



# IESNA LM79-2008 Test Report

TÜV SÜD America

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

Report Prepared for:

**Bill Dixon**

Director of Engineering & Operations

**Beghelli North America**

3250 Corporate Way, Unit B

Miramar, FL 33025

United States

Telephone: 954-442-6189

**Sample Tested:**

**Draco 720 5700K Narrow 40W**

**Manufacturer:**

**Beghelli North America**

**Technical Report Number:**

**JI306325-5-LM79**

**Report Issue Date:**

**June 27<sup>th</sup>, 2013**

**Total Number of Pages:**

**9** (including this page)

**Report Prepared by:**

**Byrd Evans**

TÜV SÜD Project Handler

**Report Reviewed by:**

**Steve Longo**

TÜV SÜD Manager

**TÜV SÜD America, Inc.**

5945 Cabot Parkway, Suite 100,  
Alpharetta GA 30005

Telephone: 678-341-5900 [www.tuvamerica.com](http://www.tuvamerica.com)

Page 1

NRG\_F\_10.04

**Confidential Report**



Lab Code: 500065-0

TÜV SÜD America is  
accredited under the  
NVLAP EEL program.



# IESNA LM79-2008 TEST REPORT

Report# JI136325-5-LM79

June 27, 2013

## Summary of Key Test Results

Model# **Draco 720 5700K Narrow 40W**  
Manufacturer **Beghelli North America**  
TÜV Sample# **808-2**  
Date of Test **June 25, 2013**



### Notes:

Tested in intended orientation

Parameter	Measured Result
Luminous Flux	<b>2,853 Lumens</b>
Input Power	<b>34.97 Watts</b>
Efficacy	<b>81.58 Lumens/Watt</b>
C.C.T.	<b>5388 K</b>
C.R.I. (R <sub>a</sub> )	<b>74.69</b>
Beam Angle	<b>13.3°</b>
Stabilization Time	<b>60 minutes</b>
In-Situ Temp Test (ISTMT)**	<b>Not Tested on this Model#</b>

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".

#### TÜV SÜD America, Inc.

5945 Cabot Parkway, Suite 100,  
Alpharetta GA 30005

Telephone: 678-341-5900 [www.tuvamerica.com](http://www.tuvamerica.com)

Page 2

NRG\_F\_10.04

*Confidential Report*



TÜV SÜD America is  
accredited under the  
NVLAP EEL program.





# IESNA LM79-2008 TEST REPORT

Report# JI136325-5-LM79

June 27, 2013

## TABLE OF CONTENTS

Test Results .....	4
Spectral Flux and Chromaticity Diagram .....	5
Zonal Lumen Summary .....	5
Illuminance Plots.....	6
Candela Plots .....	6
Candela Tabulation .....	7
Photometric Testing Information .....	8
Equipment List: .....	9

### TÜV SÜD America, Inc.

5945 Cabot Parkway, Suite 100,  
Alpharetta GA 30005

Telephone: 678-341-5900 [www.tuvamerica.com](http://www.tuvamerica.com)

NRG\_F\_10.04, Rev. 0, Effective: 2012-01-19

Page 3

NRG\_F\_10.04

**Confidential Report**



TÜV SÜD America is  
accredited under the  
NVLAP EEL program.





# IESNA LM79-2008 TEST REPORT

June 27, 2013

## 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 720 5700K Narrow 40W	
	Integrating Sphere	Goniophotometer
Total Luminous Flux (Lumens)	2,853.0	2950.2
Luminous Efficacy (Lumens/Watt)	81.58	84.63
Total Radiant Flux (Watts)	8.87	-
Correlated Color Temperature (CCT)	5388	-
Color Rendering Index (CRI – R <sub>a</sub> )	74.69	-
R <sub>9</sub> Value	-22.1	-
Chromaticity (Chroma x / Chroma y)	0.3351 / 0.3493	-
Chromaticity (Chroma u / Chroma v)	0.2055 / 0.3214	-
Chromaticity (Chroma u' / Chroma v')	0.2055 / 0.4821	-
D <sub>uv</sub> Value	0.00307	-

