



# GONIOPHOTOMETER TEST REPORT

## IES LM79-08 Section 9.3

TÜV SÜD America

### Photometric Testing and Evaluation in Accordance with LM79-2008

Report Prepared for:

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Director of Engineering & Operations

**Beghelli North America**

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**Sample Tested:** Draco 710 4100K (Medium)  
**Manufacturer:** Beghelli North America

**Technical Report Number:** JI1306325-8-GON  
**Report Issue Date:** June 26, 2013  
**Total Number of Pages:** 8 (including this page)

**Report Prepared by:**

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# GONIOPHOTOMETRIC TEST REPORT IES LM79-2008

Report# JI1306325-8-GON

June 26, 2013

## Summary of Key Test Results

Model# Draco 710 4100K  
(Medium)  
Manufacturer Beghelli North  
America  
TÜV Sample# 808-3  
Date of Test June 20, 2013



### Notes:

Tested in intended orientation (LBU)  
(with aperture down)

Parameter	Measured Result
Luminous Flux	2,183 Lumens
Input Power	35.13 Watts
Efficacy	62.15 Lumens/Watts
Beam Angle	17.8°
Stabilization Time	75 minutes
In-Situ Temp Test (ISTMT)**	Not Tested on this Model#

The above results are recorded / derived from measurements in accordance with LM79-08

\*\*ISTMT in accordance with "Energy Star Program Requirements for Luminaires – Version 1.2".

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## Test Results –

The following results were obtained after stabilization of the sample in accordance with the requirements set forth in section 5.0 of IES LM79-2008. Stability is achieved when the variation of 3 readings of light output and electrical power over a period of 30 minutes, taken 15 minutes apart, is less than 0.5%.

Photometric Results	Draco 710 4100K (Medium)
	Goniophotometer
Total Luminous Flux (Lumens)	2,183.2
Luminous Efficacy (Lumens/Watt)	62.15

Electrical Results	Draco 710 4100K (Medium)
	Goniophotometer
Input Power (Watts)	35.13
Input Voltage (Volts AC)	120.08
Input Current (Amps)	0.290
Power Factor	0.997
Input Frequency (Hertz)	60.0
A-THD (Current %)	2.68%

Additional Parameters	Draco 710 4100K (Medium)
	Goniophotometer
Stabilization Time (Light and Power)	75 minutes
Test Geometry Configuration	Type C
Photometer	Gigahertz Optik P9801
Ambient Temperature	25.3°C
ISTMT (In-Situ Temperature Measurement)	Not Tested on this Model#
Spacing Criteria	0.26 (0° – 180°) / 0.28 (90° – 270°)

## Zonal Lumen Summary

Zone	Lumens	% Lamp / Luminaire
0 - 60	1,831.1	83.9 %
60 - 90	135.2	6.2 %
0 - 90	1,966.3	90.1 %
90 - 180	216.8	9.9 %
0 - 180	2,183.2	100 %

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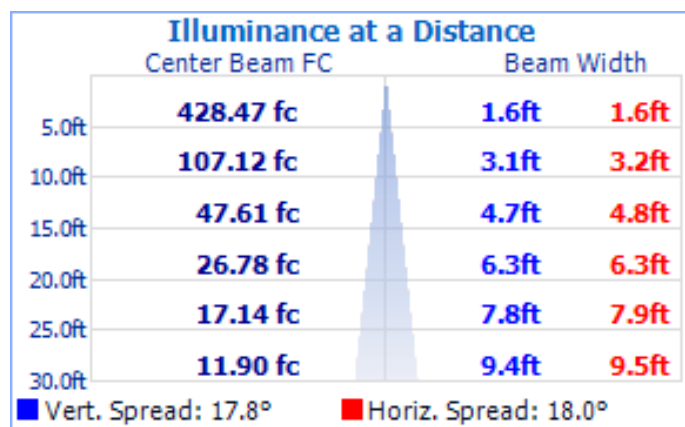


