



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: CY4459		Driver Details: CY2029	
DUT Lab ID	SRIS 2831-6	Seasoning	0 Hour	Type	LED Power Supply
Lamp Type	LED/SSL	Test Product	BUT-90-CW-30	Manufacturer	Meanwell
Current Mode	AC	Manufacturer	EPISTAR	Catalog No.	IDLV-45-12
Test Report	S2008183-R1	Lamp Catalog No.	OMNICHIP (HCE E 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	3000 K	Operating Frequency	60 Hz
Ambient	25.1 °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-30	Lens	Opalin Acrylic Diffuser	Z	-2.9583

Stabilization Time: 10 min

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

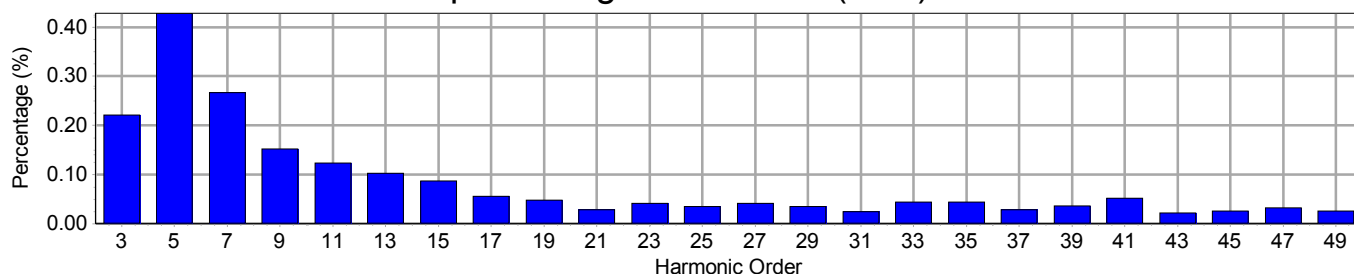


Electrical Measurements

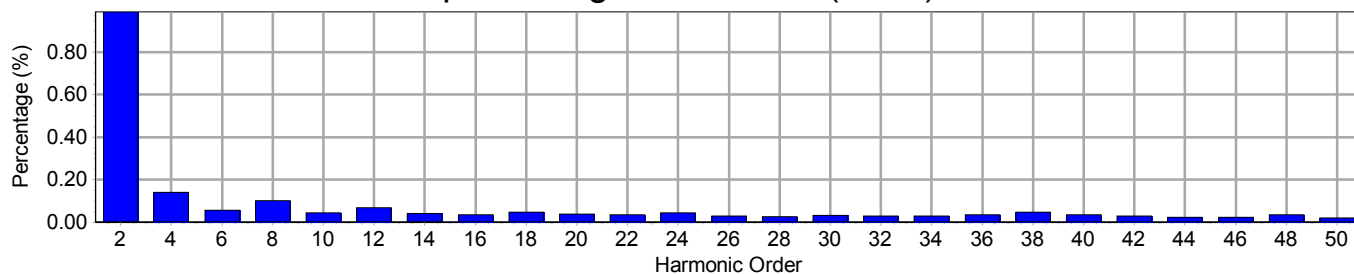
Input

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

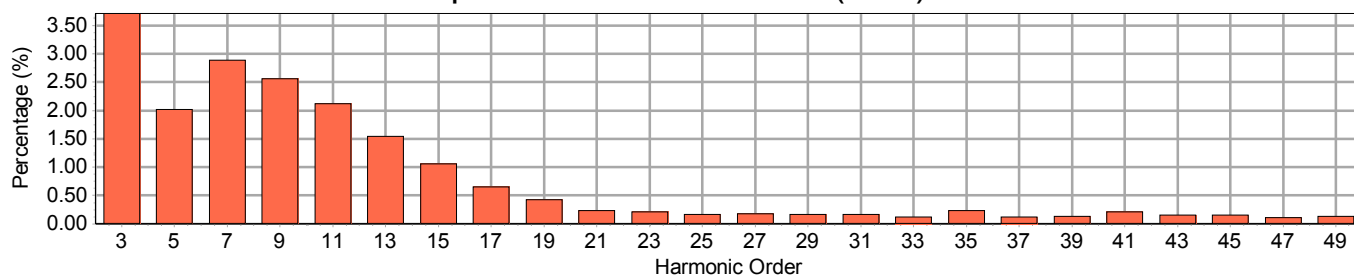
Input Voltage Harmonics (Odd)



