



UL Verification Services Inc.
7036 Snowdrift Road
Allentown, PA 18106
610-774-1300

Photometric Indoor Test Report

Relevant Standards
IES LM-79-2008
ANSI C82.77-2002

Prepared For
Elemental LED Inc, DBA Diode LED
Wes Buck
Suite 211, 1195 Park Ave.
Emeryville, CA 94608
United States

Catalog Number
Fencer™ 90 DI-13xx-18-yy-30-90
Project Number
10517620
Test Number
777300

Test Date

2014-10-03

Prepared By

Derek Smarr

Derek Smarr, Technician

Approved By

Eric M. Gaudreau

Eric Gaudreau, Engineering Project Handler

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Luminaire Description: White aluminum housing, frosted plastic lens
Catalog Number: Fencer™ 90 DI-13xx-18-yy-30-90
Lamp: 15 white LEDs
Mounting: Surface
Ballast/Driver: LED power supply

Luminaire

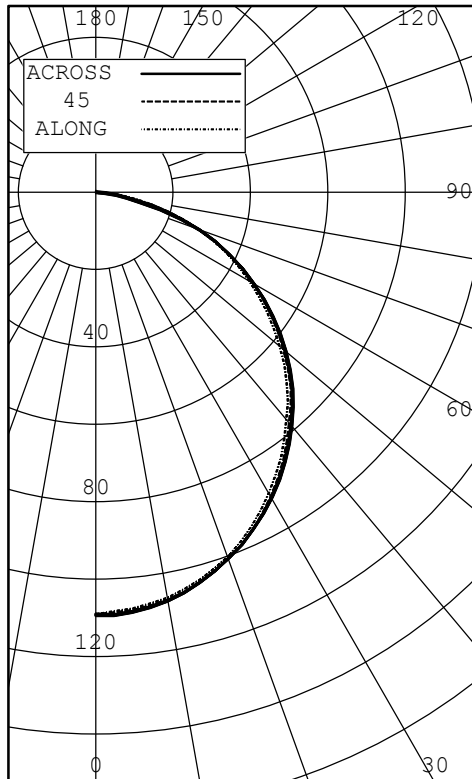


Test Conditions

Test Temperature:	25.0 °C
Voltage:	120.0 VAC
Current:	0.05870 A
Power:	6.132 W
Power Factor:	0.871
Frequency:	60 Hz
Current THD:	55.3 %



INTENSITY (CANDLEPOWER) SUMMARY OUTPUT LUMENS



ANGLE	ALONG	22.5	45	67.5	ACROSS	OUTPUT LUMENS
0	109	109	109	109	109	
5	108	109	108	108	109	10
10	106	107	107	107	107	
15	104	104	104	104	104	29
20	100	100	101	101	101	
25	95	96	96	96	96	44
30	90	90	91	91	91	
35	84	84	85	85	85	53
40	77	77	78	78	79	
45	70	71	71	71	72	55
50	62	63	63	64	64	
55	54	55	55	55	56	49
60	46	47	47	47	47	
65	37	38	38	38	38	37
70	28	29	29	29	29	
75	19	20	20	18	17	20
80	11	11	9	8	8	
85	4	3	3	2	2	4
90	0	0	0	0	0	

ZONAL LUMENS AND PERCENTAGES

ZONE	LUMENS	% LUMINAIRE
0-30	84	27.83
0-40	137	45.30
0-60	240	79.71
0-90	301	100.00
40-90	165	54.70
60-90	61	20.29
90-180	0	0.00
0-180	301	100.00

EFFICACY (LUMENS PER WATT): 49.4

*** THIS IS AN ABSOLUTE TEST ***

LUMINOUS LENGTH: 17.750 INS
 WIDTH: 1.250 INS

LUMINANCE SUMMARY CD./SQ.M.

