



UL Verification Services

7036 Snowdrift Road Suite 200

Allentown, PA 18106

610-774-1300



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

LED Waves, LLC

Tsung-Hsun Hsieh

6TH FL 33 35TH Street

Brooklyn, NY 11232

Catalog Number

Andromeda-40-XML-5700K

Project Number

6012-001293

Test Number

33831

Test Date

2012-10-02

Prepared By

Handwritten signature of Jeffrey Lockner in black ink.

Jeffrey Lockner, Engineer

Approved By

Handwritten signature of Eric Gaudreau in black ink.

Eric Gaudreau, Project Coordinator

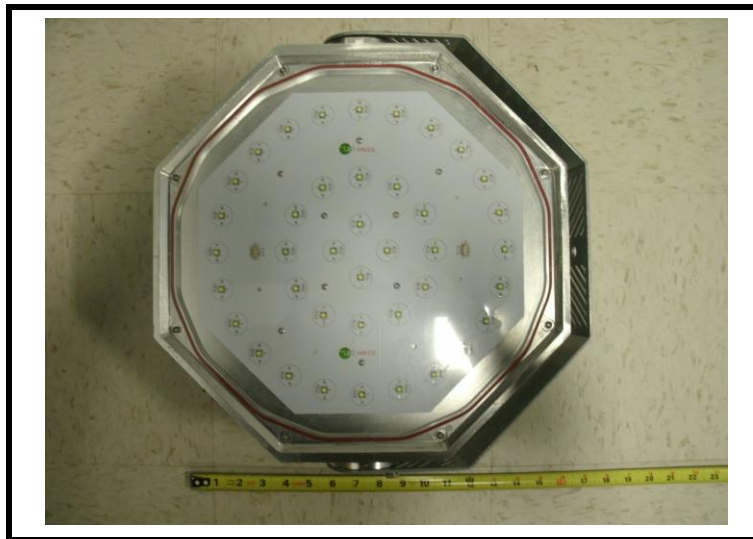
The results contained in this report pertain only to the tested sample.

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Luminaire Description: Cast aluminum heatsink housing, white enamel reflector, clear plastic enclosure
Catalog Number: Andromeda-40-XML-5700K
Lamp: 40 white LEDs
Mounting: Pendant
Ballast/Driver: Two Thomas Research Products LED96W-034-C2800-M-D

Luminaire



Summary of Results

Radiant Flux: 57240 mW
Luminous Flux: 18250 Lumens
Luminaire Efficacy: 96.8 Lumens/Watt
CCT: 6500 K
CRI (Ra): 69.9
Chromaticity (x): 0.3120
Chromaticity (y): 0.3340
Chromaticity (u): 0.1955
Chromaticity (v): 0.3139
Duv: 0.0060

Test Conditions

Test Temperature: 25.4 °C
Voltage: 120.0 VAC
Current: 1.575 A
Power: 188.5 W
Power Factor: 0.998
Frequency: 60 Hz
Current THD: 6.12 %

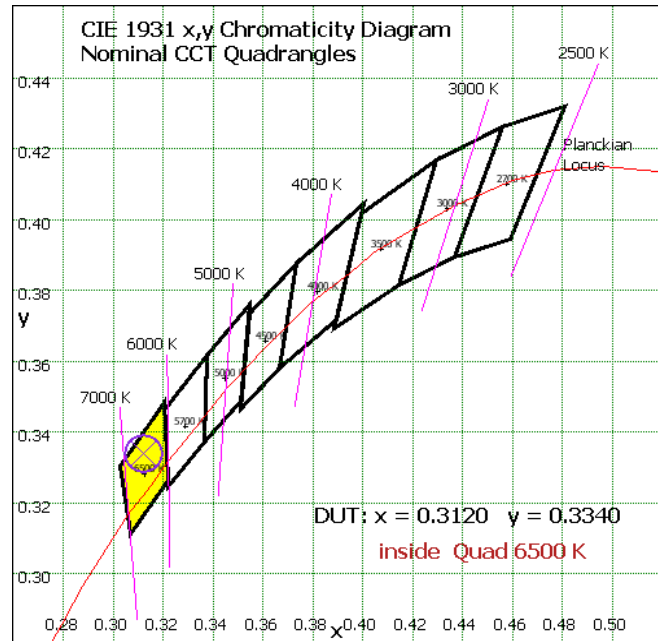
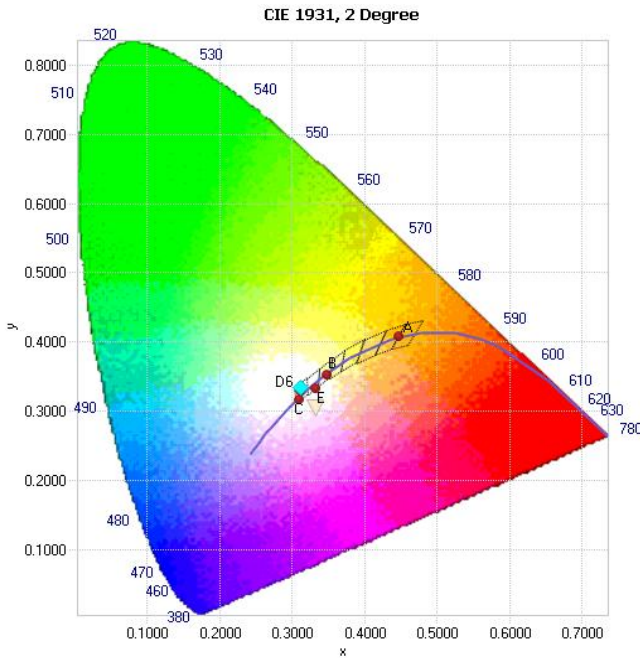


