



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™ 120V Under Cabinet Fixture DI-13xx-18-yy-30
Project Number
10459942
Test Number
741446

Test Date

2014-09-03

Prepared By

Handwritten signature of Javier Caban in black ink.

Javier Caban, Technician

Approved By

Handwritten signature of Eric M. Gaudreau in black ink.

Eric Gaudreau, Engineering Project Handler

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Luminaire Description: Brown aluminum housing, frosted plastic lens
Catalog Number: Fencer™ 120V Under Cabinet Fixture DI-13xx-18-yy-30
Lamp: 15 white LEDs
Mounting: Surface
Ballast/Driver: LED power supply

Luminaire

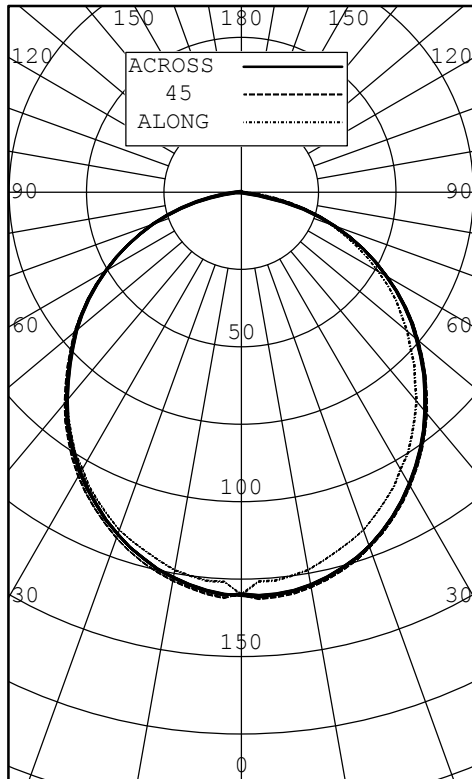


Test Conditions

Test Temperature:	25.4 °C
Voltage:	120.0 VAC
Current:	0.06041 A
Power:	6.355 W
Power Factor:	0.877
Frequency:	60 Hz
Current THD:	53.5 %



INTENSITY (CANDLEPOWER) SUMMARY OUTPUT
 BEAM SIDE LUMENS



ANGLE	ALONG	67.5	45	22.5	ACROSS	OUTPUT LUMENS
0	130	130	130	130	130	
5	126	131	131	130	130	6
10	124	129	130	129	129	
15	120	126	127	126	126	18
20	116	121	122	121	121	
25	110	116	116	115	116	26
30	103	109	109	108	109	
35	96	101	102	101	101	31
40	88	92	93	92	92	
45	79	83	84	83	84	32
50	70	74	75	74	74	
55	61	64	65	64	64	29
60	51	54	55	54	54	
65	41	44	44	43	44	21
70	31	33	33	33	32	
75	21	22	22	21	21	11
80	11	12	11	8	6	
85	3	3	0	0	0	1
90	0	0	0	0	0	

BOTH SIDES
 ZONAL LUMENS AND PERCENTAGES

ZONE	LUMENS	% LUMINAIRE
0-30	100	28.76
0-40	161	46.57
0-60	279	80.68
0-90	346	100.00
40-90	185	53.43
60-90	67	19.32
90-180	0	0.00
0-180	346	100.00

EFFICACY (LUMENS PER WATT): 54.1

*** THIS IS AN ABSOLUTE TEST ***

LUMINOUS LENGTH: 1.000 INS
 WIDTH: 17.750 INS

LUMINANCE SUMMARY - CD./SQ.M.

BEAM SIDE			
ANGLE	ALONG	45	ACROSS
45	9756	10413	10351
55	9286	9918	9842
65	8471	9102	9022
75	7085	7431	6976
85	3005	0	0

TESTED IN ACCORDANCE WITH IES PROCEDURES.