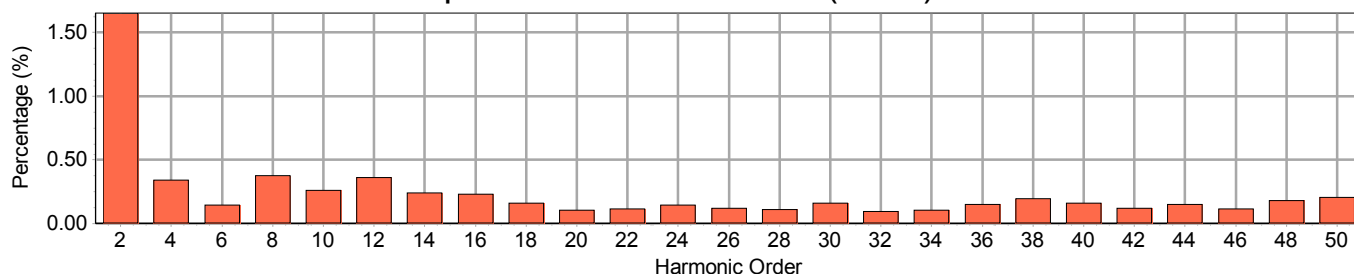
Input Voltage Harmonics (Even)



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: S2008183-R1

Prepared for: ANDlight · Test Date: 18 August 2020

Luminaire: BUTTON · Lumcat: BUT-90-CW-30

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

Zone	Lumens	% Lamp	% Luminaire
0 - 10	2	0.08	0.08
10 - 20	13	0.64	0.64
20 - 30	37	1.86	1.86
30 - 40	72	3.59	3.59
40 - 50	111	5.58	5.58
50 - 60	151	7.58	7.58
60 - 70	186	9.32	9.32
70 - 80	211	10.59	10.59
80 - 90	224	11.26	11.26
90 - 120	617	30.97	30.97
90 - 130	766	38.41	38.41
90 - 150	942	47.26	47.26
90 - 180	987	49.51	49.51
0 - 180	1994	100.00	100.00

Average Luminance (Cd/m²)

Angle	0 Degree	45 Degree	90 Degree
0			
10			
20			
30			
40			
50			
60			
70			
80			
90			
100			
110			
120			
130			
140			
150			
160			
170			
180			