Chromaticity Coordinates

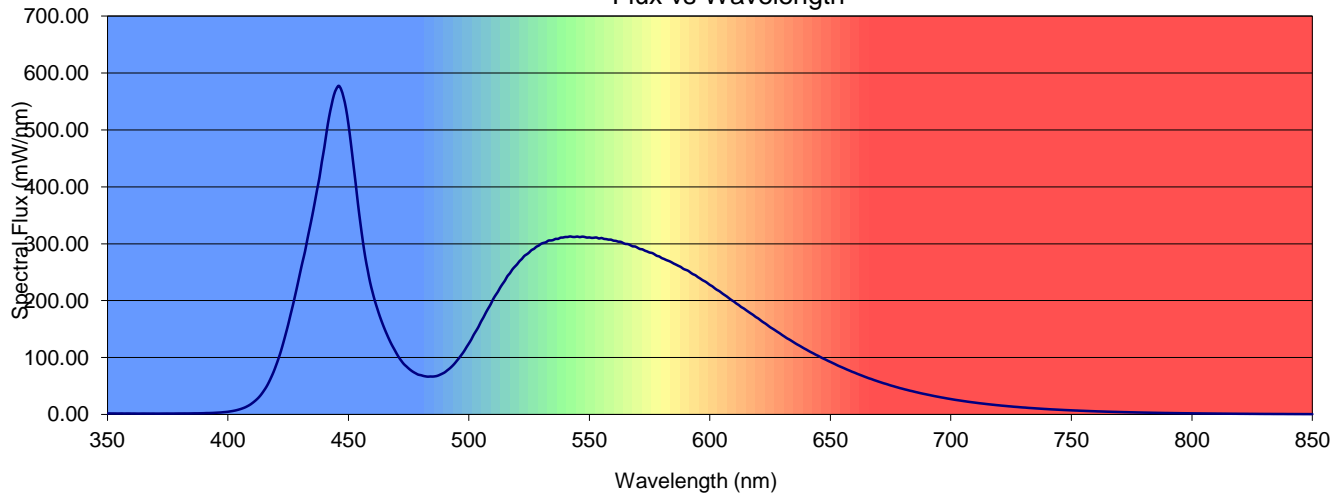
x	y	u	v	u'	v'	Duv
0.3120	0.3340	0.1955	0.3139	0.1955	0.4709	0.0060

Color Rendering Index Detail

Ra (CRI)	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14
69.9	68.0	72.2	74.9	71.8	70.0	64.2	78.3	60.0	-33.3	34.0	70.4	43.3	67.6	85.8