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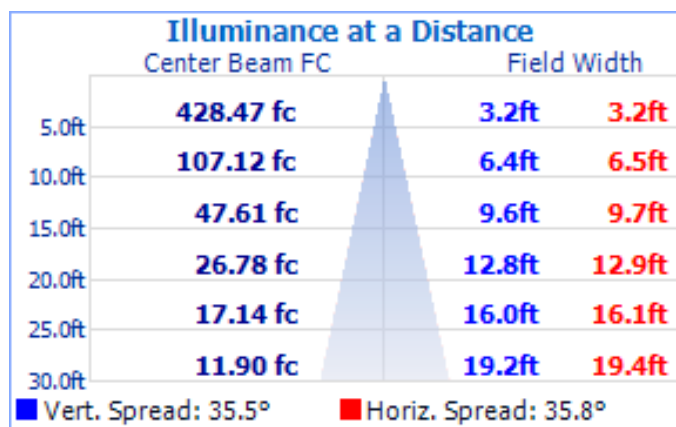


## Test Results – Illuminance Plots

The following images depict the illuminance characteristics of the luminaire (Mount Height = 30ft):



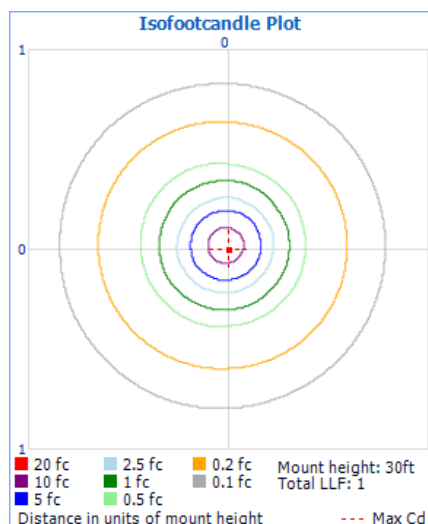
Beam Angle = 17.8°



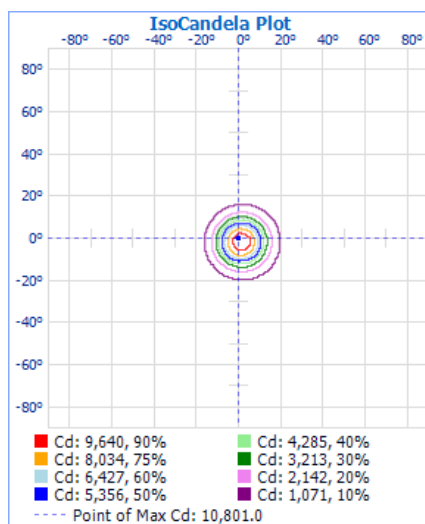
Field Angle = 35.5°

## Test Results – Candela Plots

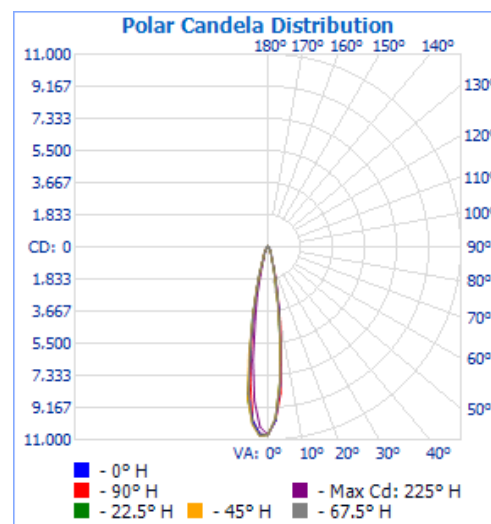
The following images depict the luminous intensity distribution characteristics of the luminaire:



Isofootcandle Plot



Isocandela Plot



Polar Candela



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## Test Results – Candela Tabulation

The table below displays the tabulated Candela measurements from the IES file:

Horizontal (lateral) angles are shown in **red** across the top of the table, in increments of 22.5°.

Vertical (longitudinal) angles are shown in **blue** down the side of the table, in increments of 2.5°.

