	3.87	686	1.55	758	0.214	830	0.0284
399	0.0290	471	1.18	543	2.79	615	3.87	687	1.51	759	0.208	831	0.0271
400	0.0301	472	1.13	544	2.78	616	3.88	688	1.48	760	0.202	832	0.0268
401	0.0318	473	1.07	545	2.79	617	3.87	689	1.45	761	0.195	833	0.0258
402	0.0333	474	1.02	546	2.79	618	3.88	690	1.41	762	0.190	834	0.0252
403	0.0351	475	0.979	547	2.78	619	3.87	691	1.38	763	0.184	835	0.0246
404	0.0381	476	0.944	548	2.79	620	3.87	692	1.34	764	0.179	836	0.0241
405	0.0402	477	0.922	549	2.78	621	3.86	693	1.31	765	0.174	837	0.0237
406	0.0428	478	0.913	550	2.79	622	3.84	694	1.28	766	0.169	838	0.0226
407	0.0476	479	0.903	551	2.78	623	3.84	695	1.25	767	0.164	839	0.0222
408	0.0506	480	0.901	552	2.79	624	3.82	696	1.22	768	0.159	840	0.0218
409	0.0547	481	0.906	553	2.79	625	3.80	697	1.19	769	0.154	841	0.0210
410	0.0594	482	0.922	554	2.80	626	3.79	698	1.16	770	0.150	842	0.0208
411	0.0651	483	0.937	555	2.81	627	3.77	699	1.13	771	0.146	843	0.0200
412	0.0725	484	0.951	556	2.81	628	3.75	700	1.10	772	0.142	844	0.0196
413	0.0796	485	0.973	557	2.82	629	3.73	701	1.07	773	0.138	845	0.0192
414	0.0874	486	1.00	558	2.83	630	3.71	702	1.04	774	0.134	846	0.0190
415	0.0988	487	1.03	559	2.83	631	3.68	703	1.02	775	0.129	847	0.0185
416	0.110	488	1.06	560	2.83	632	3.65	704	0.991	776	0.126	848	0.0178
417	0.123	489	1.09	561	2.85	633	3.63	705	0.965	777	0.122	849	0.0172
418	0.138	490	1.14	562	2.85	634	3.60	706	0.939	778	0.119	850	0.0167
419	0.156	491	1.18	563	2.86	635	3.56	707	0.915	779	0.115		
420	0.175	492	1.22	564	2.87	636	3.54	708	0.892	780	0.112		
421	0.199	493	1.27	565	2.88	637	3.51	709	0.869	781	0.109		