



Spectra Lux

2750 Sabourin, Saint-Laurent (Quebec) H4S 1M2 Canada
Tel.: (514) 332-0082 Fax: (514) 332-3590 www.spectralux.ca



Lab Code: 200899-0

Moving Mirror Goniophotometer Test Report

Standard(s): IES LM-63, IES LM-79, ANSI C82.77

Customer ANDlight, 1951 Franklin St., Vancouver, British Columbia , Canada, V5L 0C7

General Information		Lamp Details: CY4461		Driver Details: CY2029	
DUT Lab ID	SRIS 2831-8	Seasoning	0 Hour	Type	LED Power Supply
Lamp Type	LED/SSL	Test Product	BUT-90-CW-41	Manufacturer	Meanwell
Current Mode	AC	Manufacturer	EPISTAR	Catalog No.	IDLV-45-12
Test Report	S2008188-R1	Lamp Catalog No.	OMNICHIP (320404-xx-300-12-4.4)	Maximum Power	45 W
Test Date	18 August 2020	Drive Current	30 mA	Input Voltage	120.00 V
Report Date	20 November 2020	Nominal Color	4100 K	Operating Frequency	60 Hz
Ambient	24.4 °C	Burning Position	Junction Axial	Input Power	26.50 W

Luminaire Data

General Information		Optics		Aperture (feet)	
Manufacturer	ANDlight	Reflector	None	X	0.0000
Name	BUTTON	Housing	Aluminum Body c/w Nylon Rope	Y	-2.9583
Catalog No.	BUT-90-CW-41	Lens	Opalin Acrylic Diffuser	Z	-2.9583

Stabilization Time: 1 hour

Approved Signatory: Chrisnel Blot

Signature:



Luminaire Test Method

Precise installation and alignment of the luminaire to the rotation axis of the photometer is governed by a servomotor controlled via a microcontroller. A laser is used to validate the luminaire positioning. Before photometric measurements are taken, luminaire is operated long enough to reach stabilization and temperature equilibrium.

All movement commands issued to the photometer axes are mediated by the software to ensure the motion is within the limits of operation. The photometric detector used is a silicon detector corrected to closely match the spectral luminous efficiency photopic curve with a quality index less than 1.5%. Proper shielding is incorporated to the photometric test bench such that only the light from the unit under test is measured.

Luminous intensity measurements are performed at a distance great enough so that the inverse-square law applies. During each measurement the computer records the luminous intensity associated to the corresponding angles of radiation, as well as input electrical operational parameters and temperature measurements. Candela values are reported in IES format as per LM-63.

Equipment, reference standards are traceable to National Institute of Standards and Technology (NIST) and National Research Council of Canada (NRC).





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Electrical Equipment

Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due Date
Power Supply	iRDC	CIF-3000A	974998	N.P.C.R.	N.P.C.R.
Input Power Meter	Yokogawa	WT210	27E116584	2020/07/22	2021/09/22
Output Power Meter	N/A	N/A	N/A	N.P.C.R.	N.P.C.R.

Photometric Equipment

Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due Date
Photometer	N/A	N/A	N/A	N.P.C.R.	N.P.C.R.
Photodetector	INPHORA	IPR-PDET 19	110802	2019/09/05	2020/09/05

Environment Equipment

Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due Date
Temperature Humidity Sensor	Omega	HH311	120504176	2020/07/16	2021/07/16