S/MH: 1.2
 SC: 1.2

ANGLE	ALONG	45	ACROSS
45	6895	7066	7130
55	6589	6754	6822
65	6124	6328	6330
75	5209	5323	4660
85	2805	2250	1931

TESTED IN ACCORDANCE WITH IES PROCEDURES.



INTENSITY (CANDLEPOWER) DATA
 IN 2.5 DEGREE STEPS

ANGLE	PLANE						OUTPUT LUMENS
	ALONG	22.5	45	67.5	ACROSS	AVERAGE	
0.0	109	109	109	109	109	109	
2.5	108	109	109	109	110	109	
5.0	108	109	108	108	109	109	10
7.5	107	108	108	108	108	108	
10.0	106	107	107	107	107	107	
12.5	105	106	106	106	106	106	
15.0	104	104	104	104	104	104	29
17.5	102	102	103	102	103	102	
20.0	100	100	101	101	101	101	
22.5	98	98	99	98	99	98	
25.0	95	96	96	96	96	96	44
27.5	93	93	93	93	94	93	
30.0	90	90	91	91	91	90	
32.5	87	87	88	88	88	87	
35.0	84	84	85	85	85	84	53
37.5	80	81	81	81	82	81	
40.0	77	77	78	78	79	78	
42.5	74	74	75	75	75	74	
45.0	70	71	71	71	72	71	55
47.5	66	67	67	68	68	67	
50.0	62	63	63	64	64	63	
52.5	58	59	59	60	60	59	
55.0	54	55	55	55	56	55	49
57.5	50	51	51	51	52	51	
60.0	46	47	47	47	47	47	
62.5	41	42	43	42	43	42	
65.0	37	38	38	38	38	38	37
67.5	33	33	34	33	34	33	
70.0	28	29	29	29	29	29	
72.5	24	24	24	24	23	24	
75.0	19	20	20	18	17	19	20
77.5	15	15	15	12	12	14	
80.0	11	11	9	8	8	9	
82.5	7	7	5	5	5	6	
85.0	4	3	3	2	2	3	4
87.5	1	1	0	1	1	1	
90.0	0	0	0	0	0	0	



COEFFICIENTS OF UTILIZATION

ZONAL CAVITY METHOD

EFFECTIVE FLOOR CAVITY REFLECTANCE = .20

CC WALL	90				80				70				50				30				10				0
	70	50	30	10	70	50	30	10	70	50	30	10	50	30	10	50	30	10	50	30	10	50	30	10	0
RCR																									
0	1.221	.221	.221	.221	1.191	.191	.191	.191	1.161	.161	.161	.161	1.111	.111	.111	1.061	.061	.061	1.021	.021	.021	1.00			
1	1.121	.071	.030	.99	1.101	.051	.010	.98	1.071	.031	.000	.96	0.990	.960	.93	0.950	.930	.90	0.910	.890	.88	0.86			
2	1.030	.950	.890	.83	1.010	.930	.870	.82	0.980	.910	.850	.81	0.880	.830	.79	0.850	.810	.77	0.820	.780	.75	0.73			
3	0.940	.840	.760	.69	0.920	.820	.750	.69	0.900	.810	.740	.68	0.780	.720	.67	0.750	.700	.66	0.730	.680	.65	0.63			
4	0.870	.750	.660	.60	0.850	.740	.660	.59	0.830	.730	.650	.59	0.700	.630	.58	0.680	.620	.57	0.660	.610	.57	0.55			
5	0.800	.670	.580	.51	0.780	.660	.570	.51	0.760	.650	.570	.51	0.630	.560	.50	0.610	.540	.50	0.590	.540	.49	0.47			
6	0.740	.600	.510	.45	0.720	.590	.500	.44	0.700	.580	.500	.44	0.560	.490	.44	0.550	.480	.43	0.530	.470	.43	0.41			
7	0.680	.540	.450	.39	0.660	.530	.440	.39	0.650	.520	.440	.38	0.510	.430	.38	0.490	.420	.37	0.480	.420	.37	0.35			
8	0.630	.490	.400	.34	0.610	.480	.400	.34	0.600	.470	.390	.34	0.460	.390	.34	0.450	.380	.33	0.430	.380	.33	0.31			
9	0.580	.440	.360	.30	0.570	.440	.350	.30	0.550	.430	.350	.30	0.420	.350	.30	0.410	.340	.29	0.400	.340	.29	0.27			
10	0.540	.400	.320	.26	0.530	.400	.320	.26	0.520	.390	.320	.26	0.380	.310	.26	0.370	.310	.26	0.360	.300	.26	0.24			

