



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
Project Number
10459942
Test Number
741447

Test Date

2014-09-03

Prepared By

Javier Caban

Javier Caban, Technician

Approved By

Eric M. Gaudreau

Eric Gaudreau, Engineering Project Handler

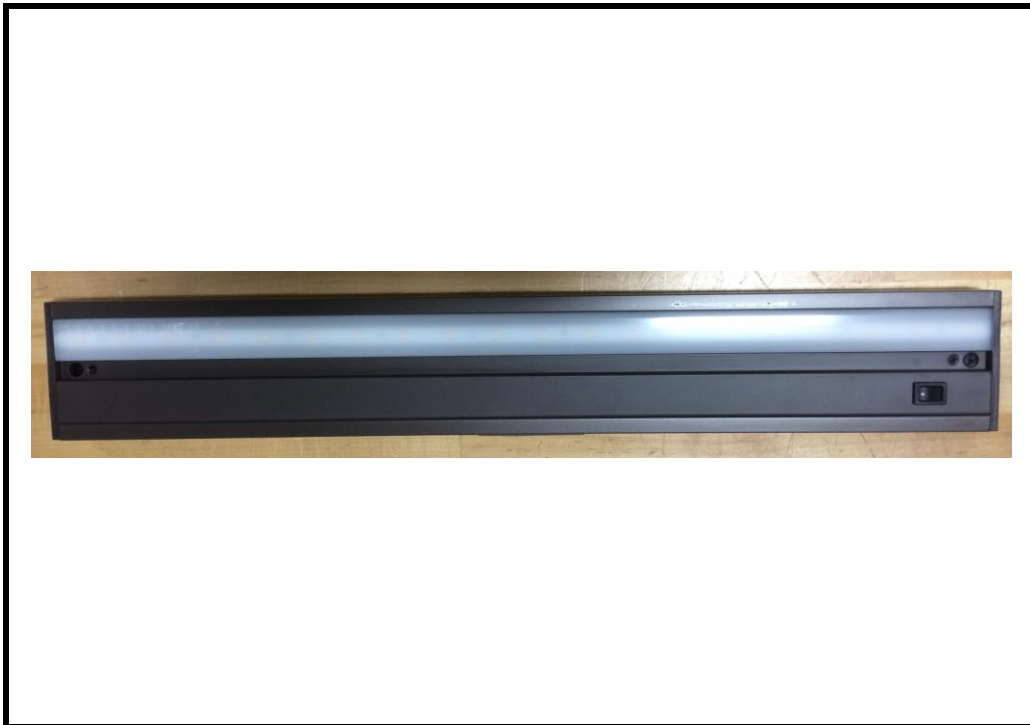
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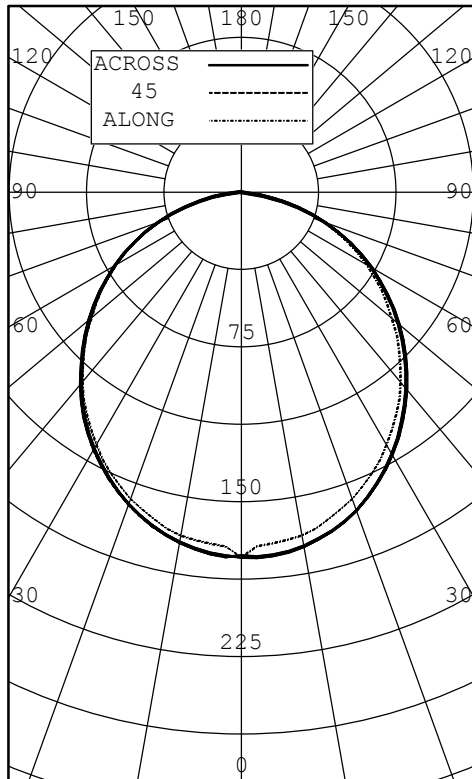
Luminaire Description: Brown aluminum housing, frosted plastic lens
Catalog Number: Fencer™ 120V Under Cabinet Fixture DI-13xx-24-yy-30
Lamp: 20 white LEDs
Mounting: Surface
Ballast/Driver: LED power supply

Luminaire



Test Conditions

Test Temperature:	24.4 °C
Voltage:	120.0 VAC
Current:	0.08328 A
Power:	8.116 W
Power Factor:	0.812
Frequency:	60 Hz
Current THD:	71.0 %



