



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 BS730 5700K Narrow 40W

Manufacturer:

Beghelli North America

Technical Report Number:

JI302916-12-LM79

Report Issue Date:

June 12th, 2013

Total Number of Pages:

10 (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

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# JI1302916-12-LM79

June 12, 2013

Summary of Key Test Results

Model# Draco BS730 5700K Narrow 40W
Manufacturer Beghelli North America
TÜV Sample# 712-8
Date of Test June 7, 2013

Notes:

Tested in intended orientation



Parameter	Measured Result
Luminous Flux	3077 Lumens
Input Power	35.29 Watts
Efficacy	87.19 Lumens/Watt
C.C.T.	5382 K
C.R.I. (R _a)	74.64
Beam Angle	13.2°
Stabilization Time	60 minutes
In-Situ Temp Test (ISTMT)**	70.7 °C

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

**ISTMT in accordance with "Energy Star Program Requirements for Integral LED Lamps – Version 1.4".

TÜV SÜD America, Inc.

5945 Cabot Parkway, Suite 100,
Alpharetta GA 30005

Telephone: 678-341-5900 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# JI1302916-12-LM79

June 12, 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

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 12, 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 BS730 5700K Narrow 40W	
	Integrating Sphere	Goniophotometer
Total Luminous Flux (Lumens)	3077.0	3168.4
Luminous Efficacy (Lumens/Watt)	87.19	89.58
Total Radiant Flux (Watts)	9.5	-
Correlated Color Temperature (CCT)	5382	-
Color Rendering Index (CRI – R _a)	74.64	-
R ₉ Value	-26.0	-
Chromaticity (Chroma x / Chroma y)	0.3353 / 0.3527	-
Chromaticity (Chroma u / Chroma v)	0.2044 / 0.3225	-
Chromaticity (Chroma u' / Chroma v')	0.2044 / 0.4838	-
D _{uv} Value	0.00465	-

Electrical Results	Draco BS730 5700K Narrow 40W	
	Integrating Sphere	Goniophotometer
Input Power (Watts)	35.29	35.37
Input Voltage (Volts AC)	120.01	119.95
Input Current (Amps)	0.295	0.300
Power Factor (120V / 277V)	0.996 / 0.911	0.983
Input Frequency (Hertz)	60.0	60.0
A-THD (Current %) (120V / 277V)	1.56 % / 6.27 %	1.79 %

Additional Parameters	Draco BS730 5700K Narrow 40W	
	Integrating Sphere	Goniophotometer
Stabilization Time (Light and Power)	60 minutes	53 minutes
Test Geometry Configuration	4 π	Type C
Spectroradiometer	Labsphere CDS1100	Gigahertz Optik P9801
Ambient Temperature	25.3 °C	25.2 °C
ISTMT (In-Situ Temperature Measurement)	70.7 °C	
Spacing Criteria	0.26 (0° – 180°) / 0.24 (90° – 270°)	