Luminaire Luminous Flux: 1994

Measured Input Power: 26.50 W

Total Luminaire Efficiency: N/A

Luminaire Luminous Efficacy: 75.2 lm/W

Luminaire Spacing Criterion (0 Degree): 9.8824

Luminaire Spacing Criterion (90 Degree): 2.6493

Category: Up and Down



Photometric Report: S2008183-R1

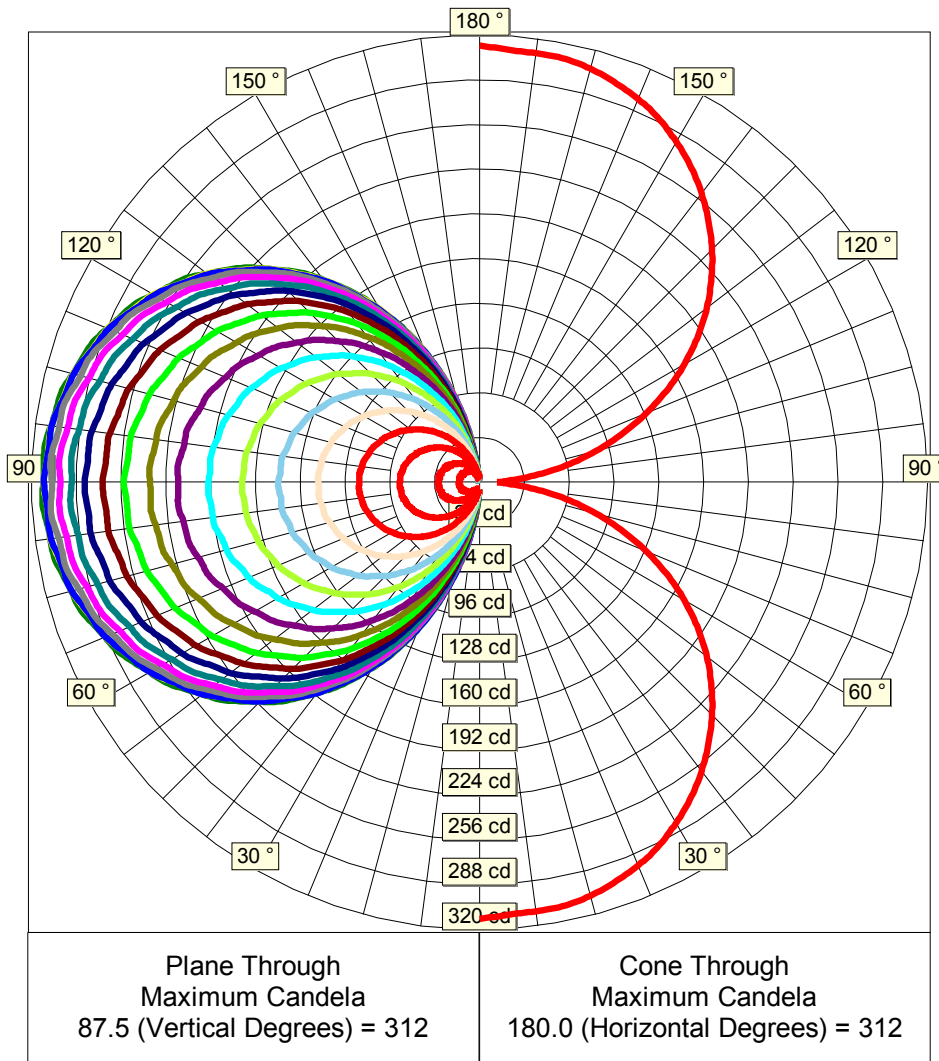
Prepared for: ANDlight · Test Date: 18 August 2020

Luminaire: BUTTON · Lumcat: BUT-90-CW-30

Luminous Intensity - Polar Curve for each Plane(1)

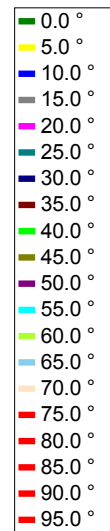
Plane
Angles

Plane Angles	Candela Values
0.0	5
2.5	8
5.0	17
7.5	28
10.0	42
12.5	56
15.0	70
17.5	84
20.0	99
22.5	113
25.0	127
27.5	141
30.0	153
32.5	166
35.0	179
37.5	190
40.0	201
42.5	213
45.0	222
47.5	232
50.0	242
52.5	249
55.0	258
57.5	266
60.0	272
62.5	278
65.0	285
67.5	289
70.0	294
72.5	299
75.0	302
77.5	305
80.0	308
82.5	309
85.0	311
87.5	312
90.0	311
92.5	311
95.0	311
97.5	308



Cone
Angles

Cone Angles	Candela Values
0.0	312
5.0	310
10.0	309
15.0	306
20.0	300
25.0	292
30.0	281
35.0	268
40.0	252
45.0	235
50.0	215
55.0	194
60.0	169
65.0	143
70.0	115
75.0	86
80.0	57
85.0	29
90.0	15
95.0	29



