



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

**Technical Report Number:** JI1306325-9-GON  
**Report Issue Date:** June 26, 2013  
**Total Number of Pages:** 7 (including this page)

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# GONIOPHOTOMETRIC TEST REPORT IES LM79-2008

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June 26, 2013

## Summary of Key Test Results

Model# Draco 710 4100K  
(Wide)  
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               | 2,210 Lumens              |
| Input Power                 | 34.90 Watts               |
| Efficacy                    | 63.32 Lumens/Watts        |
| Beam Angle                  | 22.2°                     |
| 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 (Wide) |
|---------------------------------|------------------------|
|                                 | Goniophotometer        |
| Total Luminous Flux (Lumens)    | 2,210                  |
| Luminous Efficacy (Lumens/Watt) | 63.32                  |

| Electrical Results       | Draco 710 4100K (Wide) |
|--------------------------|------------------------|
|                          | Goniophotometer        |
| Input Power (Watts)      | 34.90                  |
| Input Voltage (Volts AC) | 120.05                 |
| Input Current (Amps)     | 0.290                  |
| Power Factor             | 0.996                  |
| Input Frequency (Hertz)  | 60.0                   |
| A-THD (Current %)        | 3.38%                  |

| Additional Parameters                   | Draco 710 4100K (Wide)               |
|---|--------------------------------------|
|   | Goniophotometer                      |
| Stabilization Time (Light and Power)    | 57 minutes                           |
| Test Geometry Configuration             | Type C                               |
| Photometer                              | Gigahertz Optik P9801                |
| Ambient Temperature                     | 25.4°C                               |
| ISTMT (In-Situ Temperature Measurement) | Not Tested on this Model#            |
| Spacing Criteria                        | 0.42 (0° – 180°) / 0.36 (90° – 270°) |

## Zonal Lumen Summary

| Zone     | Lumens  | % Lamp / Luminaire |
|----------|---------|--------------------|
| 0 - 60   | 2,032.8 | 92.0 %             |
| 60 - 90  | 177.2   | 8.0 %              |
| 0 - 90   | 2,210   | 100 %              |
| 90 - 180 | 0.0     | 0.0 %              |
| 0 - 180  | 2,210   | 100 %              |

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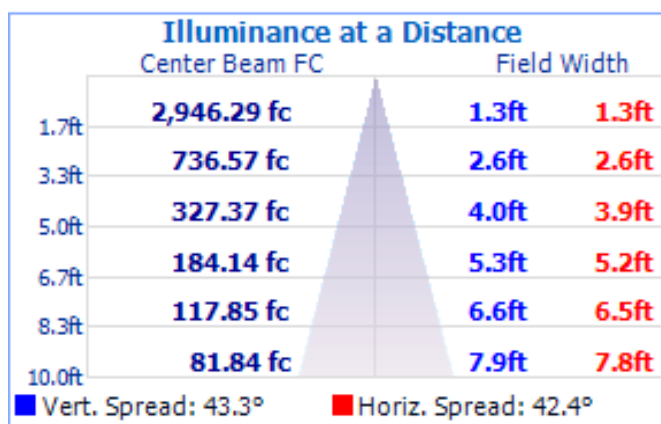
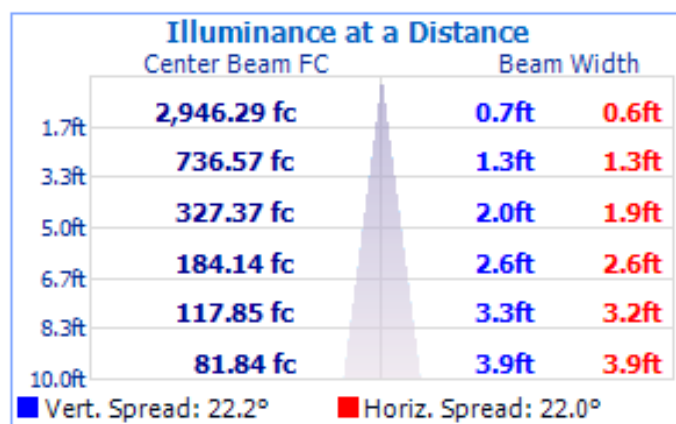
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## Test Results – Illuminance Plots

The following images depict the illuminance characteristics of the luminaire (Mount Height = 10ft):