BEAM SIDE
 INTENSITY (CANDLEPOWER) DATA
 IN 2.5 DEGREE STEPS

ANGLE	PLANE						OUTPUT LUMENS
	ALONG	67.5	45	22.5	ACROSS	AVERAGE	
0.0	130	130	130	130	130	130	
2.5	126	131	132	130	131	130	
5.0	126	131	131	130	130	130	6
7.5	125	130	131	130	130	129	
10.0	124	129	130	129	129	128	
12.5	122	128	128	127	128	127	
15.0	120	126	127	126	126	125	18
17.5	118	124	125	124	124	123	
20.0	116	121	122	121	121	121	
22.5	113	119	119	118	119	118	
25.0	110	116	116	115	116	115	26
27.5	107	112	113	112	112	112	
30.0	103	109	109	108	109	108	
32.5	100	105	105	105	105	104	
35.0	96	101	102	101	101	100	31
37.5	92	97	97	97	97	96	
40.0	88	92	93	92	92	92	
42.5	83	88	89	88	88	87	
45.0	79	83	84	83	84	83	32
47.5	74	79	79	79	79	78	
50.0	70	74	75	74	74	74	
52.5	65	69	70	69	69	69	
55.0	61	64	65	64	64	64	29
57.5	56	59	60	59	59	59	
60.0	51	54	55	54	54	54	
62.5	46	49	49	49	49	49	
65.0	41	44	44	43	44	43	21
67.5	36	39	39	38	38	38	
70.0	31	33	33	33	32	33	
72.5	26	28	28	27	27	27	
75.0	21	22	22	21	21	22	11
77.5	16	17	17	15	14	16	
80.0	11	12	11	8	6	10	
82.5	7	8	5	1	0	4	
85.0	3	3	0	0	0	1	1
87.5	0	0	0	0	0	0	
90.0	0	0	0	0	0	0	



OPPOSITE SIDE TO BEAM
 INTENSITY (CANDLEPOWER) DATA
 IN 2.5 DEGREE STEPS

ANGLE	PLANE						OUTPUT LUMENS
	ALONG	112.5	135	157.5	ACROSS	AVERAGE	
0.0	130	130	130	130	130	130	
2.5	126	131	131	130	130	130	
5.0	126	130	130	129	129	129	6
7.5	125	129	129	128	128	128	
10.0	124	128	127	126	126	126	
12.5	122	126	126	124	125	125	
15.0	120	124	124	122	123	123	17
17.5	118	122	121	120	120	120	
20.0	116	119	119	117	117	118	
22.5	113	116	116	114	115	115	
25.0	110	113	113	111	111	112	26
27.5	107	110	109	108	108	108	
30.0	103	106	106	104	104	105	
32.5	100	103	102	100	101	101	
35.0	96	99	98	96	97	97	30
37.5	92	94	93	92	93	93	
40.0	88	90	89	88	88	88	
42.5	83	85	84	83	83	84	
45.0	79	80	79	78	79	79	31
47.5	74	76	75	74	74	75	
50.0	70	71	71	70	70	70	
52.5	65	67	66	65	65	66	
55.0	61	62	61	60	60	61	27
57.5	56	57	56	55	56	56	
60.0	51	51	51	50	51	51	
62.5	46	46	46	45	46	46	
65.0	41	41	41	40	41	41	20
67.5	36	36	36	35	36	36	
70.0	31	31	31	30	31	31	
72.5	26	26	26	25	25	26	
75.0	21	21	21	20	20	20	11
77.5	16	16	16	15	15	15	
80.0	11	11	11	10	10	11	
82.5	7	7	6	6	6	6	
85.0	3	3	2	2	2	2	2
87.5	0	0	0	0	0	0	
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	.22	1.191	.191	.191	.19	1.161	.161	.161	.16	1.111	.111	.111	.11	1.061	.061	.061	.06	1.021	.021	.021	.02	1.00
	1	1.131	.081	.041	.00	1.101	.061	.020	.99	1.071	.041	.000	.97	0.990	.960	.94	0.950	.930	.91	0.920	.900	.88	0.86			
	2	1.030	.960	.890	.83	1.010	.940	.880	.82	0.990	.920	.860	.82	0.880	.840	.80	0.850	.810	.78	0.820	.790	.76	0.74			
	3	0.950	.840	.770	.70	0.930	.830	.760	.70	0.900	.810	.750	.69	0.790	.730	.68	0.760	.710	.67	0.740	.690	.66	0.64			
	4	0.880	.760	.670	.61	0.860	.750	.660	.60	0.840	.730	.660	.60	0.710	.640	.59	0.690	.630	.58	0.660	.620	.58	0.55			
	5	0.810	.680	.590	.52	0.790	.670	.580	.52	0.770	.660	.580	.52	0.630	.560	.51	0.620	.550	.51	0.600	.540	.50	0.48			
	6	0.750	.610	.520	.46	0.730	.600	.510	.45	0.710	.590	.510	.45	0.570	.500	.45	0.550	.490	.44	0.540	.480	.44	0.42			
	7	0.680	.540	.460	.40	0.670	.540	.450	.40	0.650	.530	.450	.39	0.510	.440	.39	0.500	.430	.38	0.490	.430	.38	0.36			
	8	0.630	.490	.410	.35	0.620	.490	.410	.35	0.610	.480	.400	.35	0.470	.390	.34	0.460	.390	.34	0.440	.380	.34	0.32			
	9	0.590	.450	.360	.31	0.570	.440	.360	.31	0.560	.440	.360	.31	0.420	.350	.30	0.410	.350	.30	0.400	.340	.30	0.28			
	10	0.540	.410	.320	.27	0.530	.400	.320	.27	0.520	.400	.320	.27	0.390	.320	.27	0.380	.310	.27	0.370	.310	.27	0.25			

