



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-24-yy-30-90
Project Number
10458922
Test Number
738582

Test Date

2014-09-02

Prepared By

Javier Caban

Javier Caban, Technician

Approved By

Eric M. Gaudreau

Eric Gaudreau, Engineering Project Handler

The results contained in this report pertain only to the tested sample.
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Luminaire Description: White aluminum housing, frosted plastic lens
Catalog Number: Fencer™ 120V Under Cabinet Fixture DI-13xx-24-yy-30-90
Lamp: 20 white LEDs
Mounting: Surface
Ballast/Driver: LED power supply

Luminaire

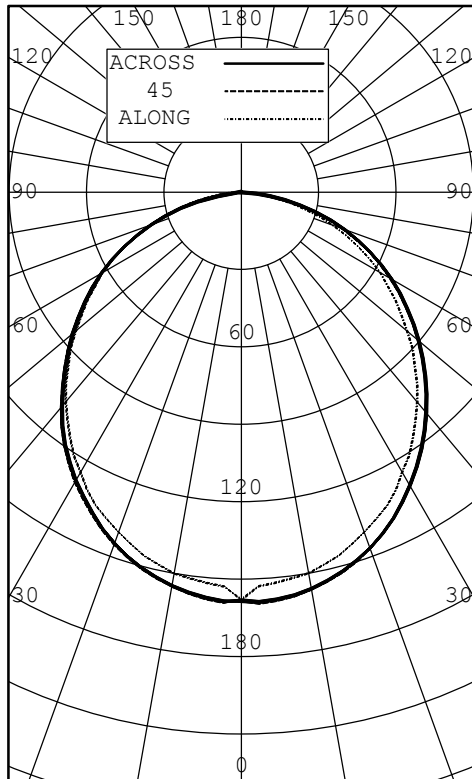


Test Conditions

Test Temperature:	25.3 °C
Voltage:	120.0 VAC
Current:	0.08111 A
Power:	7.932 W
Power Factor:	0.815
Frequency:	60 Hz
Current THD:	69.9 %



INTENSITY (CANDLEPOWER) SUMMARY OUTPUT
 BEAM SIDE LUMENS



ANGLE	ALONG	67.5	45	22.5	ACROSS	OUTPUT LUMENS
0	158	158	158	158	158	
5	152	160	159	159	159	8
10	150	158	157	156	156	
15	146	153	153	152	152	21
20	140	148	147	147	147	
25	134	140	140	140	140	32
30	125	132	131	131	131	
35	116	122	122	122	122	38
40	106	112	112	112	111	
45	95	101	101	101	101	39
50	84	89	90	90	90	
55	73	77	78	78	78	35
60	62	66	66	67	67	
65	50	53	54	55	55	26
70	38	41	42	43	43	
75	26	28	29	30	30	15
80	14	16	17	17	17	
85	5	6	6	6	6	4
90	0	0	0	0	0	

BOTH SIDES
 ZONAL LUMENS AND PERCENTAGES

ZONE	LUMENS	% LUMINAIRE
0-30	121	28.50
0-40	196	46.14
0-60	340	79.89
0-90	425	100.00
40-90	229	53.86
60-90	86	20.11
90-180	0	0.00
0-180	425	100.00

EFFICACY (LUMENS PER WATT): 53.9

*** THIS IS AN ABSOLUTE TEST ***

LUMINOUS LENGTH: 1.125 INS
 WIDTH: 23.750 INS

LUMINANCE SUMMARY - CD./SQ.M.

BEAM SIDE			
ANGLE	ALONG	45	ACROSS
45	7793	8301	8301
55	7383	7898	7959
65	6863	7466	7606
75	5827	6575	6772
85	3328	4004	4075