Electrical Results	Draco 720 5700K Narrow 40W	
	Integrating Sphere	Goniophotometer
Input Power (Watts)	34.97	34.86
Input Voltage (Volts AC)	119.99	120.02
Input Current (Amps)	0.293	0.290
Power Factor (120V / 277V)	0.996 / 0.915	0.996
Input Frequency (Hertz)	60.0	60.0
A-THD (Current %) (120V / 277V)	2.63 % / 5.62 %	4.23 %

Additional Parameters	Draco 720 5700K Narrow 40W	
	Integrating Sphere	Goniophotometer
Stabilization Time (Light and Power)	60 minutes	56 minutes
Test Geometry Configuration	4 $\pi$	Type C
Spectroradiometer	Labsphere CDS1100	Gigahertz Optik P9801
Ambient Temperature	25.2 °C	25.6 °C
ISTMT (In-Situ Temperature Measurement)	Not tested	
Spacing Criteria	0.24 (0° – 180°) / 0.18 (90° – 270°)	

**TÜV SÜD America, Inc.**5945 Cabot Parkway, Suite 100,  
Alpharetta GA 30005

Telephone: 678-341-5900 www.tuvamerica.com

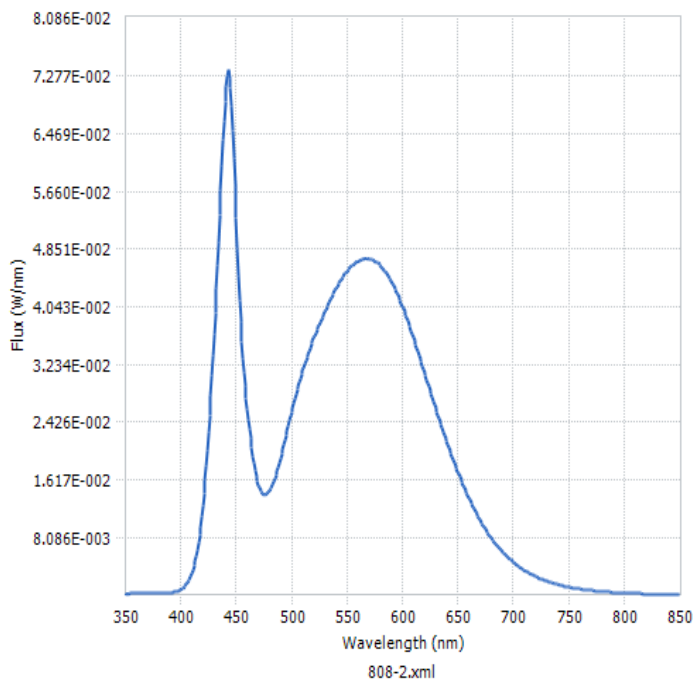
Page 4

NRG\_F\_10.04

*Confidential Report*TÜV SÜD America is  
accredited under the  
NVLAP EEL program.

## Spectral Flux and Chromaticity Diagram

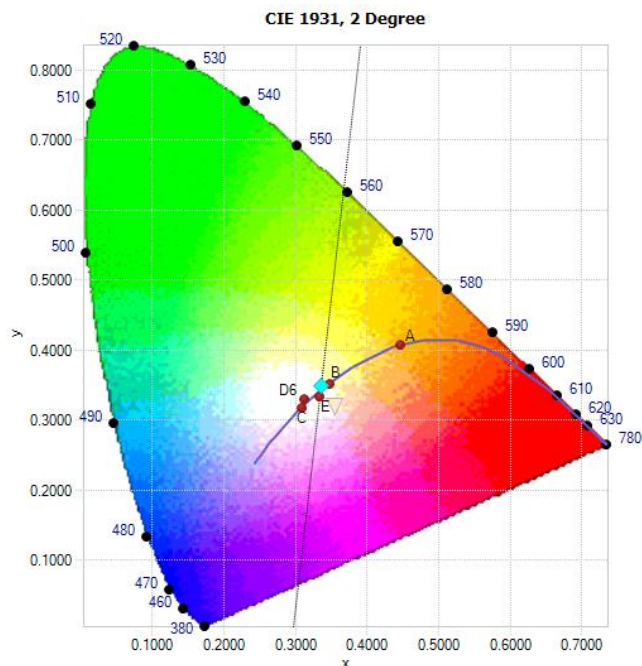
### Spectral Flux



Spectral response of the Radiant Flux

(350nm to 850nm)

### Chromaticity Diagram



Tristimulus values (from page 5):

$x / y = 0.3351 / 0.3493$

The locations on the diagram of the tristimulus coordinates are indicated by the blue diamond.