INTENSITY (CANDLEPOWER) SUMMARY

ANGLE	BEAM SIDE					OUTPUT LUMENS
	ALONG	67.5	45	22.5	ACROSS	
0	177	177	177	177	177	
5	171	178	177	177	177	9
10	169	175	175	174	174	
15	164	171	170	170	170	24
20	158	165	164	164	164	
25	150	157	156	156	156	36
30	141	147	147	146	146	
35	131	137	136	136	136	42
40	120	126	125	124	124	
45	108	113	113	112	112	43
50	95	100	100	100	100	
55	83	87	87	86	86	38
60	70	74	73	73	73	
65	56	60	59	59	59	29
70	42	45	45	44	44	
75	28	31	30	29	29	16
80	15	17	16	13	11	
85	4	5	0	0	0	2
90	0	0	0	0	0	

BOTH SIDES
 ZONAL LUMENS AND PERCENTAGES

ZONE	LUMENS	% LUMINAIRE
0-30	135	28.62
0-40	219	46.38
0-60	380	80.43
0-90	472	100.00
40-90	253	53.62
60-90	92	19.57
90-180	0	0.00
0-180	472	100.00

EFFICACY (LUMENS PER WATT): 58.3

*** THIS IS AN ABSOLUTE TEST ***

LUMINOUS LENGTH: 1.000 INS
 WIDTH: 23.750 INS

LUMINANCE SUMMARY - CD./SQ.M.

ANGLE	BEAM SIDE		
	ALONG	45	ACROSS
45	9967	10422	10385
55	9443	9902	9834
65	8647	9174	9083
75	7060	7573	7214
85	2995	225	0

TESTED IN ACCORDANCE WITH IES PROCEDURES.



BEAM SIDE
 INTENSITY (CANDLEPOWER) DATA
 IN 2.5 DEGREE STEPS

ANGLE	PLANE					AVERAGE	OUTPUT LUMENS
	ALONG	67.5	45	22.5	ACROSS		
0.0	177	177	177	177	177	177	
2.5	172	178	178	177	177	177	
5.0	171	178	177	177	177	176	9
7.5	170	177	176	176	176	175	
10.0	169	175	175	174	174	174	
12.5	167	173	173	173	172	172	
15.0	164	171	170	170	170	169	24
17.5	161	168	167	167	167	167	
20.0	158	165	164	164	164	163	
22.5	154	161	160	160	160	160	
25.0	150	157	156	156	156	155	36
27.5	146	152	152	151	151	151	
30.0	141	147	147	146	146	146	
32.5	136	142	142	141	141	141	
35.0	131	137	136	136	136	136	42
37.5	126	131	131	130	130	130	
40.0	120	126	125	124	124	124	
42.5	114	120	119	118	118	118	
45.0	108	113	113	112	112	112	43
47.5	102	107	106	106	106	106	
50.0	95	100	100	100	100	99	
52.5	89	94	93	93	93	93	
55.0	83	87	87	86	86	86	38
57.5	76	81	80	79	79	79	
60.0	70	74	73	73	73	73	
62.5	63	67	66	66	66	66	
65.0	56	60	59	59	59	59	29
67.5	49	53	52	52	51	52	
70.0	42	45	45	44	44	44	
72.5	35	38	37	37	36	37	
75.0	28	31	30	29	29	30	16
77.5	22	24	23	21	20	22	
80.0	15	17	16	13	11	15	
82.5	10	11	8	3	1	7	
85.0	4	5	0	0	0	2	2
87.5	1	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					AVERAGE	OUTPUT LUMENS
	ALONG	112.5	135	157.5	ACROSS		
0.0	177	177	177	177	177	177	
2.5	172	178	177	177	177	176	
5.0	171	177	176	176	176	175	8
7.5	170	175	174	174	174	174	
10.0	169	173	173	172	172	172	
12.5	167	171	170	170	170	170	
15.0	164	169	168	167	167	167	24
17.5	161	166	165	164	164	164	
20.0	158	162	161	161	161	161	
22.5	154	158	157	157	157	157	
25.0	150	154	153	153	153	153	35
27.5	146	150	149	148	148	148	
30.0	141	145	144	143	143	144	
32.5	136	140	139	138	138	139	
35.0	131	135	133	133	133	133	42
37.5	126	129	128	127	127	127	
40.0	120	123	121	121	121	121	
42.5	114	116	115	115	115	115	
45.0	108	110	109	109	109	109	42
47.5	102	104	103	103	103	103	
50.0	95	98	97	96	97	97	
52.5	89	91	90	90	90	90	
55.0	83	84	83	83	84	84	37
57.5	76	78	77	77	77	77	
60.0	70	71	71	71	71	71	
62.5	63	64	64	64	64	64	
65.0	56	57	57	57	57	57	28
67.5	49	50	50	50	50	50	
70.0	42	43	43	43	43	43	
72.5	35	36	36	36	36	36	
75.0	28	29	29	28	28	29	15
77.5	22	22	22	21	21	22	
80.0	15	16	15	14	14	15	
82.5	10	9	9	8	7	9	
85.0	4	4	3	1	1	3	3
87.5	1	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	.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	.840	.79	0.850	.810	.78	0.820	.790	.76	0.74			
	3	0.950	.840	.760	.70	0.930	.830	.750	.70	0.900	.810	.750	.69	0.790	.730	.68	0.760	.710	.67	0.730	.690	.65	0.63			
	4	0.880	.760	.670	.61	0.860	.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	0.770	.660	.570	.52	0.630	.560	.51	0.610	.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	.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.