IESNA LM79-2008 TEST REPORT

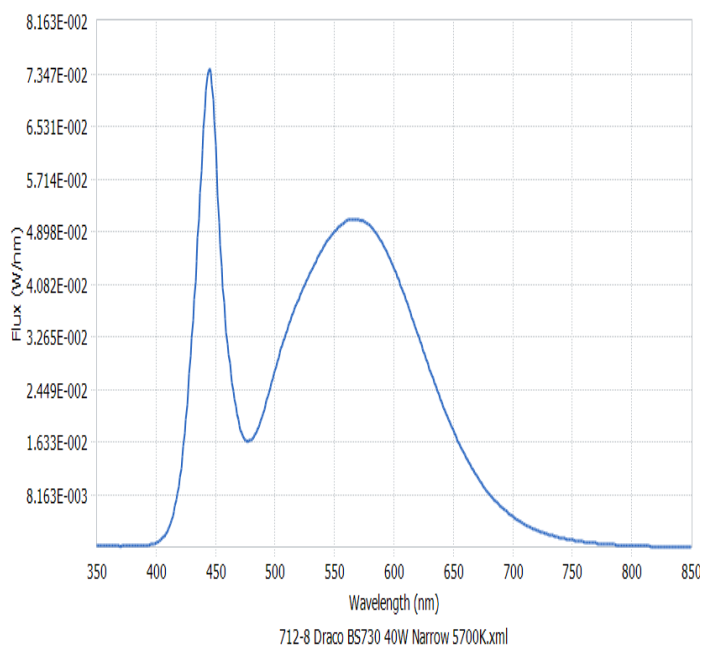
Report# JI1302916-12-LM79

June 12, 2013

Spectral Flux and Chromaticity Diagram

Spectral Flux

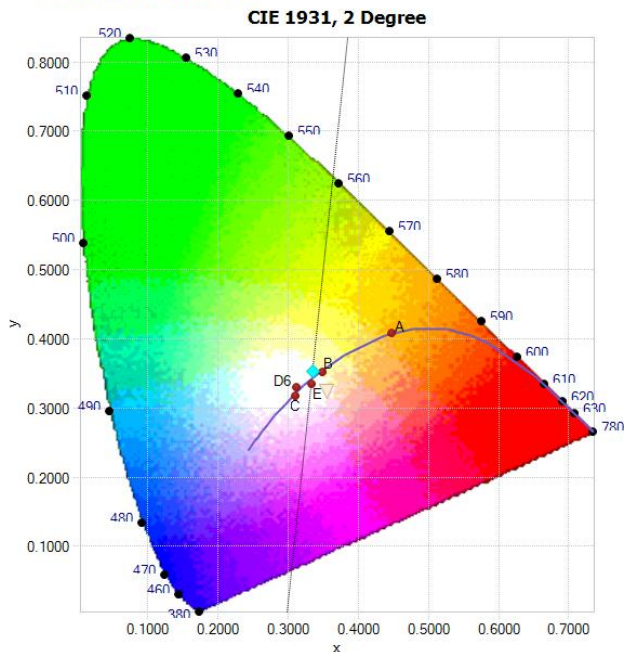
▼ SPECTRAL FLUX GRAPH:



Spectral response of the Radiant Flux
(350nm to 850nm)

Chromaticity Diagram

▼ CHROMATICITY DIAGRAM:



Tristimulus values (from page 5):

$$x / y = 0.3353 / 0.3527$$

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

Zonal Lumen Summary

Zone	Lumens	% Lamp / Luminaire
0 - 60	3107.5	98.1 %
60 - 90	60.8	1.9 %
0 - 90	3168.4	100.0 %
90 - 180	0.0	0.0 %
0 - 180	3168.4	100.0 %

TÜV SÜD America, Inc.

5945 Cabot Parkway, Suite 100,
Alpharetta GA 30005

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

Page 5

NRG_F_10.04

Confidential Report



Lab Code: 500065-0

TÜV SÜD America is
accredited under the
NVLAP EEL program.

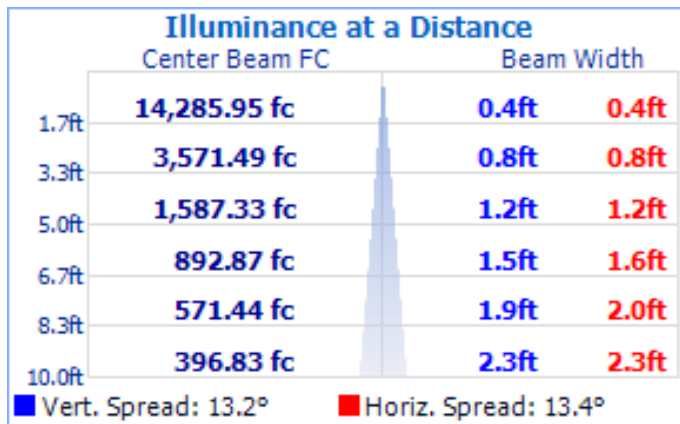


IESNA LM79-2008 TEST REPORT

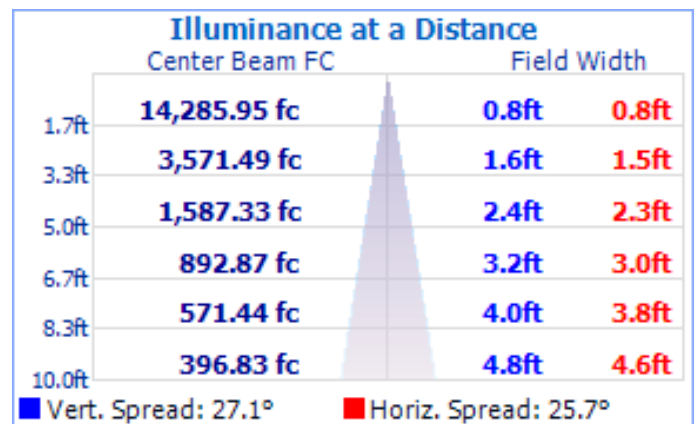
June 12, 2013

Test Results – Illuminance Plots

The following images depict the illuminance characteristics of the luminaire.