## Zonal Lumen Summary

Zone	Lumens	% Lamp / Luminaire
0 - 60	2894.6	98.1 %
60 - 90	55.7	1.9 %
0 - 90	2950.2	100.0 %
90 - 180	0.0	0.0 %
0 - 180	2950.2	100.0 %

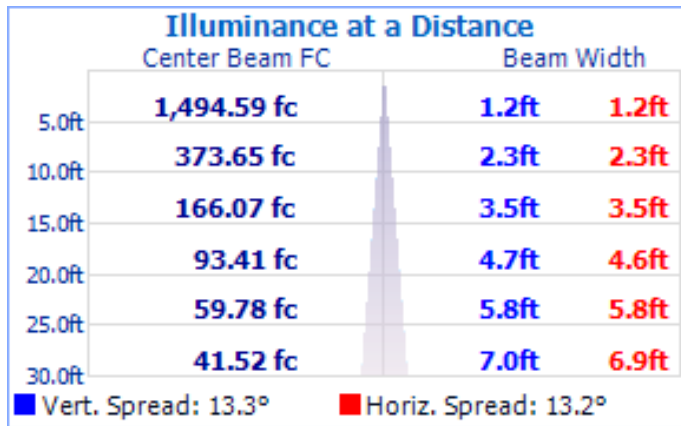


# IESNA LM79-2008 TEST REPORT

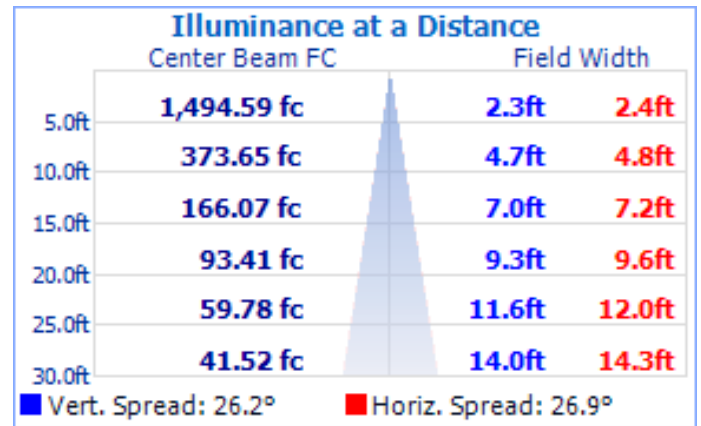
June 27, 2013

## Test Results – Illuminance Plots

The following images depict the illuminance characteristics of the luminaire.