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.



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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

Order Number
10459942
Test Number
741444

Test Date

2014-09-04

Prepared By

Javier Caban

Javier Caban, Technician

Approved By

Eric M. Gaudreau

Eric Gaudreau, Engineering Project Handler

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

Luminaire



Summary of Results		Test Conditions	
Radiant Flux:	560.5 mW	Test Temperature:	24.6 °C
Luminous Flux:	176.8 Lumens	Voltage:	120.0 VAC
Luminaire Efficacy:	61.3 Lumens/Watt	Current:	0.04743 A
CCT:	2984 K	Power:	2.885 W
CRI (Ra):	83.9	Power Factor:	0.507
Chromaticity (x):	0.4372	Frequency:	60 Hz
Chromaticity (y):	0.4029	Current THD:	163 %
Chromaticity (u):	0.2512		
Chromaticity (v):	0.3473		
Duv:	-0.0007		

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

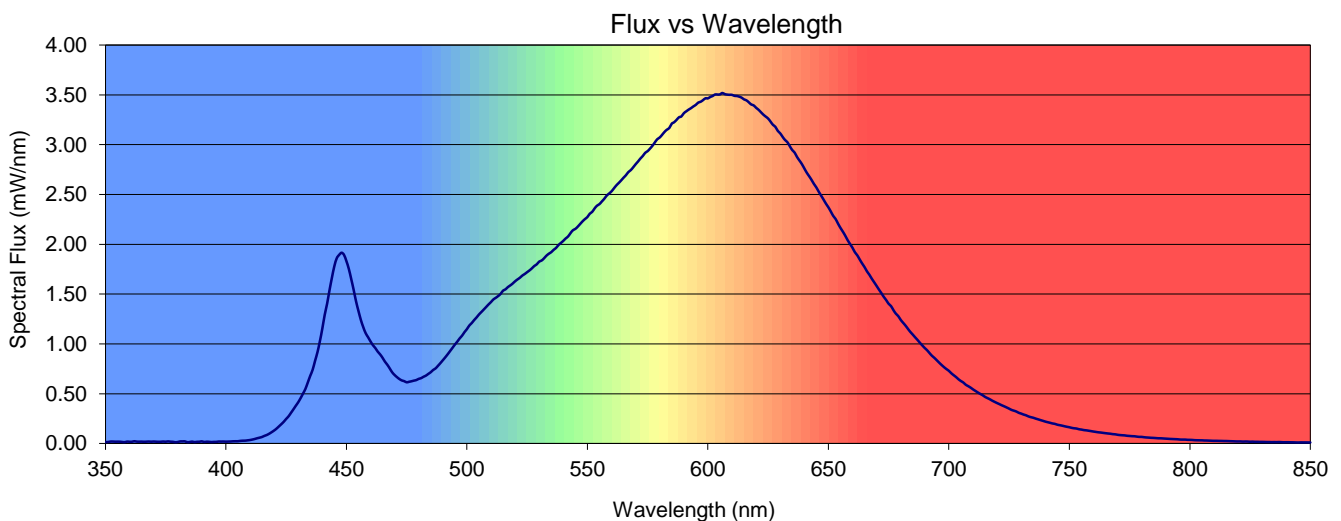
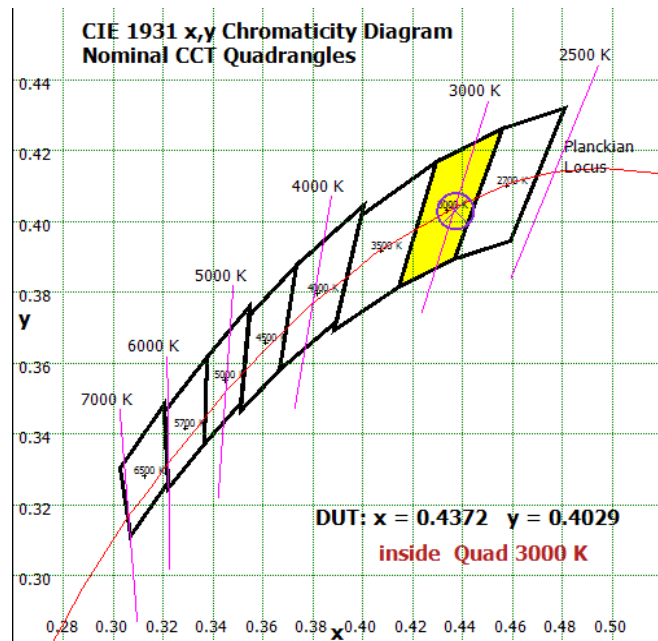
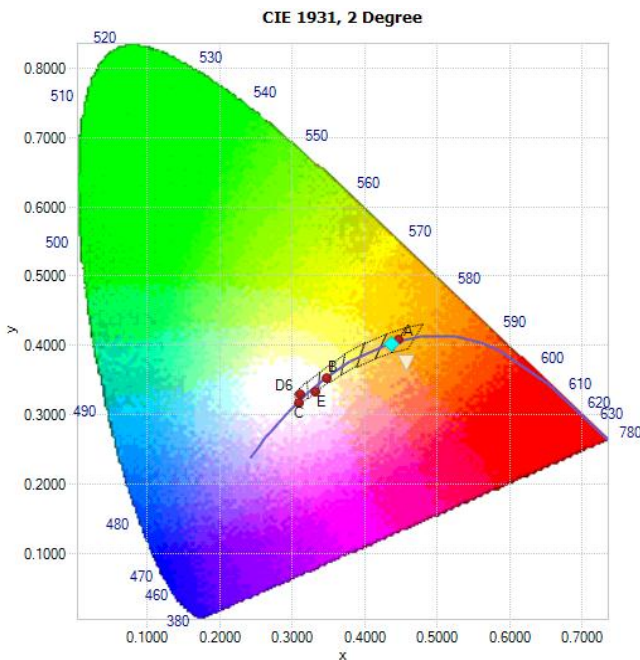


Chromaticity Coordinates

x	y	u	v	u'	v'	Duv
0.4372	0.4029	0.2512	0.3473	0.2512	0.5210	-0.0007

Color Rendering Index Detail

Ra (CRI)	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14
83.9	82.3	90.4	96.6	82.3	82.1	87.6	85.3	64.6	19.3	77.7	81.1	72.5	83.9	98.1