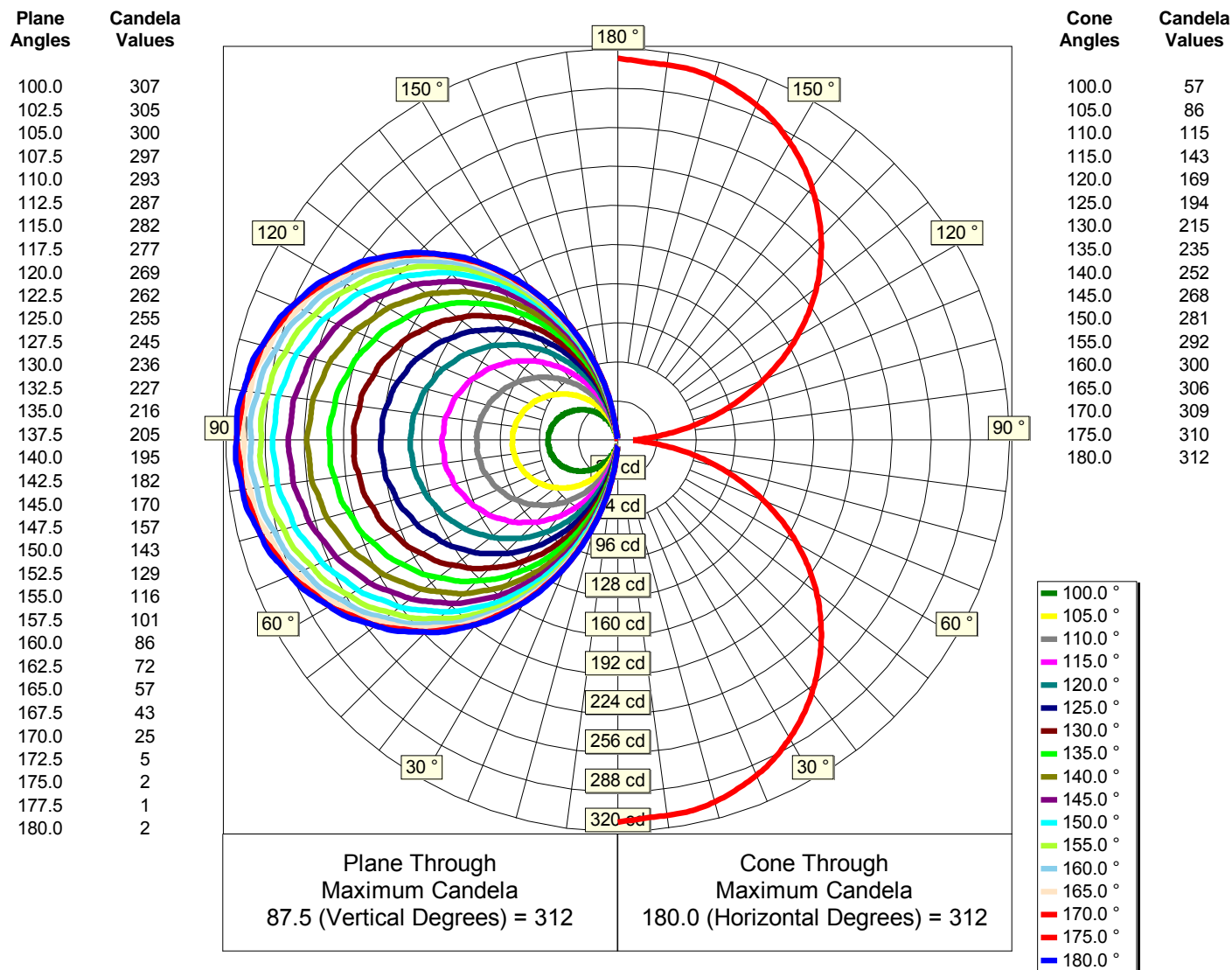


Photometric Report: S2008183-R1

Prepared for: ANDlight · Test Date: 18 August 2020

Luminaire: BUTTON · Lumcat: BUT-90-CW-30

Luminous Intensity - Polar Curve for each Plane(2)





