



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-79:2019, ANSI C82.2:2002, ANSI C82.77-10:2021

Customer ANDlight, 1951 Franklin St., Vancouver, British Columbia , Canada, V5L 0C7

| General Information | | Lamp Details: CY5451 | | Driver Details: CY2567 | |
|---------------------|-----------------|-------------------------|-------------------|----------------------------|------------------|
| DUT Lab ID | SRIS 3157-8 | Seasoning | 0 Hour | Type | LED Power Supply |
| Lamp Type | LED/SSL | Test Product | COL-175-2-P-V-30K | Manufacturer | Meanwell |
| Current Mode | AC | Manufacturer | Nichia | Catalog No. | PWM-90-24 |
| Test Report | S2212024-R1 | Lamp Catalog No. | N.K. | Maximum Power | 90 W |
| Test Date | 2 December 2022 | Drive Current | N.K. | Input Voltage | 120.00 V |
| Report Date | 8 December 2022 | Nominal Color | 3000 K | Operating Frequency | 60 Hz |
| Ambient | 24.2 °C | Burning Position | Axial | Input Power | 26.02 W |

Luminaire Data

| General Information | | Optics | | Aperture (feet) | |
|---------------------|-------------------|----------------|---------------------------------|-----------------|---------|
| Manufacturer | ANDlight | Optics | None | X | -0.5833 |
| Name | Column Series | Housing | (2) Facetted Vertical Cylinders | Y | 1.7500 |
| Catalog No. | COL-175-2-P-V-30K | Lens | (2) Acrylic Diffusers | Z | -0.5833 |

Stabilization Time: 45 minutes

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 | 974997 | N.P.C.R. | N.P.C.R. |
| Input Power Meter | Yokogawa | WT210 | 27E116584 | 2022/09/22 | 2023/09/22 |
| 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 | 110803 | 2022/09/07 | 2023/09/07 |

Environment Equipment

| Equipment | Manufacturer | Model | Serial Number | Calibration Date | Calibration Due Date |
|-----------------------------|--------------|-------|---------------|------------------|----------------------|
| Temperature Humidity Sensor | Omega | HH311 | 120504176 | 2022/09/07 | 2023/09/07 |