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	158	158	158	158	158	158	
2.5	153	161	160	159	159	159	
5.0	152	160	159	159	159	158	8
7.5	151	159	158	158	158	157	
10.0	150	158	157	156	156	156	
12.5	148	156	155	154	154	154	
15.0	146	153	153	152	152	152	21
17.5	143	151	150	150	150	149	
20.0	140	148	147	147	147	146	
22.5	137	144	144	143	143	143	
25.0	134	140	140	140	140	139	32
27.5	130	136	136	135	135	135	
30.0	125	132	131	131	131	130	
32.5	121	127	127	127	126	126	
35.0	116	122	122	122	122	121	38
37.5	111	117	117	117	117	116	
40.0	106	112	112	112	111	111	
42.5	101	106	106	106	106	106	
45.0	95	101	101	101	101	100	39
47.5	90	95	95	95	95	95	
50.0	84	89	90	90	90	89	
52.5	78	83	84	84	84	83	
55.0	73	77	78	78	78	77	35
57.5	67	72	72	73	73	72	
60.0	62	66	66	67	67	66	
62.5	56	59	60	61	61	60	
65.0	50	53	54	55	55	54	26
67.5	44	47	48	49	49	48	
70.0	38	41	42	43	43	41	
72.5	32	34	36	36	37	35	
75.0	26	28	29	30	30	29	15
77.5	20	22	23	24	24	23	
80.0	14	16	17	17	17	17	
82.5	9	11	11	11	12	11	
85.0	5	6	6	6	6	6	4
87.5	1	2	2	1	1	1	
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	158	158	158	158	158	158	
2.5	153	160	159	159	159	159	
5.0	152	159	158	158	158	158	8
7.5	151	158	157	157	157	156	
10.0	150	156	155	155	155	155	
12.5	148	155	153	153	153	153	
15.0	146	152	151	151	151	151	21
17.5	143	150	148	148	148	148	
20.0	140	146	145	145	145	145	
22.5	137	143	142	141	141	141	
25.0	134	139	138	137	137	137	32
27.5	130	135	134	133	133	133	
30.0	125	131	130	129	129	129	
32.5	121	126	125	124	124	124	
35.0	116	121	120	119	119	119	37
37.5	111	116	115	114	114	114	
40.0	106	110	109	108	108	109	
42.5	101	104	103	102	103	103	
45.0	95	98	97	97	97	97	37
47.5	90	93	92	91	91	91	
50.0	84	87	86	85	86	86	
52.5	78	81	80	80	80	80	
55.0	73	75	74	74	74	74	33
57.5	67	69	69	68	69	68	
60.0	62	63	63	62	63	63	
62.5	56	57	57	56	57	56	
65.0	50	51	51	50	50	50	25
67.5	44	45	45	44	44	44	
70.0	38	39	38	38	37	38	
72.5	32	32	32	31	31	32	
75.0	26	26	26	25	24	25	13
77.5	20	20	20	18	18	19	
80.0	14	15	14	11	9	13	
82.5	9	9	7	3	2	6	
85.0	5	5	1	0	0	2	2
87.5	1	1	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	.98	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	.81	0.880	.830	.79	0.850	.810	.78	0.820	.790	.76	0.74			
	3	0.950	.840	.760	.70	0.920	.830	.750	.69	0.900	.810	.740	.69	0.780	.720	.68	0.760	.710	.66	0.730	.690	.65	0.63			
	4	0.880	.760	.670	.61	0.850	.740	.660	.60	0.830	.730	.660	.60	0.710	.640	.59	0.680	.630	.58	0.660	.610	.57	0.55			
	5	0.810	.680	.590	.52	0.790	.670	.580	.52	0.760	.650	.570	.52	0.630	.560	.51	0.610	.550	.50	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	.44	0.550	.490	.44	0.540	.480	.44	0.42			
	7	0.680	.540	.460	.40	0.670	.540	.450	.39	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	0.600	.480	.400	.35	0.470	.390	.34	0.450	.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.