IES File Headers

IESNA:LM-63
 [ISSUEDATE] 18 August 2020
 [TESTLAB] Spectra Lux
 [TEST] S2008183-R1
 [MANUFAC] ANDlight
 [LUMCAT] BUT-90-CW-30
 [LUMINAIRE] BUTTON
 [LAMP] EPISTAR OMNICHIP (320404-xx-300-12-4.4)LEDs c/w Meanwell Driver IDLV-45-12 @ 120.00V
 [_BURNING] Axial (1,994 Luminaire Lumens)
 [_REFLECTOR] None
 [_LENS] Opalin Acrylic Diffuser
 [_HOUSING] Aluminum Body c/w Nylon Rope
 [_NOMINAL COLOR] 3000 K
 [_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
0.0	5	5	5	5	5	5	5	5	5	5
2.5	8	8	9	8	8	9	8	8	8	7
5.0	17	17	17	16	16	16	15	14	14	12
7.5	28	28	29	27	27	26	25	23	22	19
10.0	42	41	41	40	39	38	35	33	31	28
12.5	56	54	55	53	52	51	48	45	42	37
15.0	70	69	70	67	66	64	60	57	53	47
17.5	84	83	84	82	80	77	73	68	64	57
20.0	99	98	98	96	94	91	86	81	75	68
22.5	113	112	113	109	107	104	99	93	87	78
25.0	127	125	126	124	121	117	111	105	98	89
27.5	141	139	139	137	134	130	123	116	109	99
30.0	153	153	153	149	146	142	135	128	120	109
32.5	166	165	165	163	159	154	146	139	130	119
35.0	179	177	177	174	171	166	158	150	140	128
37.5	190	190	190	185	181	176	169	160	150	137
40.0	201	200	200	197	193	187	178	169	159	147
42.5	213	210	211	207	203	198	189	179	168	155
45.0	222	221	222	217	212	206	199	189	177	163
47.5	232	230	231	227	223	216	207	196	185	171
50.0	242	239	239	236	232	225	215	205	193	178
52.5	249	249	249	244	239	232	224	213	201	184
55.0	258	256	256	253	248	241	230	219	207	192
57.5	266	264	263	260	255	248	238	227	213	198
60.0	272	272	272	266	261	254	245	234	220	203
62.5	278	276	277	274	268	261	250	238	225	209
65.0	285	283	283	279	274	267	256	244	230	213
67.5	289	289	289	284	278	270	261	249	235	217
70.0	294	292	293	290	284	276	264	252	238	222
72.5	299	297	296	293	288	280	269	256	242	225
75.0	302	301	301	296	290	282	273	260	246	227
77.5	305	303	303	301	294	286	275	262	247	231
80.0	308	306	305	302	297	289	277	265	249	232
82.5	309	309	309	303	297	289	280	267	252	233
85.0	311	309	309	306	300	291	280	267	252	235
87.5	312	310	309	306	300	292	281	268	252	235
90.0	311	311	311	305	299	291	282	269	254	235



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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	311	310	310	307	300	292	280	267	252	236
	95.0	311	309	308	305	299	291	280	267	251	234
	97.5	308	308	308	303	297	288	279	266	251	233
	100.0	307	305	305	302	296	287	276	263	248	232
	102.5	305	302	302	299	293	285	274	261	246	229
	105.0	300	300	300	295	289	280	272	259	244	226
	107.5	297	295	295	292	286	278	267	254	240	224
	110.0	293	291	290	287	282	274	263	251	236	219
	112.5	287	287	287	282	276	268	259	247	232	215
	115.0	282	280	280	278	272	263	253	241	227	211
	117.5	277	274	274	271	265	258	248	235	221	206
	120.0	269	269	268	264	258	250	242	230	216	200
	122.5	262	260	260	258	252	244	234	223	209	195
	125.0	255	252	252	249	244	237	227	216	202	188
	127.5	245	245	244	240	235	227	220	209	196	181
	130.0	236	235	234	233	227	220	211	200	188	174
	132.5	227	225	225	223	217	211	202	192	179	166
	135.0	216	216	215	212	207	200	193	183	171	158
A n g l e s	137.5	205	205	204	202	197	191	183	173	162	150
	140.0	195	193	192	191	186	180	173	163	152	141
	142.5	182	182	182	179	174	168	162	153	143	131
	145.0	170	169	168	167	163	157	150	142	132	122
	147.5	157	156	155	154	150	145	139	131	121	112
	150.0	143	143	143	140	136	131	127	119	111	101
	152.5	129	129	128	127	124	119	114	107	99	91
	155.0	116	115	114	113	110	106	101	95	88	81
	157.5	101	101	100	99	96	92	89	83	77	70
	160.0	86	86	85	85	82	79	76	71	65	60
	162.5	72	72	71	71	68	66	63	59	53	48
	165.0	57	58	57	56	54	51	48	44	39	36
	167.5	43	43	42	42	38	35	32	29	26	24
	170.0	25	24	23	22	20	19	18	17	15	15
	172.5	5	7	6	8	8	8	9	9	8	8
	175.0	2	2	2	2	2	3	3	3	4	4
	177.5	1	1	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