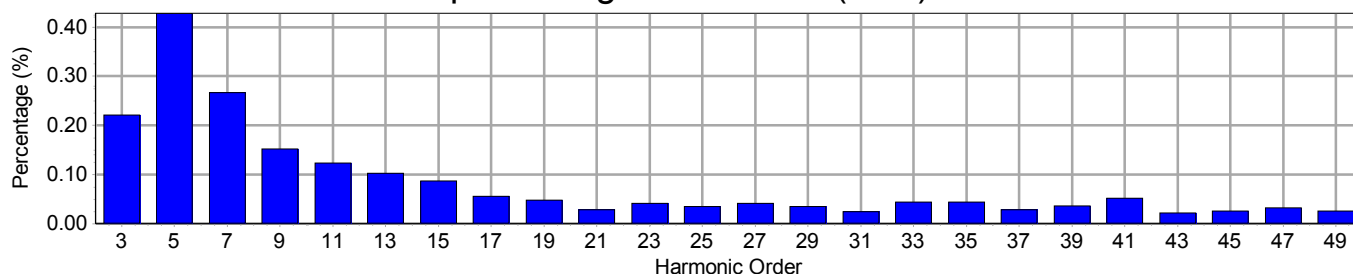


Electrical Measurements

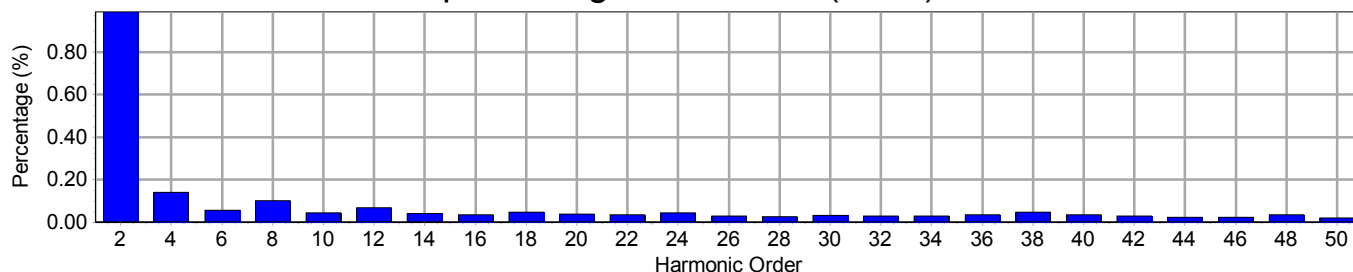
Input

Frequency	60 Hz	Active Power	26.50 W	THDV [ANSI]	1.19 %
Voltage	120.1 V(rms)	Apparent Power	27.11 VA	THDA [ANSI]	6.73 %
Current	0.2258 A(rms)	Power Factor	0.977	Max. Harmonic At	3rd order

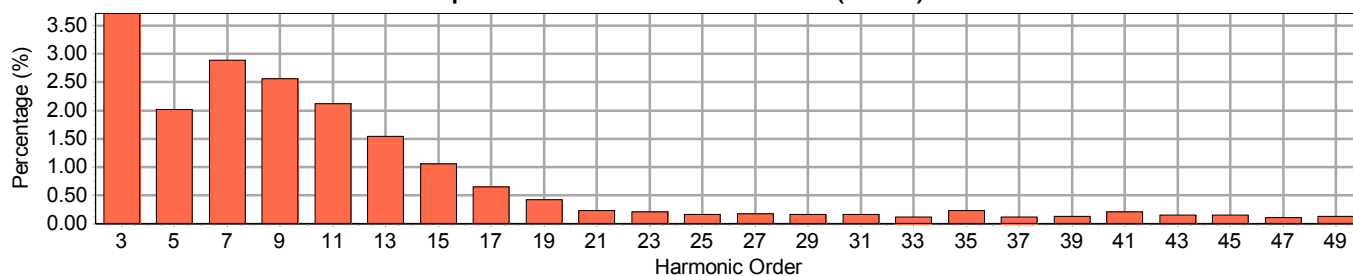
Input Voltage Harmonics (Odd)



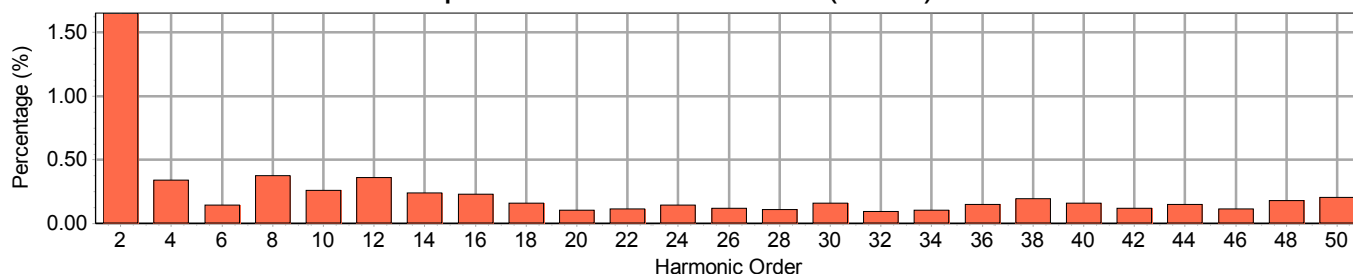
Input Voltage Harmonics (Even)



Input Current Harmonics (Odd)



Input Current Harmonics (Even)





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Harmonic Measurements

Odd Harmonics				Even Harmonics			
Harmonic Order	Frequency (HZ)	Voltage Harmonics (%)	Current Harmonics (%)	Harmonic Order	Frequency (HZ)	Voltage Harmonics (%)	Current Harmonics (%)
1	60	100.000	100.000	2	120	0.991	1.653
3	180	0.221	3.719	4	240	0.141	0.338
5	300	0.429	2.015	6	360	0.054	0.142
7	420	0.267	2.893	8	480	0.100	0.374
9	540	0.152	2.564	10	600	0.045	0.260
11	660	0.123	2.121	12	720	0.067	0.361
13	780	0.103	1.542	14	840	0.041	0.240
15	900	0.087	1.061	16	960	0.036	0.231
17	1020	0.056	0.655	18	1080	0.047	0.157
19	1140	0.047	0.420	20	1200	0.037	0.101
21	1260	0.027	0.231	22	1320	0.034	0.114
23	1380	0.041	0.208	24	1440	0.045	0.145
25	1500	0.035	0.169	26	1560	0.028	0.117
27	1620	0.042	0.178	28	1680	0.025	0.108
29	1740	0.034	0.166	30	1800	0.031	0.160
31	1860	0.023	0.163	32	1920	0.028	0.091
33	1980	0.044	0.119	34	2040	0.029	0.105
35	2100	0.044	0.235	36	2160	0.034	0.150
37	2220	0.028	0.117	38	2280	0.046	0.194
39	2340	0.036	0.127	40	2400	0.034	0.159
41	2460	0.051	0.204	42	2520	0.029	0.118
43	2580	0.022	0.154	44	2640	0.023	0.146
45	2700	0.026	0.157	46	2760	0.022	0.111
47	2820	0.031	0.104	48	2880	0.035	0.178
49	2940	0.026	0.128	50	3000	0.021	0.203