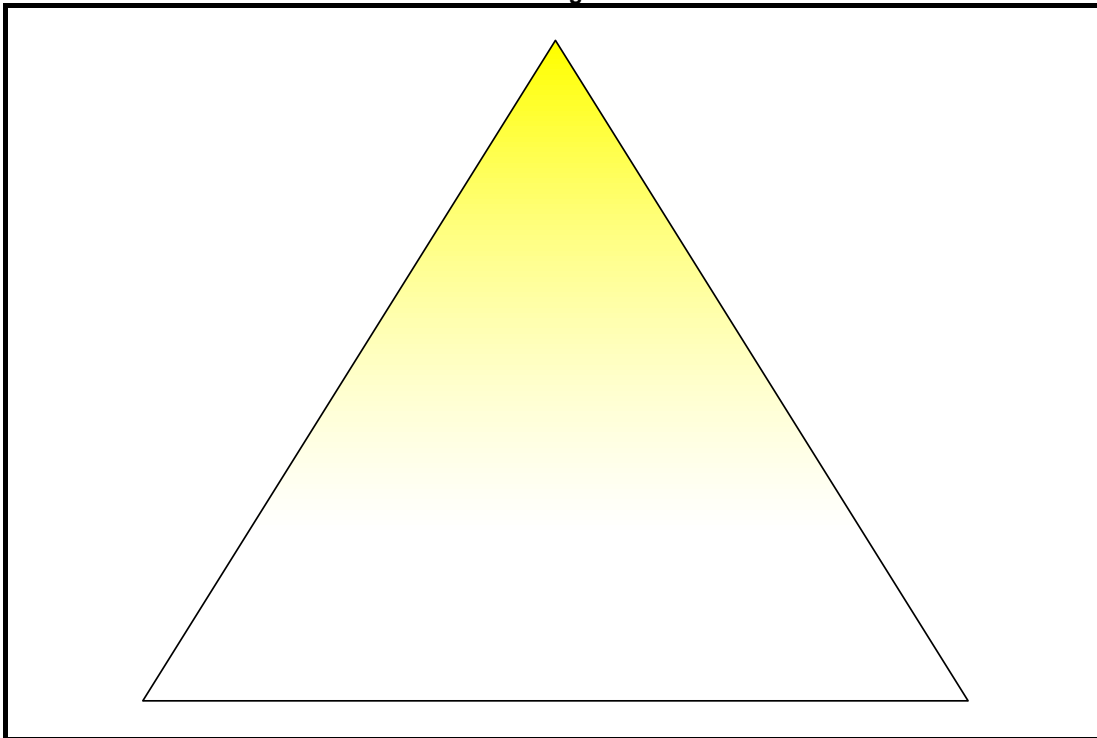


Cone of Light

Cone Of Light Tabulation

Mounting Height (Feet)	Footcandles at Nadir	Diameter (Feet)
4.00	9.94	4.86
6.00	4.42	7.30
8.00	2.48	9.73
10.0	1.59	12.2
12.0	1.10	14.6
14.0	0.811	17.0
16.0	0.621	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

Radiant Flux:	434.7 mW
Luminous Flux:	115.7 Lumens
Luminaire Efficacy:	39.5 Lumens/Watt
CCT:	3204 K
CRI (Ra):	98.1
Chromaticity (x):	0.4204
Chromaticity (y):	0.3929
Chromaticity (u):	0.2446
Chromaticity (v):	0.3430
Duv:	-0.0022

Test Conditions

Test Temperature:	24.9 °C
Voltage:	120.0 VAC
Current:	0.03595 A
Power:	2.932 W
Power Factor:	0.679
Frequency:	60 Hz
Current THD:	92.6 %

Testing was performed in a 2-meter integrating sphere using the 4 π geometry method.

Absorption correction was employed for this measurement.