	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 A n g l e s	0.0	5	5	5	5	5	5	5	5	5
	2.5	7	7	7	6	6	5	5	5	5
	5.0	12	10	9	8	7	6	5	5	5
	7.5	18	15	13	11	9	8	6	5	6
	10.0	25	21	18	15	12	10	7	6	6
	12.5	33	28	24	20	15	12	9	6	6
	15.0	42	36	30	25	19	14	10	7	7
	17.5	51	44	37	30	23	17	11	7	6
	20.0	61	52	44	36	28	20	13	8	6
	22.5	70	61	52	42	32	23	15	9	6
	25.0	80	69	59	48	37	27	17	10	6
	27.5	89	78	66	54	42	30	20	11	7
	30.0	98	86	73	61	47	34	22	12	7
	32.5	107	94	80	66	52	38	24	13	7
	35.0	116	102	88	73	56	41	26	14	8
	37.5	124	110	94	79	61	44	29	15	8
	40.0	133	117	101	84	66	48	31	16	9
	42.5	141	125	107	90	70	51	33	17	9
	45.0	148	131	114	95	75	55	35	18	9
	47.5	156	137	119	99	79	58	37	19	10
	50.0	162	144	125	105	83	61	40	20	10
	52.5	168	150	130	110	86	64	41	22	11
	55.0	175	155	135	113	91	67	43	22	11
	57.5	180	161	140	118	93	69	45	23	12
	60.0	185	166	145	122	97	72	47	24	12
	62.5	191	169	148	125	100	74	48	25	13
	65.0	195	175	152	128	102	76	50	26	13
	67.5	198	178	156	132	105	78	51	27	13
	70.0	203	181	158	133	108	80	52	27	14
	72.5	206	185	161	136	109	81	54	28	14
	75.0	208	187	163	138	111	82	54	28	14
	77.5	211	188	165	139	113	84	55	29	15
	80.0	212	191	167	141	113	85	56	29	14
	82.5	213	192	168	142	114	85	56	29	14
	85.0	216	192	168	142	115	86	56	29	15
	87.5	215	194	169	143	115	86	57	29	15
	90.0	215	194	169	144	115	86	57	29	14
	92.5	216	192	168	142	115	86	57	29	15
	95.0	214	193	168	142	114	85	57	29	15
	97.5	212	191	167	142	114	85	56	29	14
	100.0	212	189	165	139	113	84	55	29	14
	102.5	209	188	164	138	111	83	55	29	14
	105.0	206	186	162	137	110	81	54	28	14
	107.5	204	182	159	134	108	80	53	27	14
	110.0	200	180	157	132	105	78	52	27	14
	112.5	196	176	154	129	103	76	50	26	14
	115.0	193	172	149	125	101	75	49	26	13
	117.5	188	168	146	122	97	72	48	25	13
	120.0	182	163	142	119	95	70	46	24	13
	122.5	177	158	137	114	92	68	44	23	13
	125.0	171	153	132	110	88	65	43	23	12
	127.5	164	147	127	106	84	62	41	22	12
	130.0	158	140	121	101	80	59	39	21	12
	132.5	151	134	116	96	76	56	37	20	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	143	127	110	91	72	53	35	19	11	19
	137.5	135	120	103	85	67	49	33	18	11	18
	140.0	127	113	97	79	63	46	31	17	11	17
	142.5	118	105	90	74	58	43	28	16	11	16
	145.0	110	97	82	68	54	39	26	15	10	15
	147.5	100	89	75	62	49	36	24	14	10	14
	150.0	91	80	68	56	44	32	22	13	9	13
	152.5	82	72	61	50	39	29	19	12	8	12