THE ABOVE COEFFICIENTS HAVE BEEN CALCULATED BASED ON LUMINAIRE LUMENS
 BECAUSE IN AN ABSOLUTE TEST THE BARE LAMP LUMENS ARE UNKNOWN.
 LIGHTING DESIGN CALCULATIONS MADE USING THESE COEFFICIENTS SHOULD
 THEREFORE USE THE LUMINAIRE LUMENS IN THE CALCULATION FORMULA

LABORATORY RESULTS MAY NOT BE REPRESENTATIVE OF FIELD PERFORMANCE.
 BALLAST AND FIELD FACTORS HAVE NOT BEEN APPLIED.

TEST DISTANCE EXCEEDS FIVE TIMES THE GREATEST
 LUMINOUS OPENING OF LUMINAIRE.

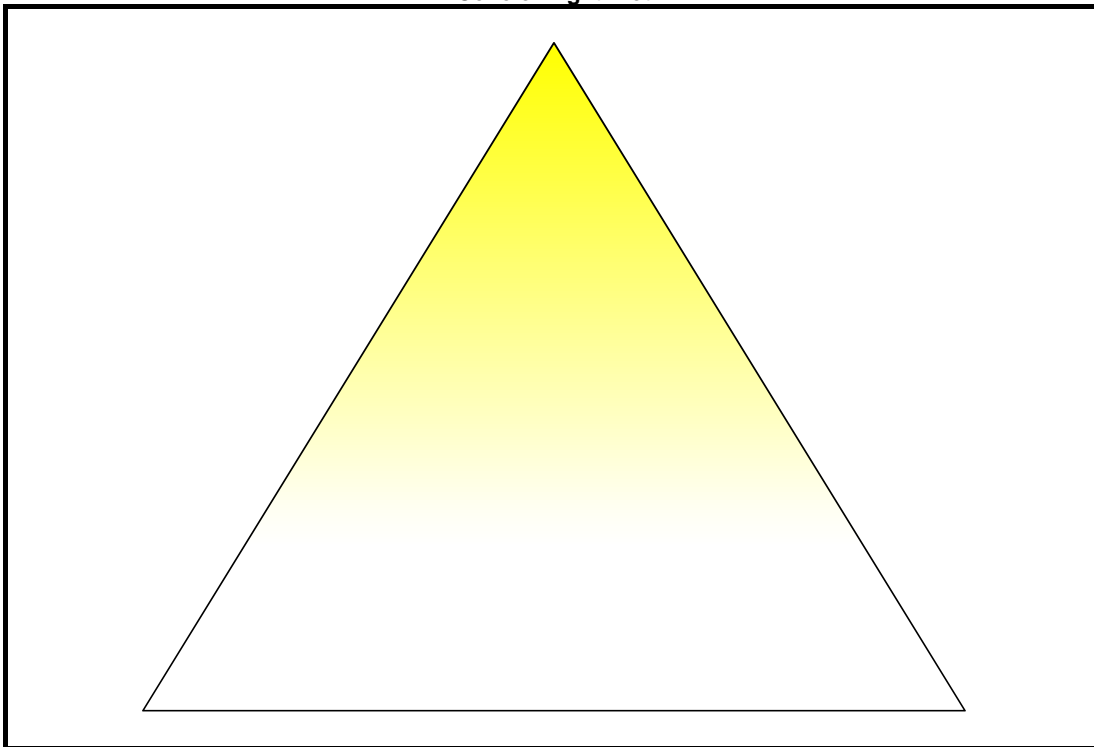


Cone of Light

Cone of Light Tabulation

Mounting Height (Feet)	Footcandles at Nadir	Diameter (Feet)
4.00	6.39	4.87
6.00	2.84	7.30
8.00	1.60	9.73
10.0	1.02	12.2
12.0	0.710	14.6
14.0	0.522	17.0
16.0	0.399	19.5