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	0.0151	422	0.172	494	0.960	566	2.69	638	2.84	710	0.544	782	0.0609
351	0.0147	423	0.194	495	0.992	567	2.72	639	2.81	711	0.528	783	0.0591
352	0.0192	424	0.218	496	1.02	568	2.74	640	2.76	712	0.513	784	0.0574
353	0.0198	425	0.246	497	1.05	569	2.77	641	2.72	713	0.498	785	0.0563
354	0.0185	426	0.273	498	1.08	570	2.80	642	2.68	714	0.485	786	0.0542
355	0.0187	427	0.308	499	1.12	571	2.83	643	2.65	715	0.468	787	0.0526
356	0.0182	428	0.342	500	1.15	572	2.86	644	2.61	716	0.456	788	0.0523
357	0.0156	429	0.379	501	1.18	573	2.89	645	2.57	717	0.444	789	0.0505
358	0.0137	430	0.414	502	1.21	574	2.92	646	2.53	718	0.430	790	0.0489
359	0.0192	431	0.455	503	1.24	575	2.93	647	2.49	719	0.418	791	0.0473
360	0.0177	432	0.501	504	1.27	576	2.96	648	2.45	720	0.406	792	0.0458
361	0.0178	433	0.548	505	1.29	577	2.99	649	2.41	721	0.395	793	0.0448
362	0.0229	434	0.613	506	1.32	578	3.02	650	2.37	722	0.383	794	0.0437
363	0.0192	435	0.680	507	1.34	579	3.05	651	2.33	723	0.373	795	0.0424
364	0.0185	436	0.740	508	1.37	580	3.07	652	2.29	724	0.362	796	0.0399
365	0.0189	437	0.830	509	1.40	581	3.10	653	2.25	725	0.350	797	0.0393
366	0.0177	438	0.916	510	1.42	582	3.13	654	2.21	726	0.338	798	0.0394
367	0.0184	439	1.03	511	1.45	583	3.15	655	2.17	727	0.330	799	0.0372
368	0.0197	440	1.15	512	1.46	584	3.17	656	2.13	728	0.321	800	0.0366
369	0.0183	441	1.29	513	1.48	585	3.21	657	2.09	729	0.308	801	0.0355
370	0.0197	442	1.40	514	1.50	586	3.23	658	2.04	730	0.300	802	0.0335
371	0.0183	443	1.54	515	1.53	587	3.25	659	2.00	731	0.291	803	0.0328
372	0.0174	444	1.66	516	1.55	588	3.27	660	1.96	732	0.283	804	0.0321
373	0.0178	445	1.78	517	1.57	589	3.28	661	1.92	733	0.272	805	0.0318
374	0.0198	446	1.86	518	1.59	590	3.32	662	1.89	734	0.265	806	0.0304
375	0.0181	447	1.89	519	1.61	591	3.33	663	1.85	735	0.259	807	0.0299
376	0.0213	448	1.91	520	1.63	592	3.35	664	1.81	736	0.250	808	0.0290
377	0.0184	449	1.89	521	1.65	593	3.37	665	1.77	737	0.243	809	0.0279
378	0.0171	450	1.83	522	1.66	594	3.38	666	1.73	738	0.235	810	0.0269
379	0.0129	451	1.75	523	1.69	595	3.40	667	1.69	739	0.228	811	0.0271
380	0.0151	452	1.65	524	1.70	596	3.42	668	1.66	740	0.220	812	0.0263
381	0.0208	453	1.54	525	1.72	597	3.43	669	1.62	741	0.214	813	0.0259
382	0.0212	454	1.43	526	1.74	598	3.45	670	1.58	742	0.208	814	0.0251
383	0.0215	455	1.33	527	1.76	599	3.47	671	1.54	743	0.201	815	0.0248
384	0.0133	456	1.24	528	1.78	600	3.46	672	1.51	744	0.197	816	0.0241
385	0.0153	457	1.17	529	1.80	601	3.48	673	1.47	745	0.189	817	0.0230