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Photometric Report: S2008188-R1

Prepared for: ANDlight · Test Date: 18 August 2020

Luminaire: BUTTON · Lumcat: BUT-90-CW-41

Coefficients of Utilization - Zonal Cavity Method

RCR	RC				0.9				0.8				0.7				0.5			0.1			0
	RW	0.7	0.5	0.3	0.1	0.7	0.5	0.3	0.1	0.7	0.5	0.3	0.1	0.5	0.3	0.1	0.5	0.3	0.1	0.5	0.3	0.1	0
0		116	116	116	116	107	107	107	107	99	99	99	99	84	84	84	57	57	57	50			
1		101	93	86	80	92	85	79	74	84	78	73	68	65	60	57	41	38	36	31			
2		89	78	68	60	82	71	63	56	74	65	57	51	53	47	42	33	29	26	21			
3		80	66	56	47	73	61	51	44	66	55	47	40	45	39	33	27	23	20	15			
4		73	57	46	38	66	53	43	35	60	48	39	32	39	32	27	23	19	16	12			
5		66	50	39	32	60	46	36	29	54	42	33	27	34	27	22	20	16	13	9			
6		60	44	34	26	55	41	31	24	50	37	29	22	30	23	18	18	14	10	7			
7		55	40	29	22	50	36	27	21	46	33	25	19	27	20	15	16	12	9	6			
8		51	36	26	19	47	33	24	18	42	30	22	16	24	18	13	15	10	7	5			
9		47	32	23	17	43	29	21	15	39	27	19	14	22	16	12	13	9	6	4			
10		44	29	20	15	40	27	19	14	36	25	17	12	20	14	10	12	8	6	3			

Zonal Lumen Summary

Average Luminance (Cd/m²)

Zone	Lumens	% Lamp	% Luminaire	Angle	0 Degree	45 Degree	90 Degree
0 - 10	2	0.08	0.08				
10 - 20	12	0.64	0.64				
20 - 30	36	1.86	1.86				
30 - 40	69	3.59	3.59	45.0	476	348	20
40 - 50	108	5.58	5.58				
50 - 60	146	7.58	7.58	55.0	681	507	30
60 - 70	180	9.32	9.32				
70 - 80	204	10.59	10.59	65.0	1023	764	46
80 - 90	217	11.26	11.26				
90 - 120	598	30.97	30.97	75.0	1766	1331	83
90 - 130	741	38.41	38.41				
90 - 150	912	47.26	47.26	85.0	5401	4094	256
90 - 180	955	49.51	49.51				
0 - 180	1930	100.00	100.00				