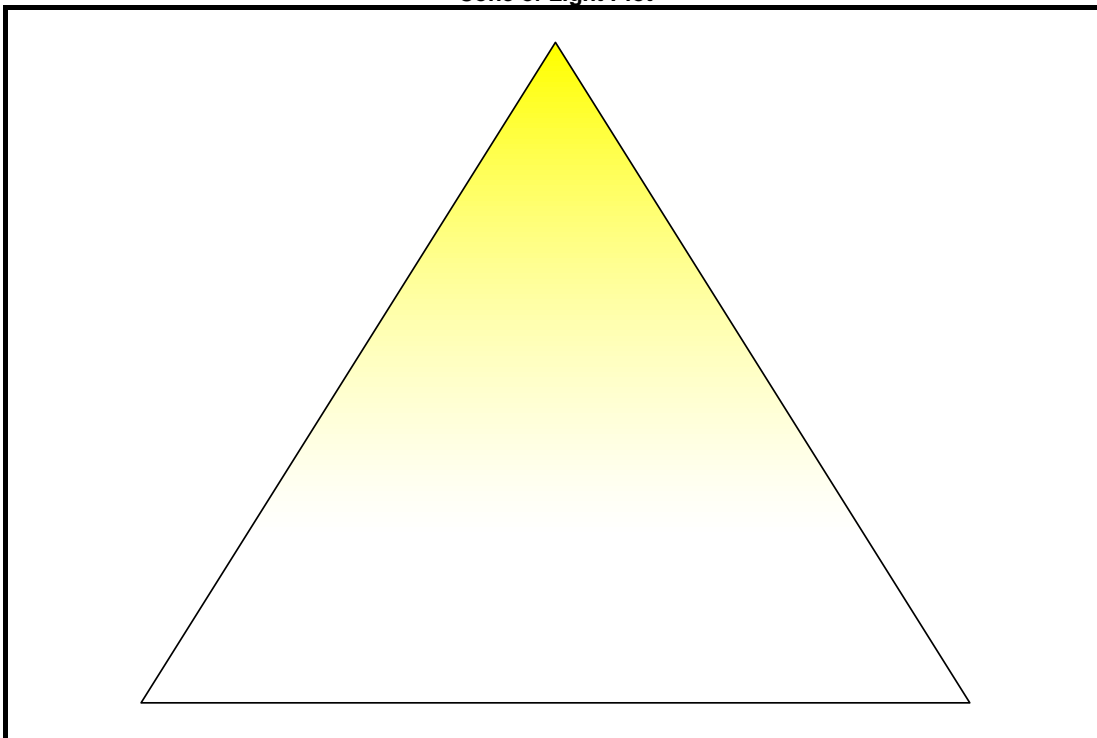


Cone of Light

Cone Of Light Tabulation

Mounting Height (Feet)	Footcandles at Nadir	Diameter (Feet)
4.00	11.1	4.88
6.00	4.94	7.32
8.00	2.78	9.76
10.0	1.78	12.2
12.0	1.24	14.6
14.0	0.908	17.1
16.0	0.695	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

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

Radiant Flux: 560.5 mW
Luminous Flux: 176.8 Lumens
Luminaire Efficacy: 61.3 Lumens/Watt
CCT: 2984 K
CRI (Ra): 83.9
Chromaticity (x): 0.4372
Chromaticity (y): 0.4029
Chromaticity (u): 0.2512
Chromaticity (v): 0.3473
Duv: -0.0007

Test Conditions

Test Temperature: 24.6 °C
Voltage: 120.0 VAC
Current: 0.04743 A
Power: 2.885 W
Power Factor: 0.507
Frequency: 60 Hz
Current THD: 163 %

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

Absorption correction was employed for this measurement.