Flux vs Wavelength





Spectral Power Distribution

λ(nm)	mW/nm	λ(nm)	mW/nm	λ(nm)	mW/nm	λ(nm)	mW/nm	λ(nm)	mW/nm	λ(nm)	mW/nm	λ(nm)	mW/nm	λ(nm)	mW/nm
350	1.88	422	111	494	89.2	566	299	638	119	710	20.9	782	3.24		
351	1.89	423	126	495	94.4	567	297	639	116	711	20.3	783	3.14		
352	1.84	424	142	496	99.7	568	295	640	114	712	19.8	784	3.07		
353	1.84	425	158	497	105	569	295	641	112	713	19.3	785	2.98		
354	1.75	426	175	498	111	570	293	642	109	714	18.8	786	2.89		
355	1.79	427	193	499	118	571	291	643	107	715	18.3	787	2.83		
356	1.86	428	211	500	125	572	290	644	105	716	17.9	788	2.75		
357	1.71	429	230	501	132	573	288	645	103	717	17.4	789	2.69		
358	1.83	430	250	502	140	574	286	646	101	718	16.9	790	2.66		
359	1.82	431	269	503	147	575	285	647	98.4	719	16.5	791	2.56		
360	1.70	432	286	504	154	576	284	648	96.6	720	16.1	792	2.51		
361	1.74	433	308	505	163	577	281	649	94.3	721	15.7	793	2.43		
362	1.65	434	329	506	170	578	279	650	92.4	722	15.3	794	2.39		
363	1.60	435	349	507	179	579	278	651	90.4	723	14.9	795	2.31		
364	1.68	436	371	508	186	580	275	652	88.4	724	14.5	796	2.27		
365	1.73	437	395	509	193	581	273	653	86.2	725	14.1	797	2.22		
366	1.67	438	416	510	202	582	271	654	84.4	726	13.7	798	2.16		
367	1.70	439	444	511	209	583	270	655	82.6	727	13.4	799	2.12		
368	1.63	440	469	512	215	584	268	656	80.7	728	13.1	800	2.06		
369	1.70	441	497	513	223	585	265	657	78.8	729	12.7	801	2.01		
370	1.60	442	523	514	229	586	263	658	77.1	730	12.4	802	1.96		
371	1.59	443	543	515	236	587	261	659	75.2	731	12.1	803	1.91		
372	1.62	444	561	516	243	588	259	660	73.6	732	11.7	804	1.89		
373	1.71	445	572	517	248	589	256	661	71.8	733	11.4	805	1.82		
374	1.71	446	577	518	255	590	254	662	70.1	734	11.1	806	1.79		
375	1.75	447	571	519	259	591	252	663	68.5	735	10.8	807	1.72		
376	1.69	448	557	520	264	592	249	664	66.8	736	10.6	808	1.71		
377	1.68	449	538	521	269	593	247	665	65.2	737	10.3	809	1.68		
378	1.71	450	510	522	273	594	245	666	63.6	738	10.0	810	1.63		
379	1.80	451	478	523	279	595	241	667	62.3	739	9.75	811	1.57		
380	1.83	452	442	524	281	596	239	668	60.7	740	9.52	812	1.57		
381	1.84	453	407	525	285	597	236	669	59.3	741	9.22	813	1.51		
382	1.86	454	369	526	289	598	234	670	57.8	742	9.00	814	1.48		
383	1.81	455	336	527	291	599	231	671	56.5	743	8.79	815	1.46		
384	1.89	456	304	528	295	600	228	672	55.0	744	8.58	816	1.40		
385	1.97	457	277	529	297	601	225	673	53.9	745	8.36	817	1.38		
386	2.05	458	254	530	300	602	222	674	52.5	746	8.16	818	1.34		
387	2.05	459	232	531	301	603	219	675	51.1	747	7.90	819	1.32		
388	2.10	460	215	532	303	604	217	676	49.9	748	7.74	820	1.28		
389	2.20	461	199	533	306	605	213	677	48.7	749	7.52	821	1.27		
390	2.29	462	186	534	306	606	210	678	47.5	750	7.34	822	1.24		
391	2.53	463	173	535	307	607	207	679	46.2	751	7.15	823	1.21		
392	2.55	464	161	536	309	608	204	680	45.2	752	6.97	824	1.14		
393	2.68	465	151	537	308	609	201	681	44.0	753	6.81	825	1.15		
394	2.83	466	141	538	311	610	198	682	43.0	754	6.60	826	1.12		
395	3.11	467	131	539	311	611	195	683	41.9	755	6.45	827	1.08		
396	3.33	468	123	540	312	612	192	684	41.0	756	6.28	828	1.05		
397	3.56	469	115	541	312	613	189	685	39.9	757	6.14	829	1.02		
398	3.99	470	107	542	313	614	186	686	38.9	758	5.95	830	1.00		
399	4.36	471	100	543	312	615	183	687	37.9	759	5.82	831	0.992		
400	4.82	472	94.2	544	312	616	180	688	37.0	760	5.67	832	0.975		
401	5.49	473	88.7	545	313	617	178	689	36.1	761	5.50	833	0.951		
402	6.21	474	84.8	546	312	618	175	690	35.2	762	5.36	834	0.912		
403	7.05	475	80.9	547	312	619	171	691	34.3	763	5.24	835	0.909		
404	8.07	476	77.5	548	312	620	169	692	33.4	764	5.10	836	0.892		
405	9.28	477	74.6	549	311	621	166	693	32.5	765	4.96	837	0.870		
406	10.7	478	72.2	550	311	622	162	694	31.7	766	4.85	838	0.866		
407	12.3	479	70.0	551	310	623	160	695	30.9	767	4.70	839	0.828		
408	14.4	480	69.2	552	311	624	157	696	30.1	768	4.61	840	0.791		
409	16.7	481	67.9	553	311	625	153	697	29.4	769	4.49	841	0.805		
410	19.7	482	67.0	554	309	626	151	698	28.6	770	4.38	842	0.772		
411	23.0	483	66.5	555	310	627	148	699	27.8	771	4.24	843	0.742		
412	26.7	484	66.8	556	309	628	145	700	27.1	772	4.14	844	0.738		
413	31.0	485	66.7	557	308	629	143	701	26.4	773	4.06	845	0.755		
414	36.1	486	67.1	558	307	630	140	702	25.7	774	3.94	846	0.710		
415	42.2	487	68.1	559	307	631	137	703	25.1	775	3.86	847	0.708		
416	48.8	488	69.9	560	305	632	134	704	24.4	776	3.76	848	0.685		
417	56.7	489	71.8	561	305	633	132	705	23.8	777	3.65	849	0.676		
418	65.7	490	74.1	562	304	634	129	706	23.2	778	3.57	850	0.635		
419	75.3	491	77.5	563	303	635	126	707	22.5	779	3.49				
420	86.4	492	80.8	564	301	636	124	708	22.0	780	3.39				
421	98.3	493	84.7	565	300	637	121	709	21.4	781	3.31				