386	0.0189	458	1.11	530	1.83	602	3.49	674	1.44	746	0.184	818	0.0223
387	0.0143	459	1.07	531	1.84	603	3.50	675	1.40	747	0.179	819	0.0211
388	0.0171	460	1.03	532	1.86	604	3.50	676	1.38	748	0.173	820	0.0207
389	0.0178	461	0.987	533	1.89	605	3.50	677	1.34	749	0.168	821	0.0208
390	0.0216	462	0.959	534	1.91	606	3.52	678	1.30	750	0.163	822	0.0192
391	0.0156	463	0.923	535	1.92	607	3.51	679	1.28	751	0.157	823	0.0200
392	0.0182	464	0.895	536	1.94	608	3.50	680	1.24	752	0.153	824	0.0194
393	0.0171	465	0.861	537	1.96	609	3.50	681	1.21	753	0.150	825	0.0178
394	0.0148	466	0.822	538	1.99	610	3.50	682	1.18	754	0.143	826	0.0187
395	0.0164	467	0.790	539	2.01	611	3.49	683	1.15	755	0.140	827	0.0171
396	0.0166	468	0.753	540	2.03	612	3.49	684	1.12	756	0.135	828	0.0172
397	0.0199	469	0.715	541	2.06	613	3.48	685	1.09	757	0.132	829	0.0164
398	0.0194	470	0.688	542	2.08	614	3.47	686	1.07	758	0.128	830	0.0163
399	0.0199	471	0.666	543	2.11	615	3.45	687	1.04	759	0.124	831	0.0158
400	0.0186	472	0.647	544	2.14	616	3.44	688	1.01	760	0.120	832	0.0149
401	0.0195	473	0.633	545	2.15	617	3.42	689	0.984	761	0.116	833	0.0149
402	0.0203	474	0.626	546	2.18	618	3.40	690	0.958	762	0.113	834	0.0139
403	0.0221	475	0.615	547	2.20	619	3.39	691	0.936	763	0.110	835	0.0144
404	0.0227	476	0.620	548	2.23	620	3.37	692	0.907	764	0.107	836	0.0139
405	0.0231	477	0.625	549	2.25	621	3.35	693	0.880	765	0.104	837	0.0151
406	0.0264	478	0.631	550	2.27	622	3.33	694	0.860	766	0.101	838	0.0136
407	0.0282	479	0.637	551	2.31	623	3.30	695	0.835	767	0.0982	839	0.0126
408	0.0288	480	0.649	552	2.33	624	3.28	696	0.811	768	0.0942	840	0.0129
409	0.0318	481	0.656	553	2.36	625	3.26	697	0.788	769	0.0924	841	0.0127
410	0.0351	482	0.670	554	2.39	626	3.23	698	0.766	770	0.0879	842	0.0121
411	0.0398	483	0.681	555	2.40	627	3.20	699	0.747	771	0.0848	843	0.0119
412	0.0458	484	0.699	556	2.43	628	3.18	700	0.730	772	0.0829	844	0.0107
413	0.0530	485	0.716	557	2.46	629	3.14	701	0.706	773	0.0813	845	0.0103
414	0.0588	486	0.738	558	2.49	630	3.11	702	0.686	774	0.0776	846	0.0111
415	0.0659	487	0.754	559	2.51	631	3.08	703	0.667	775	0.0759	847	0.0111
416	0.0769	488	0.780	560	2.53	632	3.05	704	0.645	776	0.0735	848	0.0110
417	0.0859	489	0.807	561	2.56	633	3.02	705	0.627	777	0.0727	849	0.0107
418	0.0988	490	0.835	562	2.59	634	2.98	706	0.612	778	0.0694	850	0.0105
419	0.114	491	0.864	563	2.62	635	2.95	707	0.590	779	0.0666		
420	0.130	492	0.895	564	2.64	636	2.92	708	0.576	780	0.0665		
421	0.149	493	0.927	565	2.67	637	2.88	709	0.561	781	0.0631		