Luminaire Luminous Flux: 1930

Measured Input Power: 26.50 W

Total Luminaire Efficiency: N/A

Luminaire Luminous Efficacy: 72.8 lm/W

Luminaire Spacing Criterion (0 Degree): 9.8824

Luminaire Spacing Criterion (90 Degree): 2.6493

Category: Up and Down



Photometric Report: S2008188-R1

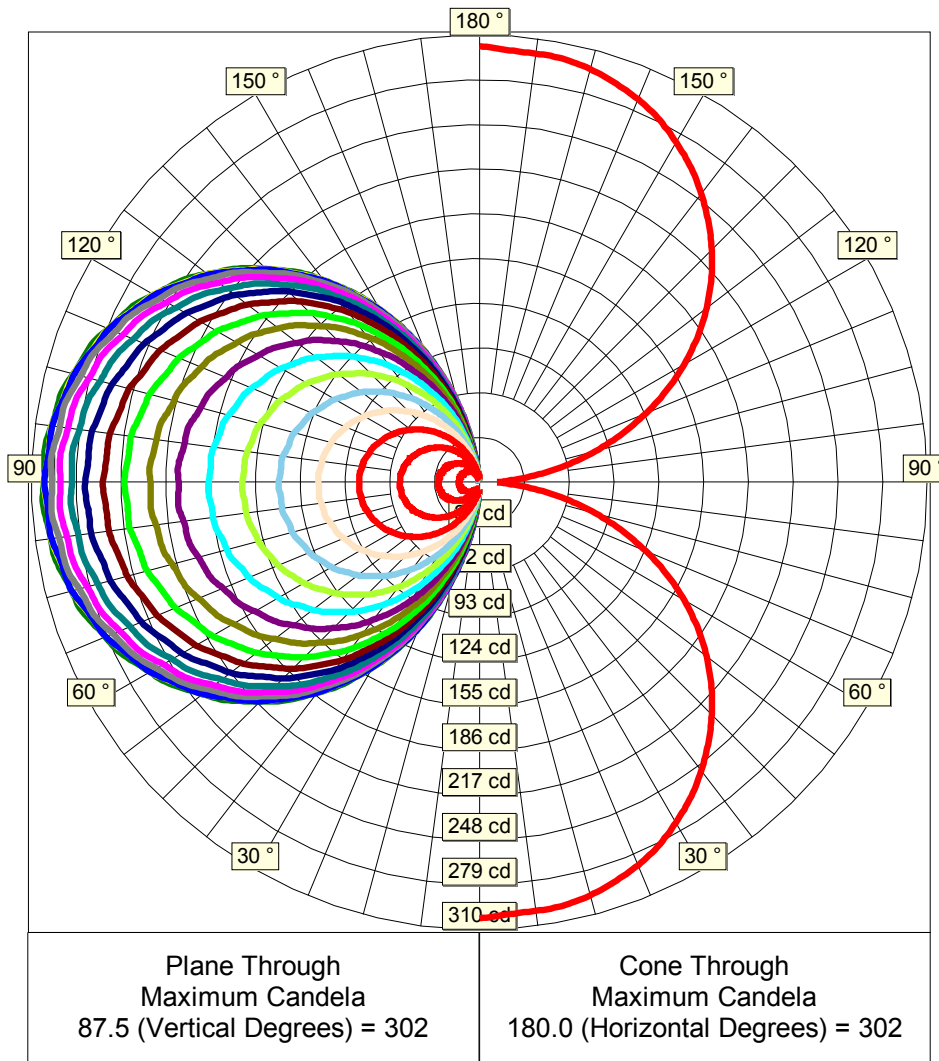
Prepared for: ANDlight · Test Date: 18 August 2020

Luminaire: BUTTON · Lumcat: BUT-90-CW-41

Luminous Intensity - Polar Curve for each Plane(1)

Plane
Angles

Plane Angles	Candela Values
0.0	5
2.5	8
5.0	17
7.5	28
10.0	40
12.5	54
15.0	68
17.5	82
20.0	96
22.5	109
25.0	123
27.5	136
30.0	148
32.5	161
35.0	173
37.5	184
40.0	195
42.5	206
45.0	215
47.5	224
50.0	234
52.5	241
55.0	249
57.5	257
60.0	263
62.5	269
65.0	276
67.5	280
70.0	285
72.5	290
75.0	292
77.5	295
80.0	298
82.5	299
85.0	301
87.5	302
90.0	301
92.5	301
95.0	301
97.5	299



Cone
Angles

Cone Angles	Candela Values
0.0	302
5.0	300
10.0	299
15.0	296
20.0	291
25.0	283
30.0	272
35.0	260
40.0	244
45.0	228
50.0	208
55.0	187
60.0	164
65.0	139
70.0	111
75.0	83
80.0	55
85.0	28
90.0	14
95.0	28

0.0 °
5.0 °
10.0 °
15.0 °
20.0 °
25.0 °
30.0 °
35.0 °
40.0 °
45.0 °
50.0 °
55.0 °
60.0 °
65.0 °
70.0 °
75.0 °
80.0 °
85.0 °
90.0 °
95.0 °