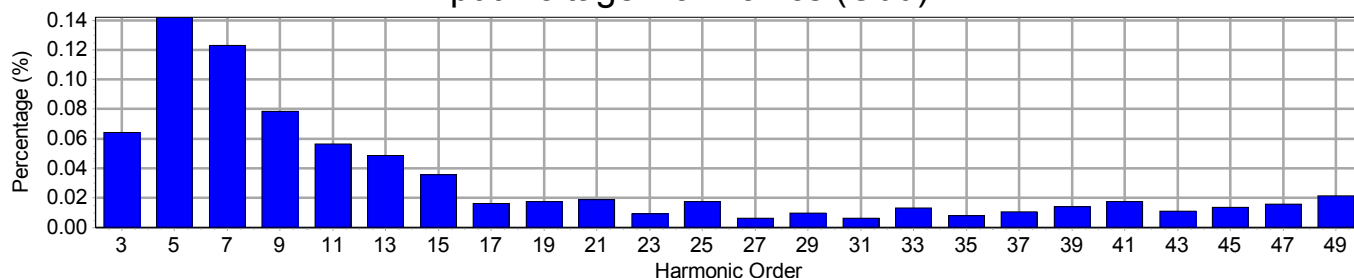


Electrical Measurements

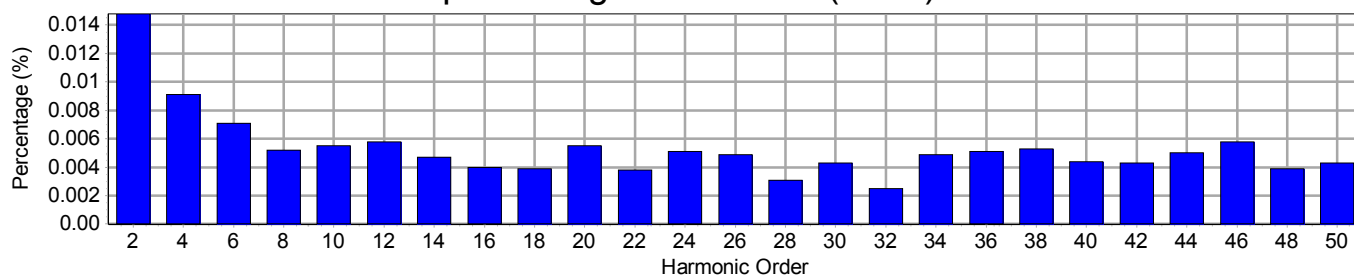
Input

| | | | | | |
|-----------|---------------|----------------|----------|------------------|-----------|
| Frequency | 60 Hz | Active Power | 26.02 W | THDV [ANSI] | 0.23 % |
| Voltage | 120.0 V(rms) | Apparent Power | 49.09 VA | THDA [ANSI] | 156.59 % |
| Current | 0.4092 A(rms) | Power Factor | 0.530 | Max. Harmonic At | 3rd order |

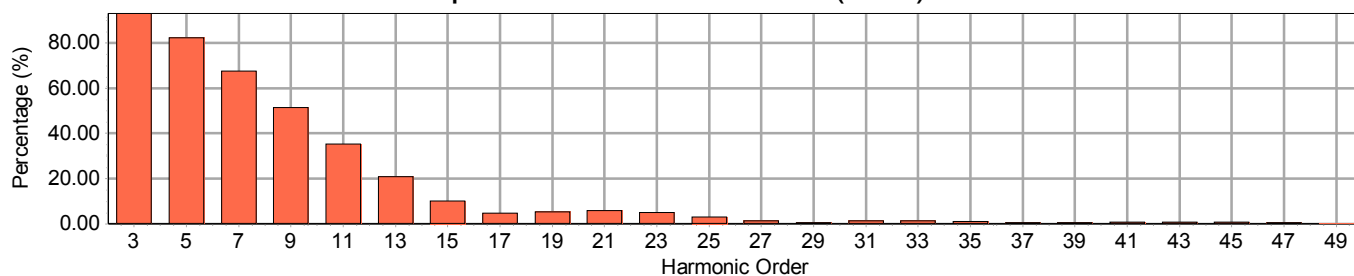
Input Voltage Harmonics (Odd)



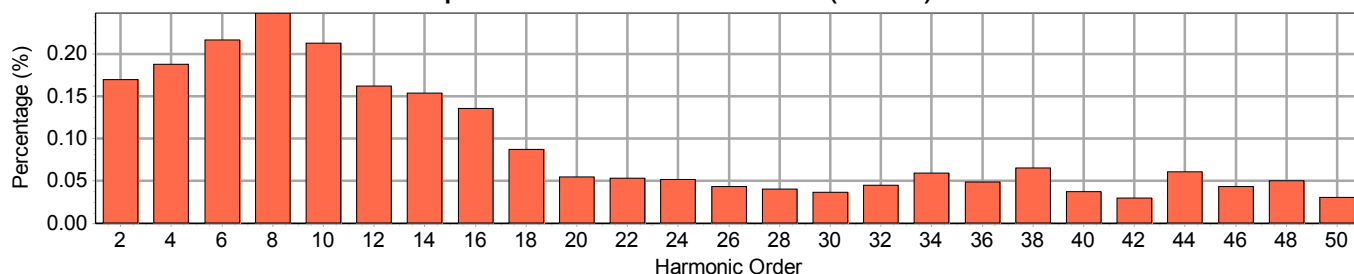
Input Voltage Harmonics (Even)