	155.0	72	64	54	44	34	25	17	10	8	10
	157.5	62	55	47	38	30	22	15	9	7	9
	160.0	53	46	39	31	25	18	13	8	6	8
	162.5	42	37	31	25	20	15	10	7	6	7
	165.0	31	27	23	19	15	11	8	6	5	6
	167.5	21	18	16	13	11	8	6	5	5	5
	170.0	13	12	10	8	7	6	5	4	4	4
	172.5	7	7	6	5	5	4	4	4	4	4
	175.0	4	4	4	4	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	6	6	6	7	7	7	8	8
	5.0	6	7	7	8	9	10	12	14	14
	7.5	6	8	9	11	13	15	18	22	23
	10.0	7	10	12	15	18	21	25	31	33
	12.5	9	12	15	20	24	28	33	42	45
	15.0	10	14	19	25	30	36	42	53	57
	17.5	11	17	23	30	37	44	51	64	68
	20.0	13	20	28	36	44	52	61	75	81
	22.5	15	23	32	42	52	61	70	87	93
	25.0	17	27	37	48	59	69	80	98	105
	27.5	20	30	42	54	66	78	89	109	116
	30.0	22	34	47	61	73	86	98	120	128
	32.5	24	38	52	66	80	94	107	130	139
	35.0	26	41	56	73	88	102	116	140	150
	37.5	29	44	61	79	94	110	124	150	160
	40.0	31	48	66	84	101	117	133	159	169
	42.5	33	51	70	90	107	125	141	168	179
	45.0	35	55	75	95	114	131	148	177	189
A n g l e s	47.5	37	58	79	99	119	137	156	185	196
	50.0	40	61	83	105	125	144	162	193	205
	52.5	41	64	86	110	130	150	168	201	213
	55.0	43	67	91	113	135	155	175	207	219
	57.5	45	69	93	118	140	161	180	213	227
	60.0	47	72	97	122	145	166	185	220	234
	62.5	48	74	100	125	148	169	191	225	238
	65.0	50	76	102	128	152	175	195	230	244
	67.5	51	78	105	132	156	178	198	235	249
	70.0	52	80	108	133	158	181	203	238	252
	72.5	54	81	109	136	161	185	206	242	256
	75.0	54	82	111	138	163	187	208	246	260
	77.5	55	84	113	139	165	188	211	247	262
	80.0	56	85	113	141	167	191	212	249	265
	82.5	56	85	114	142	168	192	213	252	267
	85.0	56	86	115	142	168	192	216	252	267
	87.5	57	86	115	143	169	194	215	252	268
	90.0	57	86	115	144	169	194	215	254	269
	92.5	57	86	115	142	168	192	216	252	267
	95.0	57	85	114	142	168	193	214	251	267
	97.5	56	85	114	142	167	191	212	233	266
	100.0	55	84	113	139	165	189	212	232	263
	102.5	55	83	111	138	164	188	209	229	261
	105.0	54	81	110	137	162	186	206	226	259
	107.5	53	80	108	134	159	182	204	224	254
	110.0	52	78	105	132	157	180	200	219	251
	112.5	50	76	103	129	154	176	196	215	247
	115.0	49	75	101	125	149	172	193	211	241
	117.5	48	72	97	122	146	168	188	206	235
	120.0	46	70	95	119	142	163	182	200	230
	122.5	44	68	92	114	137	158	177	195	223
	125.0	43	65	88	110	132	153	171	188	216
	127.5	41	62	84	106	127	147	164	181	209
	130.0	39	59	80	101	121	140	158	174	200
	132.5	37	56	76	96	116	134	151	166	192