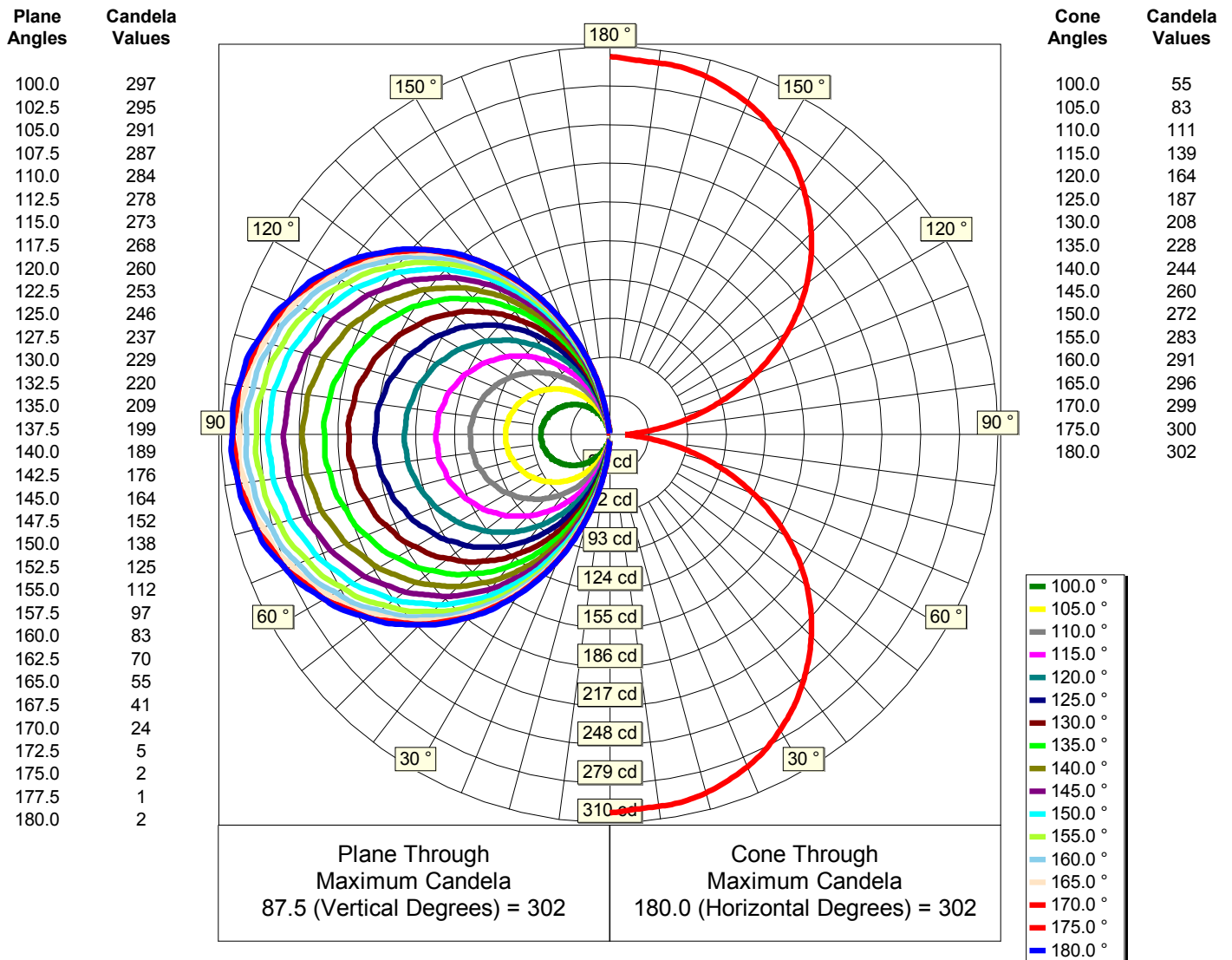


Photometric Report: S2008188-R1

Prepared for: ANDlight · Test Date: 18 August 2020

Luminaire: BUTTON · Lumcat: BUT-90-CW-41

Luminous Intensity - Polar Curve for each Plane(2)