Cone of Light Plot





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Integrating Sphere Test Report

Relevant Standards
IES LM-79-2008
ANSI C78.377-2011, ANSI C82.77-2002
CIE 13.3-1995, CIE 15-2004

Prepared For
Elemental LED Inc, DBA Diode LED
Wes Buck
Suite 211, 1195 Park Ave.
Emeryville, CA 94608
United States

Catalog Number
Fencer™ 120V Under Cabinet Fixture DI-13xx-8-yy-30-90

Order Number
10458922
Test Number
738579

Test Date
2014-09-03

Prepared By

Javier Caban

Javier Caban, Technician

Approved By

Eric M. Gaudreau

Eric Gaudreau, Engineering Project Handler

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Luminaire Description: White aluminum housing, frosted plastic lens
Catalog Number: Fencer™ 120V Under Cabinet Fixture DI-13xx-8-yy-30-90
Lamp: 7 white LEDs
Mounting: Surface
Ballast/Driver: LED power supply

Luminaire



Summary of Results		Test Conditions	
Radiant Flux:	434.7 mW	Test Temperature:	24.9 °C
Luminous Flux:	115.7 Lumens	Voltage:	120.0 VAC
Luminaire Efficacy:	39.5 Lumens/Watt	Current:	0.03595 A
CCT:	3204 K	Power:	2.932 W
CRI (Ra):	98.1	Power Factor:	0.679
Chromaticity (x):	0.4204	Frequency:	60 Hz
Chromaticity (y):	0.3929	Current THD:	92.6 %
Chromaticity (u):	0.2446		
Chromaticity (v):	0.3430		
Duv:	-0.0022		

Testing was performed in a 2-meter integrating sphere using the 4π geometry method.
Absorption correction was employed for this measurement.