	0.0	22.5	45.0	67.5	90.0	112.5	135.0	157.5	180.0	202.5	225.0	247.5	270.0	292.5	315.0	337.5	360.0
0.0	10712	10712	10712	10712	10712	10712	10712	10712	10712	10712	10712	10712	10712	10712	10712	10712	10712
2.5	9927	9814	9773	9807	9924	10091	10303	10493	10678	10785	<b>10801</b>	10772	10673	10495	10281	10078	9928
5.0	7958	7727	7737	7892	8371	8836	9236	9611	9920	10103	10175	10099	9918	9468	8820	8291	7956
7.5	5284	5146	5346	5548	5789	6389	7144	7884	8490	8768	8750	8456	7705	7003	6527	5829	5289
10.0	3544	3244	3140	3392	3787	4097	4856	5438	5690	5889	6220	5804	5315	5079	4142	3834	3546
12.5	2194	1929	1977	2091	2269	2729	2864	3332	3627	4026	3881	3923	3685	2997	2830	2361	2195
15.0	1314	1269	1143	1199	1459	1539	1820	1989	2440	2388	2563	2353	2339	2044	1658	1576	1316
17.5	837	758	799	832	823	989	1057	1270	1432	1606	1602	1688	1380	1298	1098	936	837
20.0	573	558	555	567	582	617	763	821	906	979	1075	965	943	815	712	635	573
22.5	490	474	471	473	482	500	528	576	613	688	717	699	639	604	562	522	490
25.0	415	402	398	400	409	425	447	477	512	550	574	567	546	515	479	443	415
27.5	349	338	335	337	345	360	379	404	433	465	485	480	461	436	404	374	350
30.0	294	285	282	283	291	303	320	341	365	391	407	403	387	366	340	314	294
32.5	249	240	237	239	245	256	270	287	307	327	340	337	324	307	286	264	249
35.0	216	209	206	206	211	219	230	243	258	274	284	282	271	259	244	228	216
37.5	193	186	184	184	187	193	201	211	222	233	241	240	232	227	216	204	193
40.0	174	167	166	166	167	174	182	188	197	205	213	212	205	202	192	184	174
42.5	157	151	149	149	152	158	164	171	177	186	192	192	185	182	172	165	157
45.0	138	133	131	132	135	142	150	156	162	170	175	175	167	162	155	146	138
47.5	121	117	116	117	120	125	133	139	144	151	156	155	147	141	134	128	121
50.0	108	105	104	105	107	111	116	122	127	132	138	136	128	122	116	112	108
52.5	97	95	95	96	97	101	105	108	112	116	120	119	112	108	104	101	97
55.0	89	87	87	88	89	92	95	98	100	103	106	106	101	98	94	92	89
57.5	81	79	80	81	82	84	87	90	91	93	96	95	91	89	86	84	81
60.0	74	73	73	74	75	77	80	82	83	85	87	86	83	81	78	76	74
62.5	67	66	67	68	69	70	73	75	76	77	78	78	75	74	71	70	67
65.0	61	60	61	61	62	64	67	68	69	71	71	71	68	67	65	63	61
67.5	55	54	55	55	56	58	61	62	63	64	65	64	62	60	59	57	55
70.0	49	48	49	50	50	52	54	56	57	58	58	58	55	54	52	51	49
72.5	43	43	43	44	45	47	49	51	51	52	52	52	50	48	46	45	43
75.0	38	37	37	38	39	41	43	45	45	47	46	46	44	42	41	39	38
77.5	32	32	32	33	33	35	37	39	40	41	41	40	38	37	35	34	32
80.0	28	27	27	28	28	30	32	33	34	36	35	35	33	31	30	29	28
82.5	24	23	23	23	24	25	26	28	28	29	30	29	28	27	26	26	24
85.0	21	20	20	21	21	22	22	23	24	25	25	24	23	23	22	22	21
87.5	19	19	19	19	19	19	20	21	21	21	21	21	20	20	19	19	19
90.0	31	26	22	23	23	23	20	19	19	19	20	20	19	19	20	21	31

Maximum Candela = **10,801.0** at Horizontal: 225.0°, Vertical: 2.5°

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## Test Results – Candela Tabulation (Continued....)