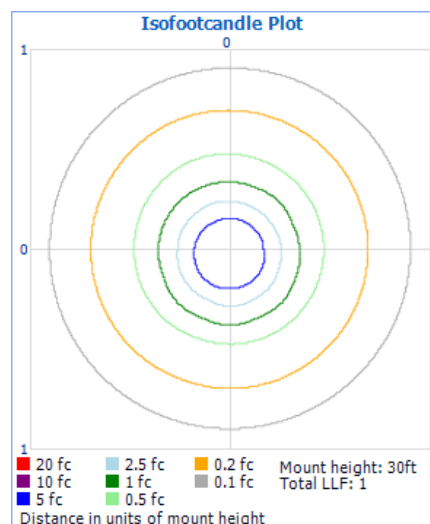


Beam Angle = 22.2°

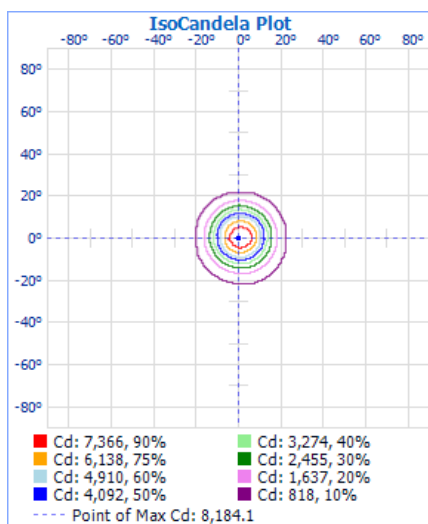
Field Angle = 43.3°

## Test Results – Candela Plots

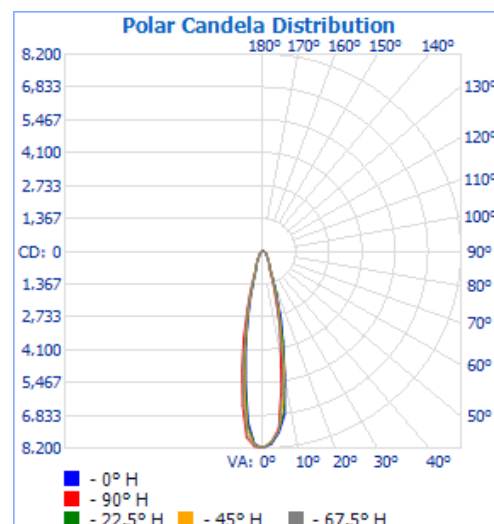
The following images depict the luminous intensity distribution characteristics of the luminaire:



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  | 8184 | 8184 | 8184 | 8184 | 8184 | 8184  | 8184  | 8184  | 8184  | 8184  | 8184  | 8184  | 8184  | 8184  | 8184  | 8184  | 8184  |
| 2.5  | 8040 | 7988 | 7948 | 7922 | 7943 | 7958  | 7993  | 8008  | 8040  | 8051  | 8080  | 8105  | 8146  | 8145  | 8122  | 8075  | 8035  |
| 5.0  | 7584 | 7514 | 7477 | 7471 | 7402 | 7196  | 6996  | 7026  | 7119  | 7285  | 7470  | 7671  | 7805  | 7791  | 7741  | 7662  | 7580  |
| 7.5  | 6862 | 6682 | 6343 | 6013 | 5751 | 5590  | 5665  | 5585  | 5506  | 5642  | 5874  | 6237  | 6492  | 6863  | 6973  | 6923  | 6858  |
| 10.0 | 5220 | 5083 | 5008 | 4668 | 4165 | 4211  | 3851  | 3866  | 4171  | 4231  | 4501  | 4800  | 5037  | 5205  | 5442  | 5374  | 5208  |
| 12.5 | 3813 | 3812 | 3388 | 3127 | 3229 | 2780  | 2918  | 2851  | 2886  | 3005  | 3133  | 3284  | 3720  | 3856  | 3957  | 4079  | 3810  |
| 15.0 | 2875 | 2515 | 2474 | 2234 | 2000 | 2080  | 1728  | 1895  | 1974  | 2240  | 2251  | 2456  | 2516  | 2681  | 2715  | 2610  | 2868  |
| 17.5 | 1808 | 1822 | 1481 | 1474 | 1352 | 1171  | 1344  | 1218  | 1282  | 1339  | 1527  | 1551  | 1762  | 1850  | 1794  | 1892  | 1805  |
| 20.0 | 1205 | 1062 | 1095 | 930  | 836  | 849   | 829   | 854   | 872   | 940   | 982   | 1070  | 1093  | 1091  | 1200  | 1128  | 1203  |
| 22.5 | 753  | 740  | 693  | 692  | 695  | 702   | 715   | 731   | 757   | 783   | 784   | 779   | 769   | 780   | 792   | 785   | 752   |
| 25.0 | 612  | 608  | 596  | 595  | 596  | 600   | 610   | 621   | 644   | 668   | 668   | 665   | 659   | 649   | 639   | 619   | 612   |
| 27.5 | 524  | 519  | 508  | 506  | 505  | 508   | 515   | 524   | 543   | 562   | 562   | 562   | 558   | 551   | 545   | 528   | 523   |
| 30.0 | 443  | 439  | 429  | 426  | 425  | 428   | 433   | 440   | 454   | 469   | 469   | 470   | 468   | 464   | 459   | 446   | 442   |
| 32.5 | 373  | 369  | 361  | 359  | 359  | 361   | 365   | 371   | 381   | 391   | 392   | 393   | 392   | 389   | 386   | 376   | 373   |
| 35.0 | 316  | 313  | 307  | 306  | 306  | 311   | 315   | 320   | 327   | 334   | 333   | 332   | 331   | 329   | 326   | 319   | 315   |
| 37.5 | 270  | 268  | 265  | 265  | 267  | 273   | 279   | 282   | 285   | 290   | 289   | 286   | 284   | 282   | 279   | 274   | 270   |
| 40.0 | 236  | 234  | 233  | 235  | 237  | 241   | 246   | 250   | 251   | 253   | 251   | 250   | 249   | 246   | 244   | 239   | 236   |
| 42.5 | 210  | 208  | 208  | 210  | 211  | 215   | 219   | 221   | 222   | 223   | 223   | 222   | 220   | 219   | 217   | 213   | 210   |
| 45.0 | 188  | 186  | 187  | 188  | 188  | 189   | 192   | 193   | 193   | 195   | 196   | 196   | 196   | 195   | 194   | 191   | 188   |
| 47.5 | 169  | 168  | 168  | 168  | 167  | 168   | 169   | 171   | 171   | 172   | 173   | 174   | 174   | 174   | 174   | 172   | 169   |
| 50.0 | 153  | 151  | 151  | 151  | 150  | 150   | 151   | 152   | 153   | 154   | 155   | 156   | 157   | 157   | 157   | 156   | 153   |
| 52.5 | 139  | 138  | 138  | 137  | 136  | 136   | 136   | 137   | 138   | 139   | 140   | 142   | 142   | 142   | 143   | 142   | 139   |
| 55.0 | 128  | 126  | 126  | 125  | 124  | 123   | 124   | 124   | 125   | 125   | 127   | 129   | 130   | 130   | 130   | 130   | 128   |
| 57.5 | 117  | 116  | 115  | 114  | 113  | 112   | 112   | 113   | 113   | 114   | 116   | 117   | 118   | 119   | 120   | 119   | 117   |
| 60.0 | 108  | 106  | 106  | 105  | 103  | 103   | 102   | 102   | 102   | 103   | 105   | 107   | 108   | 109   | 110   | 110   | 108   |
| 62.5 | 100  | 98   | 97   | 96   | 94   | 93    | 92    | 92    | 92    | 93    | 95    | 97    | 99    | 100   | 101   | 101   | 100   |
| 65.0 | 91   | 89   | 88   | 87   | 85   | 84    | 83    | 83    | 83    | 84    | 86    | 88    | 90    | 91    | 93    | 92    | 91    |
| 67.5 | 83   | 82   | 80   | 79   | 77   | 76    | 75    | 74    | 74    | 76    | 77    | 79    | 81    | 83    | 84    | 84    | 83    |
| 70.0 | 75   | 74   | 72   | 71   | 68   | 67    | 66    | 66    | 66    | 67    | 69    | 71    | 73    | 75    | 76    | 76    | 75    |
| 72.5 | 67   | 66   | 64   | 63   | 60   | 59    | 58    | 57    | 57    | 59    | 60    | 63    | 65    | 67    | 68    | 68    | 67    |
| 75.0 | 59   | 58   | 57   | 55   | 52   | 51    | 50    | 49    | 49    | 50    | 52    | 55    | 57    | 59    | 60    | 61    | 59    |
| 77.5 | 52   | 50   | 48   | 47   | 44   | 43    | 42    | 41    | 42    | 43    | 45    | 47    | 49    | 51    | 52    | 53    | 52    |
| 80.0 | 44   | 42   | 41   | 39   | 37   | 36    | 35    | 34    | 35    | 36    | 37    | 40    | 42    | 43    | 45    | 45    | 44    |
| 82.5 | 37   | 35   | 34   | 33   | 31   | 30    | 29    | 29    | 29    | 30    | 31    | 33    | 35    | 36    | 37    | 37    | 37    |
| 85.0 | 31   | 30   | 29   | 28   | 27   | 27    | 26    | 26    | 26    | 26    | 27    | 28    | 29    | 30    | 31    | 31    | 31    |
| 87.5 | 27   | 27   | 27   | 26   | 25   | 25    | 25    | 25    | 25    | 25    | 25    | 25    | 25    | 26    | 27    | 27    | 28    |
| 90.0 | 25   | 25   | 26   | 27   | 27   | 28    | 28    | 28    | 27    | 26    | 25    | 25    | 25    | 25    | 25    | 25    | 25    |

Maximum Candela = **8,184** at Horizontal: 0.0°, Vertical: 0.0°

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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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