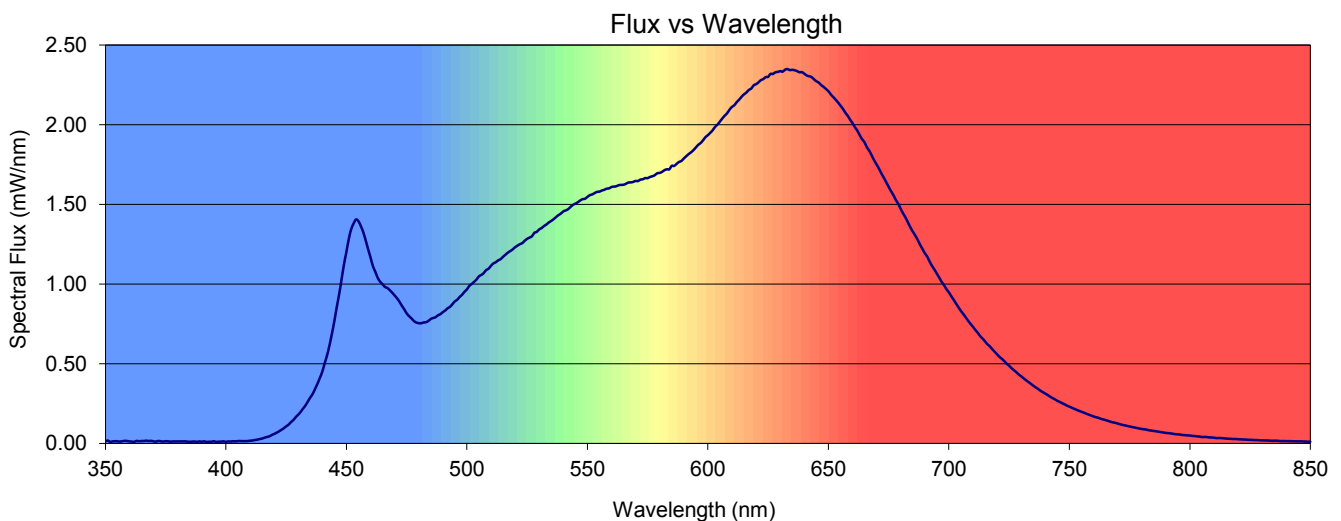
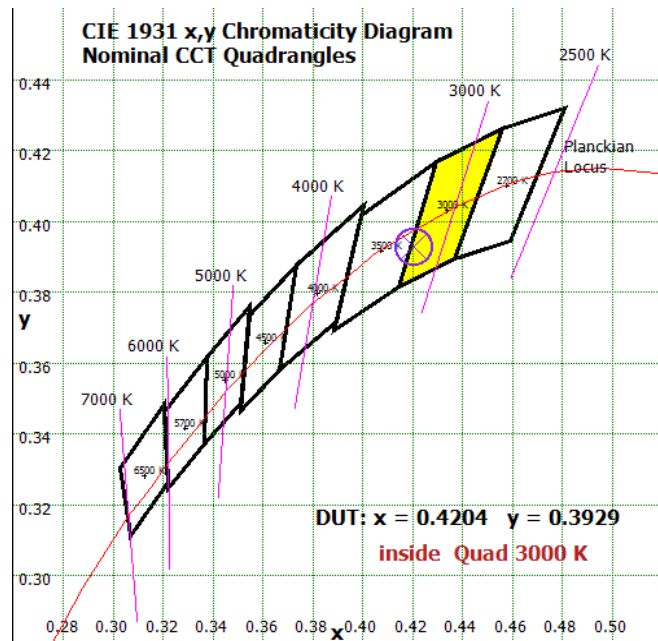
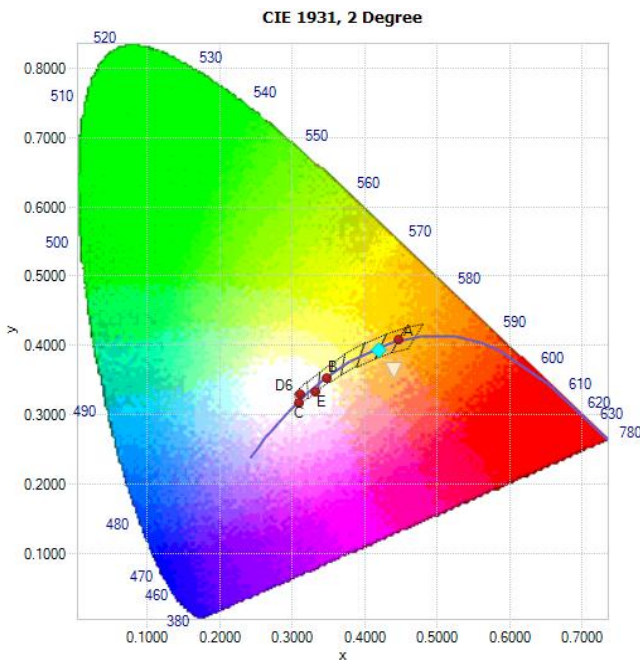


Chromaticity Coordinates

x	y	u	v	u'	v'	Duv
0.4204	0.3929	0.2446	0.3430	0.2446	0.5144	-0.0022

Color Rendering Index Detail

Ra (CRI)	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14
98.1	98.6	98.9	97.9	99.2	98.5	96.8	97.4	97.3	95.5	99.3	98.4	83.7	98.6	97.9