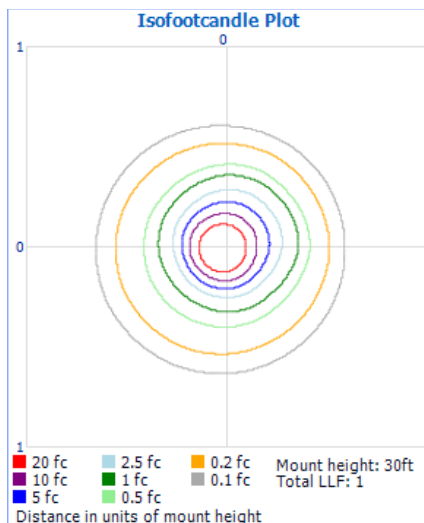
Beam Angle = 13.3°



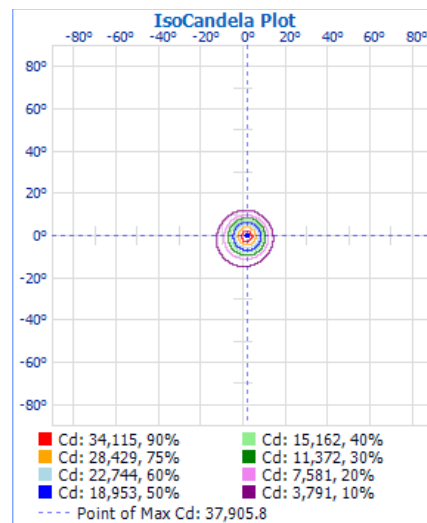
Field Angle = 26.2°

## Test Results – Candela Plots

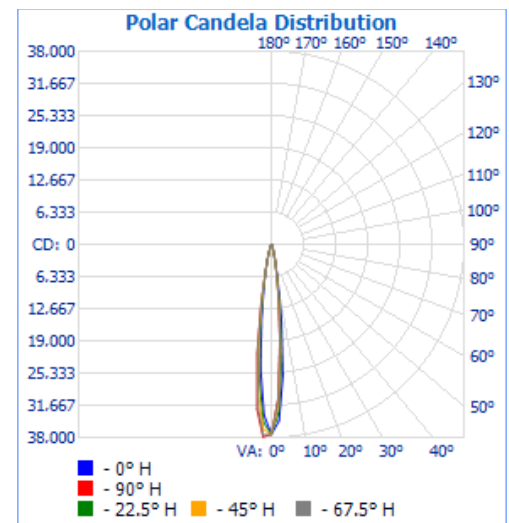
The following images depict the luminous intensity distribution characteristics of the luminaire:



Isofootcandle Plot



Isocandela Plot



Polar Candela



# IESNA LM79-2008 TEST REPORT

June 27, 2013

## 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	37365	37365	37365	37365	37365	37365	37365	37365	37365	37365	37365	37365	37365	37365	37365	37365	37365
2.5	34751	33057	31607	30648	30284	30386	31049	32078	33545	35117	36421	37534	<b>37906</b>	37600	37105	36066	34759
5.0	25879	23172	20962	19601	19030	19297	20395	22166	24457	27055	29413	31576	32540	31688	30468	28573	25884
7.5	15197	13041	11315	10589	10558	11005	11762	13002	14690	16763	18994	20843	21657	21168	19619	17455	15192
10.0	7239	6332	5831	5857	6383	6844	7336	7984	8678	9391	10335	11387	11648	10758	9419	8260	7247
12.5	3413	3231	3124	3411	4040	4443	4677	4999	5239	5226	5343	5547	5368	4746	4105	3660	3418
15.0	1825	1759	1729	1992	2544	2801	2884	3122	3148	2954	2808	2882	2620	2170	1948	1825	1826
17.5	1100	1069	1040	1193	1581	1755	1746	1889	1883	1687	1514	1568	1401	1183	1097	1056	1100
20.0	728	674	630	699	917	987	968	1092	1066	949	874	929	873	811	770	745	728
22.5	472	428	405	438	534	532	513	596	584	548	548	592	587	584	548	505	471
25.0	346	325	313	311	341	321	322	354	358	372	376	401	405	404	383	359	345
27.5	275	251	238	227	227	225	231	244	256	276	293	314	327	325	311	296	274
30.0	206	184	169	154	146	148	159	165	180	200	219	239	248	249	235	222	205
32.5	139	120	106	96	90	88	92	104	113	132	153	167	178	181	169	157	138
35.0	84	72	63	56	50	51	50	60	70	78	91	107	112	118	108	97	84
37.5	50	42	36	32	31	32	32	34	37	46	51	62	68	67	64	59	50
40.0	30	30	30	30	30	31	32	31	29	31	32	36	38	39	38	33	30
42.5	28	29	30	30	30	31	32	31	29	30	30	30	29	29	28	28	28
45.0	28	29	28	28	27	29	30	30	28	29	29	29	28	28	28	28	28
47.5	26	26	26	25	25	26	28	27	26	27	27	27	27	27	27	26	26
50.0	23	24	23	23	23	24	26	26	24	24	24	24	24	24	24	23	23
52.5	22	22	22	22	22	23	24	24	23	23	22	22	22	22	22	22	22
55.0	21	22	22	21	21	22	23	23	22	22	21	21	21	21	21	21	21
57.5	20	21	21	21	20	21	22	22	21	21	21	21	20	20	21	20	20
60.0	20	20	20	20	20	20	21	21	20	21	20	20	20	20	20	20	20
62.5	19	20	20	19	19	20	20	20	20	20	20	19	19	19	20	19	19
65.0	19	19	19	19	19	19	19	20	19	20	20	19	19	19	19	19	19
67.5	18	19	19	19	19	19	19	19	19	20	19	19	18	19	19	19	18
70.0	18	19	19	19	18	19	19	19	19	20	19	19	18	19	19	19	18
72.5	18	19	18	19	18	18	18	19	18	19	19	19	18	19	19	19	18
75.0	18	18	18	18	17	18	18	18	18	19	18	19	18	18	18	19	18
77.5	17	18	17	17	17	17	17	17	17	18	18	18	18	18	18	18	17
80.0	16	17	17	16	16	16	16	17	17	17	17	18	17	18	17	17	17
82.5	16	16	16	16	16	16	16	16	16	17	17	17	16	17	17	16	16
85.0	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
87.5	16	16	16	15	15	15	15	15	15	16	16	16	16	16	16	16	16
90.0	15	16	16	17	17	17	16	16	15	15	16	16	15	15	15	15	15