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IES File Headers

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IESNA:LM-63
[ISSUEDATE]      18 August 2020
[TESTLAB]        Spectra Lux
[TEST]           S2008188-R1
[MANUFAC]        ANDlight
[LUMCAT]          BUT-90-CW-41
[LUMINAIRE]      BUTTON
[LAMP]           Clusters of EPISTAR OMNICHIP (320404-xx-300-12-4.4) LEDs c/w Meanwell Driver IDLV-45-12 @ 120.00V
[_BURNING]        Axial (1,930 Luminaire Lumens)
[_REFLECTOR]      None
[_LENS]           Opalin Acrylic Diffuser
[_HOUSING]        Aluminum Body c/w Nylon Rope
[_NOMINAL COLOR] 4100K
[_DRIVE CURRENT] 30 mA
```

Candela Table

Lateral Angles

	0.0	5.0	10.0	15.0	20.0	25.0	30.0	35.0	40.0	45.0
V e r t i c a l	0.0	5	5	5	5	5	5	5	5	5
	2.5	8	8	8	8	8	8	8	8	7
	5.0	17	16	17	16	16	15	14	13	12
	7.5	28	27	28	26	26	24	23	21	19
	10.0	40	39	40	39	38	34	32	30	27
	12.5	54	53	53	52	51	46	43	40	36
	15.0	68	67	67	65	64	58	55	51	45
	17.5	82	80	81	79	77	70	66	62	55
	20.0	96	94	95	93	91	83	78	73	65
	22.5	109	109	109	106	104	95	90	84	75
	25.0	123	121	122	120	117	107	101	94	86
	27.5	136	135	135	132	130	119	113	105	96
	30.0	148	148	148	144	141	131	124	116	105
	32.5	161	159	160	157	154	141	134	126	115
	35.0	173	171	171	169	165	153	145	135	124
	37.5	184	183	184	179	175	164	155	146	133
	40.0	195	193	194	191	187	173	164	154	142
	42.5	206	204	204	201	197	183	173	163	150
	45.0	215	214	215	210	206	192	183	172	157
A n g l e s	47.5	224	223	223	220	216	209	200	190	166
	50.0	234	232	232	228	224	209	198	186	172
	52.5	241	241	241	236	231	217	206	194	178
	55.0	249	248	248	245	240	223	212	200	186
	57.5	257	255	255	252	247	230	219	206	191
	60.0	263	263	263	258	252	237	226	213	196
	62.5	269	268	268	265	260	242	231	217	202
	65.0	276	274	273	270	265	248	236	222	206
	67.5	280	280	280	274	269	253	241	228	210
	70.0	285	283	283	280	275	256	244	231	215
	72.5	290	287	287	284	278	260	248	234	217
	75.0	292	292	292	286	281	264	252	238	220
	77.5	295	293	294	291	285	266	254	239	223
	80.0	298	296	295	292	287	269	256	241	225
	82.5	299	299	299	293	288	271	259	244	226
	85.0	301	299	299	296	290	282	271	259	228
	87.5	302	300	299	296	291	283	272	260	228
	90.0	301	301	301	295	290	282	273	260	228



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Lateral Angles

	0.0	5.0	10.0	15.0	20.0	25.0	30.0	35.0	40.0	45.0	
V e r t i c a l	92.5	301	300	300	297	291	282	271	259	244	228
	95.0	301	299	298	295	290	282	271	258	243	226
	97.5	299	298	298	293	287	279	270	258	243	225
	100.0	297	295	295	293	286	278	267	255	240	225
	102.5	295	293	292	289	284	276	265	253	238	221
	105.0	291	291	290	285	279	271	263	251	236	219
	107.5	287	286	286	283	277	269	258	246	232	217
	110.0	284	282	281	278	273	265	255	243	228	212
	112.5	278	278	277	273	267	259	251	239	225	208
	115.0	273	271	271	269	263	255	245	233	219	205
	117.5	268	265	265	262	257	249	240	228	214	199
	120.0	260	260	259	255	250	242	234	223	209	194
	122.5	253	252	252	249	244	236	227	216	202	189
	125.0	246	244	244	241	236	229	220	209	196	182
	127.5	237	237	236	232	227	220	213	202	190	175
	130.0	229	227	227	225	220	213	204	194	181	169
	132.5	220	218	217	215	210	204	196	185	174	161
	135.0	209	209	208	205	200	194	187	177	166	153
	137.5	199	198	197	196	191	184	177	167	156	145
	140.0	189	187	186	185	180	174	167	158	147	136
A n g l e s	142.5	176	176	176	173	168	163	157	148	138	127
	145.0	164	164	163	162	157	152	145	137	128	118
	147.5	152	151	150	149	145	140	134	126	117	108
	150.0	138	139	138	136	132	127	123	116	107	98
	152.5	125	125	124	123	120	115	110	104	96	88
	155.0	112	111	110	110	106	102	98	92	85	78
	157.5	97	98	97	96	93	89	86	81	74	68
	160.0	83	83	83	82	80	76	73	69	63	58
	162.5	70	69	69	69	66	63	61	57	51	47
	165.0	55	56	55	55	53	49	47	43	38	34
167.5	41	42	41	40	37	34	31	28	25	24	
170.0	24	23	22	22	19	18	18	16	15	14	
172.5	5	6	6	8	8	8	9	9	8	8	
175.0	2	2	1	2	2	2	3	3	3	4	
177.5	1	1	1	2	2	2	2	2	2	2	
180.0	2	2	2	2	2	2	2	2	2	2	



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Lateral Angles

	50.0	55.0	60.0	65.0	70.0	75.0	80.0	85.0	90.0	95.0
V e r t i c a l	0.0	5	5	5	5	5	5	5	5	5
	2.5	7	7	6	6	6	5	5	5	5