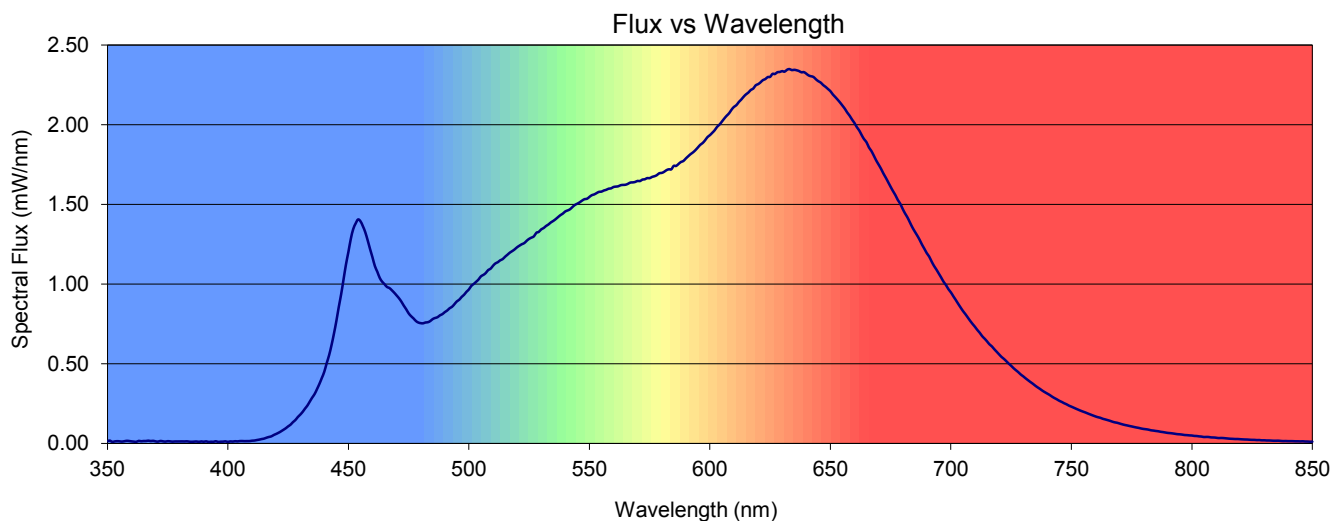
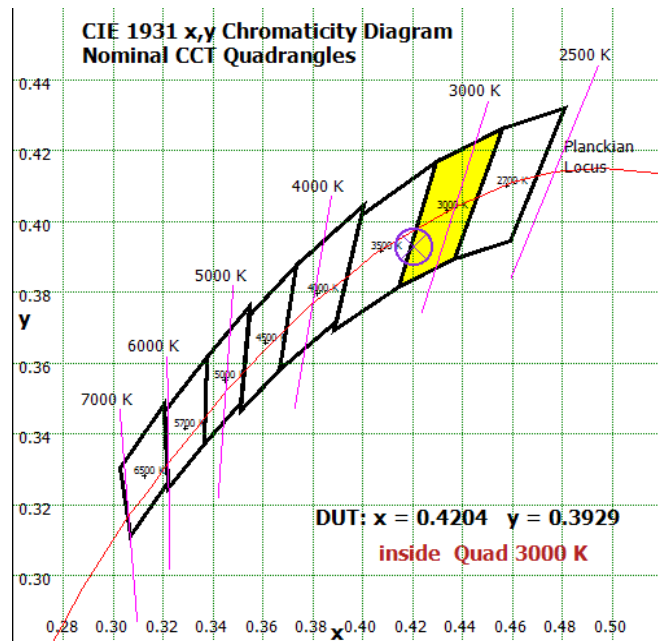
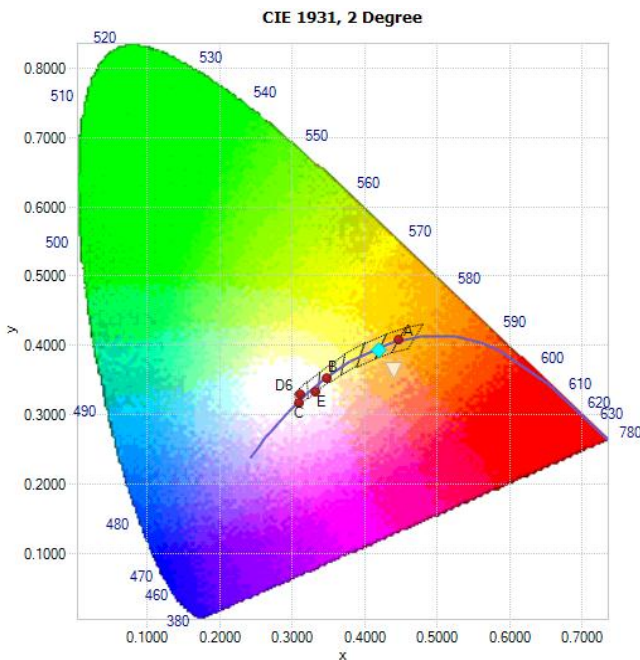


Chromaticity Coordinates

x	y	u	v	u'	v'	Duv
0.4204	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		