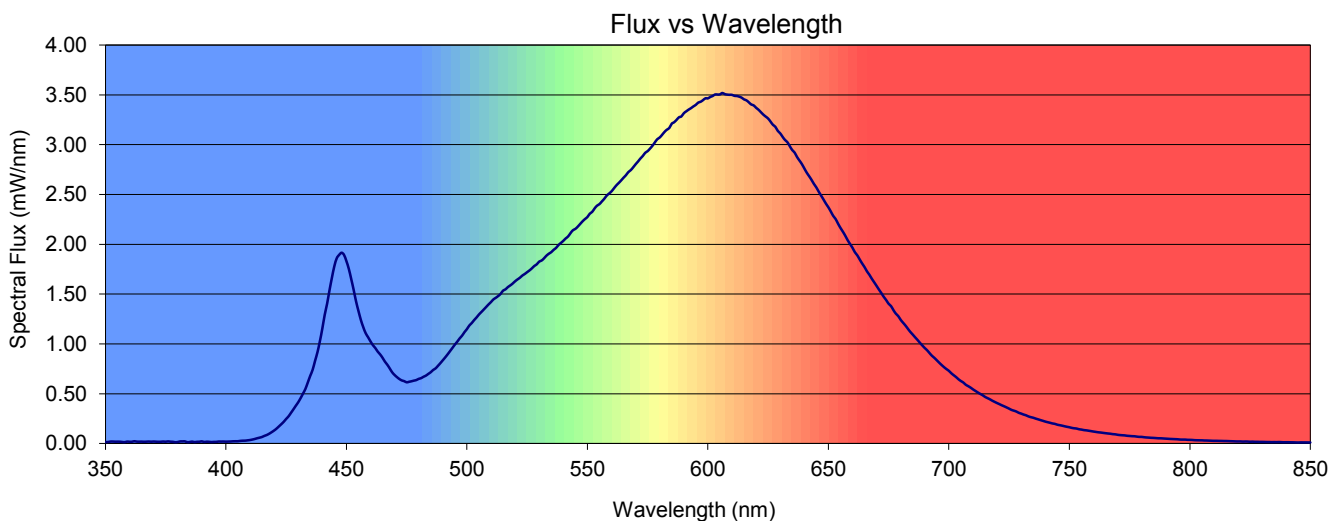
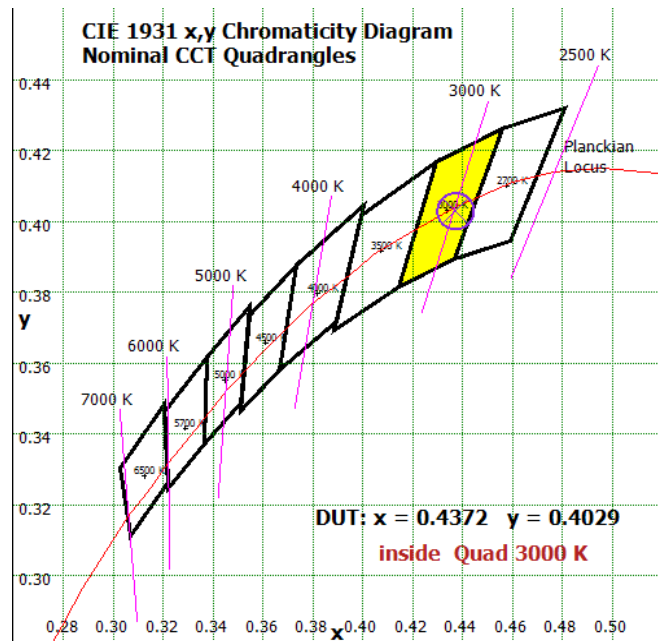
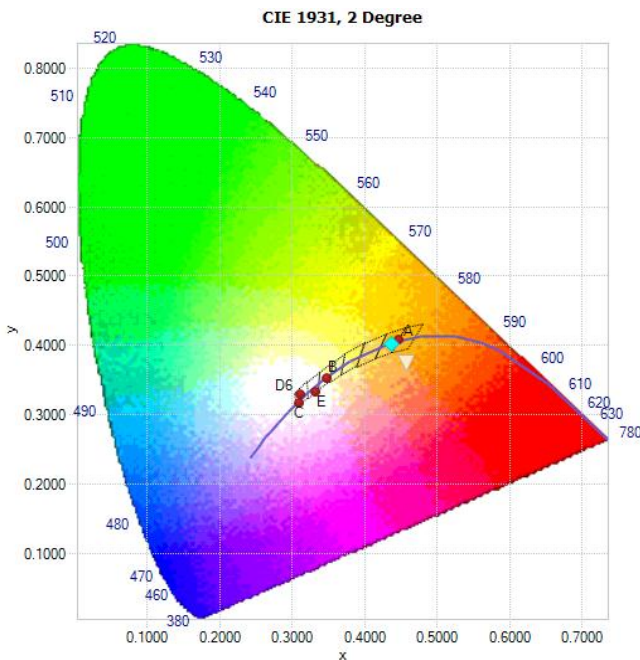


Chromaticity Coordinates

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		