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92.5	27	24	24	26	25	25	23	26	34	32	25	23	24	27	26	30	27
95.0	25	25	25	26	25	25	24	24	25	28	26	25	24	25	24	25	25
97.5	26	26	27	27	26	26	26	25	25	25	25	25	24	25	25	26	26
100.0	28	29	29	29	29	28	27	27	26	27	26	26	26	27	27	28	28
102.5	31	31	31	31	31	30	29	29	28	29	29	28	29	29	30	30	31
105.0	32	33	33	33	33	33	32	31	31	31	31	31	31	31	32	32	32
107.5	34	34	34	35	35	34	34	33	33	33	33	33	33	33	34	34	34
110.0	35	35	35	35	35	35	36	36	35	35	36	35	35	35	36	35	35
112.5	35	35	36	36	36	36	36	37	36	36	37	36	36	36	37	36	35
115.0	35	35	36	36	36	36	36	37	37	37	37	37	36	36	36	36	35
117.5	36	36	36	36	36	36	36	36	37	37	37	37	36	36	37	36	36
120.0	36	36	36	36	36	36	36	36	37	37	37	37	37	36	37	37	36
122.5	36	36	36	36	36	36	37	37	37	37	37	37	37	36	37	37	36
125.0	36	35	36	36	36	36	37	37	37	37	37	37	37	36	37	36	36
127.5	35	35	36	35	35	36	36	36	36	37	37	37	37	36	36	36	35
130.0	35	35	35	35	35	35	36	36	36	36	37	37	36	36	36	36	35
132.5	35	35	35	35	35	35	36	36	36	36	37	36	36	35	36	36	35
135.0	35	35	36	35	35	36	36	36	36	36	37	37	36	36	36	36	36
137.5	36	35	36	36	36	36	37	37	37	37	38	37	37	36	37	37	36
140.0	36	36	36	36	36	36	37	37	37	38	38	38	38	37	38	37	36
142.5	37	37	37	37	37	37	38	38	38	38	39	39	38	38	38	38	37
145.0	38	38	38	38	38	38	39	39	39	39	40	40	39	39	40	39	38
147.5	40	39	39	39	39	40	41	40	40	41	42	41	41	41	41	41	40
150.0	41	41	41	41	41	42	42	42	43	43	43	43	43	43	43	42	42
152.5	43	42	41	42	43	43	44	44	45	45	45	45	45	44	44	43	43
155.0	43	42	42	42	43	44	45	45	46	46	47	47	46	45	45	44	43
157.5	43	42	42	42	43	44	45	45	46	47	47	47	47	45	45	44	43
160.0	42	42	42	42	42	43	44	45	46	46	47	47	46	45	44	44	43
162.5	41	40	41	41	41	42	43	44	45	45	45	46	45	44	44	43	41
165.0	39	38	38	38	39	40	41	42	43	43	43	44	43	42	41	41	39
167.5	36	35	35	35	35	36	38	39	39	40	40	40	40	39	38	37	36
170.0	34	33	33	32	32	33	34	35	35	36	36	36	36	36	36	35	34
172.5	33	32	31	30	30	30	31	32	32	33	33	34	34	34	34	34	33
175.0	32	31	30	29	29	29	29	30	30	31	32	33	33	33	33	33	32
177.5	32	31	30	29	29	28	28	28	29	30	31	32	32	32	33	33	32
180.0	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31



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## TÜV SÜD Photometric Testing Information

Testing is performed in accordance with the procedures outlined in IESNA LM79-2008. The sample is evaluated for photometric and electrical characteristics using a goniophotometer, located in an accredited, temperature and humidity-controlled, draft free photometric laboratory.

### Sample Stabilization

The sample (UUT) is placed on a goniophotometer and powered by a regulated and conditioned alternating or direct current supply. The stabilization times shown on the results pages of this report denote the time of the 3<sup>rd</sup> measurement (of the 3 consecutive readings) since this is the minimum time that the sample is assumed to have taken to reach stabilization in accordance with section 5.0 of LM79-2008.

### Goniophotometer

The Goniophotometer is a Mirror based Type C optical measurement system in accordance with section 9.3.1 of IESNA LM79-2008.

### Goniophotometer Calibration

The Goniophotometer is calibrated using a frosted tungsten filament FDS/DZE lamp with the following specifications:

Manufacturer: General Electric  
Part Number: CSB-110  
Lamp Number: 112-A  
Voltage: 16.52 Volts DC  
Wattage: 150.0 Watts  
Calibration Current: 4.816 Amperes  
Luminous Intensity: 151.5 Candelas  
Calibration Date: 02-13-2011 (NIST traceable)

## TÜV SÜD Test Equipment List:

TÜV SÜD Mirror Goniophotometer System – contains the following:			
Goniophotometer	M.E. GONC02	GON002	weekly
Spectroradiometer	Gigahertz Optik P9801	GIG002	weekly
Power Analyzer	Yokogawa WT210	ATLE0031	11/16/2013
Power Source	Chroma 61603	AC007	N/A

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