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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	35	53	72	91	110	127	143	158	171	183
137.5	33	49	67	85	103	120	135	150	162	173
140.0	31	46	63	79	97	113	127	141	152	163
142.5	28	43	58	74	90	105	118	131	143	153
145.0	26	39	54	68	82	97	110	122	132	142
147.5	24	36	49	62	75	89	100	112	121	131
150.0	22	32	44	56	68	80	91	101	111	119
152.5	19	29	39	50	61	72	82	91	99	107
155.0	17	25	34	44	54	64	72	81	88	95
157.5	15	22	30	38	47	55	62	70	77	83
160.0	13	18	25	31	39	46	53	60	65	71
162.5	10	15	20	25	31	37	42	48	53	59
165.0	8	11	15	19	23	27	31	36	39	44
167.5	6	8	11	13	16	18	21	24	26	29
170.0	5	6	7	8	10	12	13	15	15	17
172.5	4	4	5	5	6	7	7	8	8	9
175.0	3	3	3	4	4	4	4	4	4	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	0.0	5	5	5	5	5	5
	2.5	8	9	8	9	8	8
	5.0	15	16	16	17	17	17
	7.5	25	26	27	29	28	28
	10.0	35	38	39	41	41	42
	12.5	48	51	52	55	54	56
	15.0	60	64	66	70	69	70
	17.5	73	77	80	84	83	84
	20.0	86	91	94	98	98	99
	22.5	99	104	107	113	112	113
	25.0	111	117	121	126	125	127
	27.5	123	130	134	139	139	141
	30.0	135	142	146	153	153	153
	32.5	146	154	159	165	165	166
	35.0	158	166	171	177	177	179
	37.5	169	176	181	190	190	190
	40.0	178	187	193	200	200	201
	42.5	189	198	203	211	210	213
	45.0	199	206	212	222	221	222
	47.5	207	216	223	231	230	232
A n g l e s	50.0	215	225	232	239	239	242
	52.5	224	232	239	249	249	249
	55.0	230	241	248	256	256	258
	57.5	238	248	255	263	264	266
	60.0	245	254	261	272	272	272
	62.5	250	261	268	277	276	278
	65.0	256	267	274	283	283	285
	67.5	261	270	278	289	289	289
	70.0	264	276	284	293	292	294
	72.5	269	280	288	296	297	299
	75.0	273	282	290	301	301	302
	77.5	275	286	294	303	303	305
	80.0	277	289	297	305	306	308
	82.5	280	289	297	303	309	309
	85.0	280	291	300	306	309	311
	87.5	281	292	300	306	310	312
	90.0	282	291	299	305	311	311
	92.5	280	292	300	307	310	311
	95.0	280	291	299	305	309	311
	97.5	279	288	297	303	308	308
	100.0	276	287	296	302	305	307
	102.5	274	285	293	299	302	305
	105.0	272	280	289	295	300	300
	107.5	267	278	286	292	295	297
	110.0	263	274	282	287	291	293
	112.5	259	268	276	282	287	287
	115.0	253	263	272	278	280	282
	117.5	248	258	265	271	274	277
	120.0	242	250	258	264	269	269
	122.5	234	244	252	258	260	262
	125.0	227	237	244	249	252	255
	127.5	220	227	235	240	245	245
	130.0	211	220	227	233	235	236
	132.5	202	211	217	223	225	227



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Lateral Angles

	150.0	155.0	160.0	165.0	170.0	175.0	180.0
135.0	193	200	207	212	215	216	216
137.5	183	191	197	202	204	205	205
140.0	173	180	186	191	192	193	195
142.5	162	168	174	179	182	182	182
145.0	150	157	163	167	168	169	170
147.5	139	145	150	154	155	156	157
150.0	127	131	136	140	143	143	143
152.5	114	119	124	127	128	129	129
155.0	101	106	110	113	114	115	116
V	89	92	96	99	100	101	101
e	76	79	82	85	85	86	86
r	63	66	68	71	71	72	72
t	48	51	54	56	57	58	57
i	32	35	38	42	42	43	43
c	17.0	18	19	20	22	23	24
a	172.5	9	8	8	6	7	5
l	175.0	3	3	2	2	2	2
	177.5	2	2	2	2	1	1
	180.0	2	2	2	2	2	2
A							
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