Maximum Candela = **37,905.8** at Horizontal: 270.0°, Vertical: 2.5°

TÜV SÜD America, Inc.

5945 Cabot Parkway, Suite 100,  
Alpharetta GA 30005

Telephone: 678-341-5900 www.tuvamerica.com

Page 7

NRG\_F\_10.04

Confidential Report



Lab Code: 500065-0

TÜV SÜD America is  
accredited under the  
NVLAP EEL program.





# IESNA LM79-2008 TEST REPORT

Report# JI136325-5-LM79

June 27, 2013

## 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 an integrating sphere and a goniophotometer, located in an accredited, temperature and humidity-controlled, draft free photometric laboratory.

### *Sphere Geometry*

The integrating spheres used for measurement utilize a “ $4\pi$  geometry” configuration in accordance with section 9 of IES LM-79-2008 and is applicable for all types of SSL products (directional and non-directional light projections). The spectroradiometer is an array-type detector manufactured and calibrated by Labsphere (Model# CDS1100).

### *Self-Absorption Correction*

The integrating sphere uses self-absorption correction to eliminate errors due to mismatches between the standard reference lamp and the test samples being measured. This auxiliary correction lamp is a halogen type lamp powered by a calibrated Lamp Power Supply manufactured and calibrated by Labsphere (model LPS150). Ambient temperature is measured using a thermocouple located inside the integrating sphere at the same height as the sample under test (UUT) and not more than 1 meter in horizontal distance away from the sample (section 2.2 of LM79-2008). The thermocouple is located behind a baffle in order to eliminate any direct optical radiation from the sample under test.

### *Sample Stabilization*

The sample (UUT) is placed inside the integrating sphere 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.

### *Sphere Calibration*

The integrating sphere is calibrated using a quartzline halogen lamp with the following specifications:

Manufacturer: EYE Lighting International

Model# J94/JD28V75W

Voltage = 28.0 Volts DC

Wattage = 75.0 Watts

Calibration Current = 2.679 Amperes

Luminous Flux = 1685 Lumens

Calibration Date = 2-17-2011 (calibrated by Labsphere – NIST traceable).

Continued.....

**TÜV SÜD America, Inc.**

5945 Cabot Parkway, Suite 100,  
Alpharetta GA 30005

Telephone: 678-341-5900 [www.tuvamerica.com](http://www.tuvamerica.com)

Page 8

NRG\_F\_10.04

*Confidential Report*



TÜV SÜD America is  
accredited under the  
NVLAP EEL program.





# IESNA LM79-2008 TEST REPORT

Report# JI136325-5-LM79

June 27, 2013

## TÜV SÜD Photometric Testing Information (continued)

### 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 Sphere System – contains the following:			
Description	Manufacturer / Model#	TÜV SÜD Ref#	Calibration Due Date
Integrating Sphere	Labsphere LM760	SPH003	weekly
Spectroradiometer	Labsphere CDS1100	ATLE0048	9/7/2016
Power Analyzer	Yokogawa WT210	ATLE0058	3/7/2014
Power Source	Chroma 61602	AC003	N/A
Thermometer	Fluke 52-II	ATLE0008	11/17/2013
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

*This technical report may only be quoted in full. Any use for advertising purposes must be granted in writing. This report is the result of a single examination of the object in question and is not generally applicable evaluation of the quality of other products in regular production.*

*This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government*

### TÜV SÜD America, Inc.

5945 Cabot Parkway, Suite 100,  
Alpharetta GA 30005

Telephone: 678-341-5900 www.tuvamerica.com

Page 9

NRG\_F\_10.04

Confidential Report



TÜV SÜD America is  
accredited under the  
NVLAP EEL program.