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
350	0.0152	422	0.0759	494	0.874	566	1.63	638	2.33	710	0.732	782	0.0870
351	0.0183	423	0.0857	495	0.892	567	1.64	639	2.33	711	0.712	783	0.0831
352	0.0105	424	0.0956	496	0.902	568	1.64	640	2.32	712	0.694	784	0.0813
353	0.0130	425	0.108	497	0.920	569	1.64	641	2.31	713	0.674	785	0.0789
354	0.0145	426	0.118	498	0.933	570	1.65	642	2.30	714	0.658	786	0.0770
355	0.0138	427	0.134	499	0.952	571	1.65	643	2.30	715	0.641	787	0.0739
356	0.0121	428	0.147	500	0.966	572	1.66	644	2.29	716	0.623	788	0.0717
357	0.0143	429	0.166	501	0.989	573	1.66	645	2.27	717	0.610	789	0.0691
358	0.0168	430	0.181	502	1.00	574	1.67	646	2.26	718	0.592	790	0.0665
359	0.0158	431	0.198	503	1.01	575	1.66	647	2.25	719	0.576	791	0.0653
360	0.0135	432	0.219	504	1.03	576	1.67	648	2.24	720	0.560	792	0.0633
361	0.0119	433	0.238	505	1.05	577	1.68	649	2.22	721	0.544	793	0.0610
362	0.0107	434	0.264	506	1.06	578	1.68	650	2.21	722	0.531	794	0.0587
363	0.0165	435	0.288	507	1.07	579	1.70	651	2.19	723	0.517	795	0.0577
364	0.0142	436	0.311	508	1.09	580	1.70	652	2.17	724	0.501	796	0.0558
365	0.0158	437	0.342	509	1.10	581	1.70	653	2.16	725	0.488	797	0.0534
366	0.0158	438	0.375	510	1.12	582	1.72	654	2.14	726	0.473	798	0.0526
367	0.0178	439	0.412	511	1.13	583	1.72	655	2.12	727	0.460	799	0.0510
368	0.0155	440	0.451	512	1.14	584	1.72	656	2.10	728	0.447	800	0.0502
369	0.0169	441	0.504	513	1.15	585	1.74	657	2.08	729	0.433	801	0.0477
370	0.0135	442	0.554	514	1.16	586	1.74	658	2.06	730	0.422	802	0.0470
371	0.0119	443	0.617	515	1.17	587	1.75	659	2.03	731	0.409	803	0.0449
372	0.0161	444	0.688	516	1.18	588	1.77	660	2.01	732	0.398	804	0.0434
373	0.0138	445	0.768	517	1.20	589	1.77	661	1.98	733	0.386	805	0.0408
374	0.0121	446	0.856	518	1.21	590	1.79	662	1.96	734	0.375	806	0.0413
375	0.0145	447	0.936	519	1.22	591	1.80	663	1.93	735	0.363	807	0.0408
376	0.0135	448	1.03	520	1.23	592	1.82	664	1.91	736	0.352	808	0.0384
377	0.0118	449	1.12	521	1.24	593	1.83	665	1.89	737	0.342	809	0.0379
378	0.0129	450	1.20	522	1.25	594	1.84	666	1.86	738	0.331	810	0.0365
379	0.0129	451	1.28	523	1.26	595	1.86	667	1.84	739	0.322	811	0.0343
380	0.0131	452	1.34	524	1.27	596	1.87	668	1.81	740	0.313	812	0.0347
381	0.0132	453	1.38	525	1.28	597	1.89	669	1.78	741	0.305	813	0.0343
382	0.0129	454	1.41	526	1.29	598	1.90	670	1.75	742	0.294	814	0.0328
383	0.0137	455	1.39	527	1.30	599	1.92	671	1.72	743	0.285	815	0.0312
384	0.0117	456	1.36	528	1.32	600	1.93	672	1.69	744	0.277	816	0.0300