	5.0	11	10	9	8	7	6	5	5	5
	7.5	17	15	13	11	9	8	6	5	5
	10.0	24	21	18	15	12	9	7	6	6
	12.5	32	28	23	19	15	11	8	6	6
	15.0	41	35	30	24	19	14	10	6	6
	17.5	50	42	36	29	23	17	11	7	5
	20.0	59	51	43	35	27	20	13	8	6
	22.5	68	59	50	41	31	23	15	9	6
	25.0	77	67	57	47	36	26	17	9	6
	27.5	86	75	64	53	40	29	19	10	6
	30.0	95	83	71	59	45	33	21	11	7
	32.5	104	91	78	64	50	36	23	12	7
	35.0	112	99	85	70	54	40	26	13	7
	37.5	120	106	91	76	59	43	28	15	8
	40.0	129	113	97	81	64	47	30	16	8
	42.5	136	121	104	87	68	50	32	17	9
	45.0	143	127	110	92	72	53	34	18	9
	47.5	151	133	115	96	77	56	36	19	10
A n g l e s	50.0	157	140	121	101	80	59	38	20	10
	52.5	163	145	126	106	84	62	40	21	10
	55.0	169	150	131	110	88	65	42	22	11
	57.5	174	156	136	114	90	67	44	23	11
	60.0	179	160	140	118	94	69	45	24	12
	62.5	185	164	143	121	97	72	47	24	12
	65.0	189	169	147	124	99	74	49	25	13
	67.5	192	172	151	127	101	75	50	26	13
	70.0	197	175	153	129	104	77	51	26	13
	72.5	199	179	156	132	105	79	52	27	13
	75.0	201	181	158	134	107	80	53	27	14
	77.5	204	182	160	135	109	81	53	28	14
	80.0	206	185	161	137	109	82	54	28	14
	82.5	206	186	163	138	110	82	54	28	14
	85.0	209	186	163	137	111	83	55	28	14
	87.5	208	187	164	139	111	83	55	28	14
	90.0	208	187	164	139	111	83	55	28	14
	92.5	209	186	163	138	111	83	55	28	14
	95.0	207	187	163	138	110	83	55	28	14
	97.5	206	185	162	137	110	82	54	28	14
	100.0	205	183	160	135	109	81	53	28	14
	102.5	203	182	159	134	107	80	53	28	14
	105.0	199	180	157	132	106	79	52	27	14
	107.5	198	176	154	130	105	78	51	26	13
	110.0	194	174	152	128	102	76	50	26	13
	112.5	190	170	149	125	100	74	49	26	13
	115.0	187	166	145	121	98	72	47	25	13
	117.5	182	163	141	118	94	70	46	24	12
	120.0	176	158	137	115	92	68	44	24	12
	122.5	171	153	132	111	89	65	43	23	12
	125.0	165	148	128	107	85	62	41	22	12
	127.5	159	142	123	103	81	60	39	21	12
	130.0	153	136	117	97	78	57	37	20	11
	132.5	146	130	112	93	73	54	36	19	11



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Lateral Angles

	50.0	55.0	60.0	65.0	70.0	75.0	80.0	85.0	90.0	95.0	
V e r t i c a l	135.0	138	123	106	88	69	51	34	19	11	19
	137.5	131	116	99	82	65	48	32	18	11	18
	140.0	123	109	93	77	61	45	30	17	10	17
	142.5	114	101	87	72	56	41	27	16	10	16
	145.0	106	93	80	66	52	38	25	15	10	15
	147.5	97	86	73	60	47	35	23	14	9	14
	150.0	88	78	66	54	43	31	21	13	9	13
	152.5	79	69	59	48	38	28	19	11	8	11
	155.0	70	62	52	42	33	24	17	10	8	10
	157.5	60	53	45	37	29	21	15	9	7	9
	160.0	52	45	38	30	24	18	12	8	6	8
	162.5	41	36	30	24	19	14	10	7	6	7
	165.0	30	26	22	18	14	11	7	6	5	6
	167.5	20	18	15	12	10	7	6	5	4	5
	170.0	13	12	10	8	6	5	5	4	4	4
	172.5	7	6	5	5	4	4	4	4	3	4
	175.0	4	4	4	3	3	3	3	3	3	3
	177.5	2	2	2	2	2	2	2	2	2	2
	180.0	2	2	2	2	2	2	2	2	2	2
A n g l e s											



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Lab Code: 200899-0

Lateral Angles

	100.0	105.0	110.0	115.0	120.0	125.0	130.0	135.0	140.0	145.0
V e r t i c a l	0.0	5	5	5	5	5	5	5	5	5
	2.5	5	5	6	6	6	7	7	7	8
	5.0	6	6	7	8	9	10	11	12	13
	7.5	6	8	9	11	13	15	17	19	21
	10.0	7	9	12	15	18	21	24	27	30
	12.5	8	11	15	19	23	28	32	36	40
	15.0	10	14	19	24	30	35	41	45	51
	17.5	11	17	23	29	36	42	50	55	62
	20.0	13	20	27	35	43	51	59	65	73
	22.5	15	23	31	41	50	59	68	75	84
	25.0	17	26	36	47	57	67	77	86	94
	27.5	19	29	40	53	64	75	86	96	105
	30.0	21	33	45	59	71	83	95	105	116
	32.5	23	36	50	64	78	91	104	115	126
	35.0	26	40	54	70	85	99	112	124	135
	37.5	28	43	59	76	91	106	120	133	146
	40.0	30	47	64	81	97	113	129	142	154
	42.5	32	50	68	87	104	121	136	150	163
	45.0	34	53	72	92	110	127	143	157	172
	47.5	36	56	77	96	115	133	151	166	179
A n g l e s	50.0	38	59	80	101	121	140	157	172	186
	52.5	40	62	84	106	126	145	163	178	194
	55.0	42	65	88	110	131	150	169	186	200
	57.5	44	67	90	114	136	156	174	191	206
	60.0	45	69	94	118	140	160	179	196	213
	62.5	47	72	97	121	143	164	185	202	217
	65.0	49	74	99	124	147	169	189	206	222
	67.5	50	75	101	127	151	172	192	210	228
	70.0	51	77	104	129	153	175	197	215	231
	72.5	52	79	105	132	156	179	199	217	234
	75.0	53	80	107	134	158	181	201	220	238
	77.5	53	81	109	135	160	182	204	223	239
	80.0	54	82	109	137	161	185	206	225	241