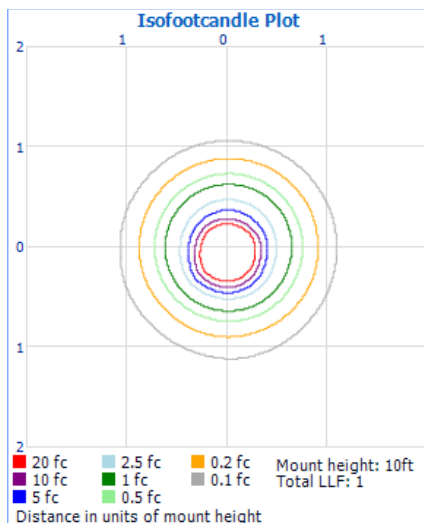
Beam Angle = 13.2°



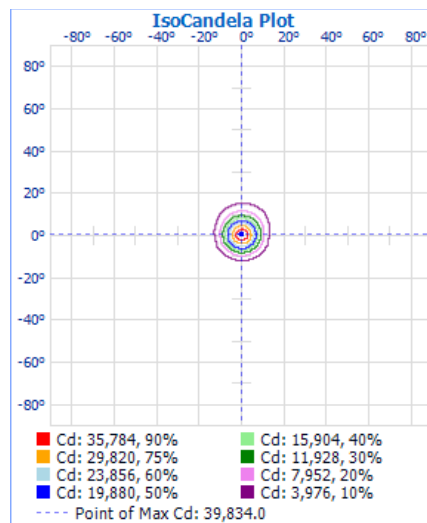
Field Angle = 27.1°

Test Results – Candela Plots

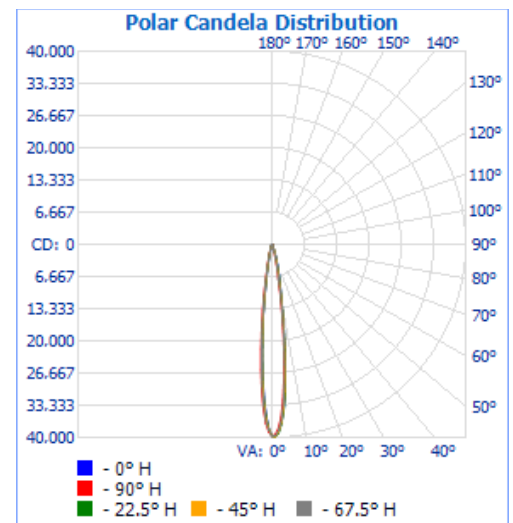
The following images depict the luminous intensity distribution characteristics of the luminaire:



Isofootcandle Plot



Isocandela Plot



Polar Candela



IESNA LM79-2008 TEST REPORT

June 12, 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° and 1.0°.