385	0.0109	457	1.33	529	1.33	601	1.95	673	1.67	745	0.268	817	0.0293
386	0.0118	458	1.27	530	1.34	602	1.97	674	1.64	746	0.261	818	0.0282
387	0.0126	459	1.22	531	1.35	603	1.99	675	1.61	747	0.253	819	0.0283
388	0.0107	460	1.17	532	1.36	604	2.00	676	1.58	748	0.246	820	0.0270
389	0.0130	461	1.11	533	1.37	605	2.02	677	1.56	749	0.238	821	0.0261
390	0.0112	462	1.08	534	1.39	606	2.04	678	1.53	750	0.231	822	0.0253
391	0.0135	463	1.04	535	1.40	607	2.06	679	1.50	751	0.225	823	0.0249
392	0.00980	464	1.02	536	1.41	608	2.07	680	1.47	752	0.218	824	0.0238
393	0.0114	465	1.000	537	1.42	609	2.09	681	1.44	753	0.211	825	0.0229
394	0.0107	466	0.982	538	1.43	610	2.11	682	1.42	754	0.205	826	0.0228
395	0.0143	467	0.976	539	1.44	611	2.12	683	1.39	755	0.199	827	0.0214
396	0.00993	468	0.962	540	1.46	612	2.14	684	1.36	756	0.194	828	0.0218
397	0.0115	469	0.946	541	1.46	613	2.16	685	1.33	757	0.187	829	0.0200
398	0.0117	470	0.929	542	1.47	614	2.18	686	1.31	758	0.181	830	0.0202
399	0.0135	471	0.911	543	1.48	615	2.19	687	1.28	759	0.176	831	0.0191
400	0.0102	472	0.890	544	1.50	616	2.20	688	1.25	760	0.170	832	0.0190
401	0.0133	473	0.865	545	1.50	617	2.22	689	1.22	761	0.165	833	0.0182
402	0.0123	474	0.842	546	1.51	618	2.23	690	1.19	762	0.161	834	0.0175
403	0.0144	475	0.817	547	1.52	619	2.25	691	1.17	763	0.155	835	0.0175
404	0.0134	476	0.799	548	1.53	620	2.25	692	1.14	764	0.151	836	0.0176
405	0.0153	477	0.785	549	1.54	621	2.27	693	1.11	765	0.147	837	0.0160
406	0.0155	478	0.769	550	1.55	622	2.28	694	1.09	766	0.143	838	0.0152
407	0.0149	479	0.759	551	1.56	623	2.29	695	1.07	767	0.137	839	0.0155
408	0.0153	480	0.755	552	1.56	624	2.30	696	1.04	768	0.133	840	0.0149
409	0.0154	481	0.754	553	1.57	625	2.30	697	1.01	769	0.130	841	0.0149
410	0.0178	482	0.759	554	1.58	626	2.32	698	0.993	770	0.126	842	0.0146
411	0.0187	483	0.761	555	1.58	627	2.32	699	0.968	771	0.121	843	0.0139
412	0.0217	484	0.769	556	1.59	628	2.33	700	0.949	772	0.117	844	0.0139
413	0.0244	485	0.781	557	1.59	629	2.33	701	0.924	773	0.114	845	0.0133
414	0.0279	486	0.788	558	1.60	630	2.34	702	0.902	774	0.110	846	0.0139
415	0.0308	487	0.793	559	1.60	631	2.33	703	0.877	775	0.107	847	0.0126
416	0.0363	488	0.804	560	1.61	632	2.34	704	0.854	776	0.104	848	0.0124
417	0.0410	489	0.812	561	1.61	633	2.35	705	0.832	777	0.101	849	0.0114
418	0.0448	490	0.824	562	1.61	634	2.34	706	0.812	778	0.0978	850	0.0117
419	0.0531	491	0.834	563	1.62	635	2.34	707	0.791	779	0.0940		
420	0.0599	492	0.848	564	1.62	636	2.34	708	0.770	780	0.0914		
421	0.0673	493	0.858	565	1.62	637	2.34	709	0.750	781	0.0895		