	82.5	54	82	110	138	163	186	206	226	244
	85.0	55	83	111	137	163	186	209	228	244
	87.5	55	83	111	139	164	187	208	228	244
	90.0	55	83	111	139	164	187	208	228	246
	92.5	55	83	111	138	163	186	209	228	244
	95.0	55	83	110	138	163	187	207	226	243
	97.5	54	82	110	137	162	185	206	225	243
	100.0	53	81	109	135	160	183	205	225	240
	102.5	53	80	107	134	159	182	203	221	238
	105.0	52	79	106	132	157	180	199	219	236
	107.5	51	78	105	130	154	176	198	217	232
	110.0	50	76	102	128	152	174	194	212	228
	112.5	49	74	100	125	149	170	190	208	225
	115.0	47	72	98	121	145	166	187	205	219
	117.5	46	70	94	118	141	163	182	199	214
	120.0	44	68	92	115	137	158	176	194	209
	122.5	43	65	89	111	132	153	171	189	202
	125.0	41	62	85	107	128	148	165	182	196
	127.5	39	60	81	103	123	142	159	175	190
	130.0	37	57	78	97	117	136	153	169	181
	132.5	36	54	73	93	112	130	146	161	174



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Lateral Angles

	100.0	105.0	110.0	115.0	120.0	125.0	130.0	135.0	140.0	145.0
135.0	34	51	69	88	106	123	138	153	166	177
137.5	32	48	65	82	99	116	131	145	156	167
140.0	30	45	61	77	93	109	123	136	147	158
142.5	27	41	56	72	87	101	114	127	138	148
145.0	25	38	52	66	80	93	106	118	128	137
147.5	23	35	47	60	73	86	97	108	117	126
150.0	21	31	43	54	66	78	88	98	107	116
152.5	19	28	38	48	59	69	79	88	96	104
155.0	17	24	33	42	52	62	70	78	85	92
157.5	15	21	29	37	45	53	60	68	74	81
160.0	12	18	24	30	38	45	52	58	63	69
162.5	10	14	19	24	30	36	41	47	51	57
165.0	7	11	14	18	22	26	30	34	38	43
167.5	6	7	10	12	15	18	20	24	25	28
170.0	5	5	6	8	10	12	13	14	15	16
172.5	4	4	4	5	5	6	7	8	8	9
175.0	3	3	3	3	4	4	4	4	3	3
177.5	2	2	2	2	2	2	2	2	2	2
180.0	2	2	2	2	2	2	2	2	2	2

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Lateral Angles

	150.0	155.0	160.0	165.0	170.0	175.0	180.0
V e r t i c a l A n g l e s	0.0	5	5	5	5	5	5
	2.5	8	8	8	8	8	8
	5.0	15	16	16	17	16	17
	7.5	24	26	26	28	27	28
	10.0	34	37	38	39	39	40
	12.5	46	49	51	52	53	54
	15.0	58	62	64	65	67	68
	17.5	70	75	77	79	81	82
	20.0	83	88	91	93	95	96
	22.5	95	100	104	106	109	109
	25.0	107	113	117	120	122	123
	27.5	119	126	130	132	135	136
	30.0	131	137	141	144	148	148
	32.5	141	149	154	157	160	161
	35.0	153	160	165	169	171	173
	37.5	164	170	175	179	184	184
	40.0	173	181	187	191	194	195
	42.5	183	191	197	201	204	206
	45.0	192	200	206	210	215	215
	47.5	200	209	216	220	223	224
	50.0	209	218	224	228	232	234
	52.5	217	225	231	236	241	241
	55.0	223	233	240	245	248	249
	57.5	230	240	247	252	255	257
	60.0	237	245	252	258	263	263
	62.5	242	252	260	265	268	269
	65.0	248	258	265	270	274	276
	67.5	253	262	269	274	280	280
	70.0	256	267	275	280	283	285
	72.5	260	271	278	284	287	290
	75.0	264	273	281	286	292	292
	77.5	266	277	285	291	294	295
	80.0	269	279	287	292	295	298
	82.5	271	280	288	293	299	299
	85.0	271	282	290	296	299	301
	87.5	272	283	291	296	300	302
	90.0	273	282	290	295	301	301
	92.5	271	282	291	297	300	301
	95.0	271	282	290	295	298	301
	97.5	270	279	287	293	298	299
	100.0	267	278	286	293	295	297
	102.5	265	276	284	289	293	295
	105.0	263	271	279	285	290	291
	107.5	258	269	277	283	286	287
	110.0	255	265	273	278	281	284
	112.5	251	259	267	273	277	278
	115.0	245	255	263	269	271	273
	117.5	240	249	257	262	265	268
	120.0	234	242	250	255	260	260
	122.5	227	236	244	249	252	253
	125.0	220	229	236	241	244	246
	127.5	213	220	227	232	236	237
	130.0	204	213	220	225	227	229
	132.5	196	204	210	215	217	220



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Lateral Angles

	150.0	155.0	160.0	165.0	170.0	175.0	180.0
135.0	187	194	200	205	208	209	209
137.5	177	184	191	196	197	198	199
140.0	167	174	180	185	186	187	189
142.5	157	163	168	173	176	176	176
145.0	145	152	157	162	163	164	164
147.5	134	140	145	149	150	151	152
150.0	123	127	132	136	138	139	138
152.5	110	115	120	123	124	125	125
155.0	98	102	106	110	110	111	112
157.5	86	89	93	96	97	98	97
160.0	73	76	80	82	83	83	83
162.5	61	63	66	69	69	69	70
165.0	47	49	53	55	55	56	55
167.5	31	34	37	40	41	42	41
170.0	18	18	19	22	22	23	24
172.5	9	8	8	8	6	6	5
175.0	3	2	2	2	1	2	2
177.5	2	2	2	2	1	1	1
180.0	2	2	2	2	2	2	2

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