	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	39683	39683	39683	39683	39683	39683	39683	39683	39683	39683	39683	39683	39683	39683	39683	39683	39683
1.0	39760	39834	39814	39625	39313	39051	38674	38302	38058	38108	38255	38495	38836	39149	39383	39693	39753
2.0	38966	39104	38879	38561	38067	37243	36370	35562	35238	35508	35976	36553	37029	37604	38222	38694	38947
3.0	37076	37269	36976	36518	35845	34576	33171	32133	31664	31950	32538	33279	34011	35069	36051	36694	37043
4.0	34486	34630	34118	33317	32346	30858	29268	28072	27540	27661	28357	29285	30292	31659	33041	33899	34464
5.0	30994	31032	30407	29439	28186	26597	25104	23778	23074	23024	23716	24795	26058	27559	29121	30269	30975
6.0	26662	26601	25997	24965	23618	22088	20660	19307	18604	18528	19254	20404	21725	23105	24525	25860	26647
7.0	21951	21948	21416	20464	19289	17903	16345	15143	14437	14398	15127	16323	17560	18859	20044	21131	21914
8.0	17421	17528	17129	16350	15236	13990	12494	11282	10680	10738	11453	12540	13730	14958	16045	16823	17402
9.0	13779	13913	13475	12728	11735	10611	9236	8142	7686	7839	8475	9415	10517	11758	12757	13379	13757
10.0	11191	11164	10614	9759	8833	7848	6745	5890	5594	5744	6261	7027	8002	9232	10238	10905	11177
12.5	7100	6806	6064	5126	4423	3797	3063	2661	2606	2788	3152	3547	4117	5168	6328	6923	7088
15.0	4455	4221	3546	2790	2364	1988	1535	1334	1341	1447	1704	1924	2225	2989	4029	4405	4446
17.5	2800	2605	2132	1577	1353	1180	932	863	866	888	1033	1139	1289	1792	2566	2765	2798
20.0	1728	1587	1288	940	828	769	676	662	659	647	683	720	788	1059	1611	1693	1725
22.5	964	897	752	559	515	488	471	468	467	454	451	460	493	623	930	939	962
25.0	524	511	459	387	372	370	370	365	363	359	354	348	357	402	524	505	524
27.5	325	329	313	296	295	297	296	288	284	281	279	274	277	286	326	314	324
30.0	229	234	232	226	227	228	225	221	217	217	214	209	211	212	221	222	229
32.5	163	166	166	167	170	173	171	168	163	161	157	155	154	152	154	157	163
35.0	112	117	118	119	123	122	120	121	118	114	111	111	110	109	109	109	112
37.5	79	80	84	84	86	88	88	84	82	81	79	79	79	78	78	79	78
40.0	57	56	58	61	62	64	63	60	58	58	57	56	56	54	53	56	57
42.5	44	44	44	46	46	46	45	44	43	42	41	42	42	42	42	43	44
45.0	38	38	37	38	37	38	37	36	35	35	35	35	35	36	36	37	38
47.5	34	34	32	32	32	32	31	31	30	30	30	31	31	32	32	32	34
50.0	32	32	30	30	29	29	28	28	27	27	27	28	28	29	29	30	31
52.5	30	29	28	27	26	26	26	25	25	25	25	25	26	26	27	28	29
55.0	28	28	27	25	25	24	24	24	24	23	24	24	25	25	25	26	28
57.5	26	27	26	25	24	24	23	23	22	23	23	23	24	24	24	25	26
60.0	25	26	25	24	23	23	23	22	22	22	22	23	23	23	23	24	25
62.5	25	24	24	24	23	23	22	22	22	21	22	22	22	22	23	23	24
65.0	23	24	23	23	22	22	22	21	21	21	21	21	21	22	22	22	23
67.5	22	22	22	22	22	22	21	21	21	21	20	20	21	21	21	21	22
70.0	21	22	22	21	21	21	21	20	20	20	20	20	20	20	21	21	21
72.5	20	21	21	21	21	20	20	20	20	20	19	19	20	20	20	20	20
75.0	20	20	20	20	20	20	19	19	19	19	19	19	19	19	19	19	20
77.5	19	19	19	19	19	19	19	18	19	18	18	18	18	18	19	19	19
80.0	19	18	18	18	18	18	18	18	18	18	18	18	17	18	18	18	18
82.5	18	18	18	18	18	18	17	17	17	17	17	17	17	17	18	18	18
85.0	17	17	17	17	17	17	17	17	17	17	17	16	16	16	17	17	17
87.5	17	17	17	17	17	17	17	16	17	17	16	16	16	16	16	16	17
90.0	16	16	17	17	17	17	16	16	16	16	16	16	16	16	16	16	16

TUV SUD 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

TUV SUD America is
accredited under the
NVLAP EEL program.



IESNA LM79-2008 TEST REPORT

June 12, 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 “ 4π 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 3rd 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

Page 8

NRG_F_10.04

Confidential Report



TÜV SÜD America is
accredited under the
NVLAP EEL program.



IESNA LM79-2008 TEST REPORT

June 12, 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.