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 | 0.015 | 0.170 |
| 3 | 180 | 0.064 | 93.139 | 4 | 240 | 0.009 | 0.188 |
| 5 | 300 | 0.142 | 82.168 | 6 | 360 | 0.007 | 0.216 |
| 7 | 420 | 0.123 | 67.580 | 8 | 480 | 0.005 | 0.249 |
| 9 | 540 | 0.079 | 51.285 | 10 | 600 | 0.006 | 0.213 |
| 11 | 660 | 0.057 | 35.126 | 12 | 720 | 0.006 | 0.162 |
| 13 | 780 | 0.049 | 20.945 | 14 | 840 | 0.005 | 0.154 |
| 15 | 900 | 0.036 | 10.187 | 16 | 960 | 0.004 | 0.135 |
| 17 | 1020 | 0.016 | 4.691 | 18 | 1080 | 0.004 | 0.087 |
| 19 | 1140 | 0.018 | 5.174 | 20 | 1200 | 0.006 | 0.055 |
| 21 | 1260 | 0.019 | 5.766 | 22 | 1320 | 0.004 | 0.053 |
| 23 | 1380 | 0.009 | 4.846 | 24 | 1440 | 0.005 | 0.052 |
| 25 | 1500 | 0.018 | 3.095 | 26 | 1560 | 0.005 | 0.044 |
| 27 | 1620 | 0.006 | 1.168 | 28 | 1680 | 0.003 | 0.041 |
| 29 | 1740 | 0.010 | 0.407 | 30 | 1800 | 0.004 | 0.037 |
| 31 | 1860 | 0.006 | 1.159 | 32 | 1920 | 0.003 | 0.045 |
| 33 | 1980 | 0.013 | 1.262 | 34 | 2040 | 0.005 | 0.059 |
| 35 | 2100 | 0.008 | 0.862 | 36 | 2160 | 0.005 | 0.049 |
| 37 | 2220 | 0.011 | 0.348 | 38 | 2280 | 0.005 | 0.066 |
| 39 | 2340 | 0.014 | 0.406 | 40 | 2400 | 0.004 | 0.037 |
| 41 | 2460 | 0.018 | 0.616 | 42 | 2520 | 0.004 | 0.030 |
| 43 | 2580 | 0.011 | 0.774 | 44 | 2640 | 0.005 | 0.061 |
| 45 | 2700 | 0.014 | 0.662 | 46 | 2760 | 0.006 | 0.043 |
| 47 | 2820 | 0.016 | 0.373 | 48 | 2880 | 0.004 | 0.050 |
| 49 | 2940 | 0.022 | 0.166 | 50 | 3000 | 0.004 | 0.031 |



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Lab Code: 200899-0

Photometric Report: S2212024-R1

Prepared for: ANDlight · Test Date: 02 December 2022

Luminaire: Column Series · Lumcat: COL-175-2-P-V-30K

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 | 83 | 83 | 83 | 56 | 56 | 56 | | | | 50 |
| 1 | | 101 | 94 | 87 | 81 | 93 | 86 | 80 | 75 | 85 | 79 | 74 | 69 | 65 | 61 | 58 | 41 | 39 | 37 | | | | 31 |
| 2 | | 90 | 79 | 69 | 62 | 82 | 72 | 64 | 57 | 75 | 66 | 59 | 52 | 54 | 49 | 44 | 33 | 30 | 27 | | | | 22 |
| 3 | | 81 | 67 | 57 | 49 | 74 | 62 | 52 | 45 | 67 | 56 | 48 | 41 | 46 | 40 | 34 | 28 | 24 | 21 | | | | 16 |
| 4 | | 73 | 58 | 48 | 39 | 67 | 53 | 44 | 36 | 60 | 49 | 40 | 34 | 40 | 33 | 28 | 24 | 20 | 17 | | | | 13 |
| 5 | | 67 | 51 | 40 | 33 | 61 | 47 | 37 | 30 | 55 | 43 | 34 | 28 | 35 | 28 | 23 | 21 | 17 | 13 | | | | 10 |
| 6 | | 61 | 45 | 35 | 27 | 55 | 41 | 32 | 25 | 50 | 38 | 29 | 23 | 31 | 24 | 19 | 19 | 14 | 11 | | | | 8 |
| 7 | | 56 | 40 | 30 | 23 | 51 | 37 | 28 | 22 | 46 | 34 | 26 | 20 | 28 | 21 | 16 | 17 | 13 | 9 | | | | 7 |
| 8 | | 52 | 36 | 27 | 20 | 47 | 33 | 25 | 19 | 43 | 30 | 23 | 17 | 25 | 19 | 14 | 15 | 11 | 8 | | | | 6 |
| 9 | | 48 | 33 | 24 | 18 | 44 | 30 | 22 | 16 | 40 | 28 | 20 | 15 | 23 | 17 | 12 | 14 | 10 | 7 | | | | 5 |
| 10 | | 45 | 30 | 21 | 15 | 41 | 27 | 19 | 14 | 37 | 25 | 18 | 13 | 21 | 15 | 11 | 13 | 9 | 6 | | | | 4 |

Zonal Lumen Summary

| Zone | Lumens | % Lamp | % Luminaire |
|----------|--------|--------|-------------|
| 0 - 10 | 3 | 0.18 | 0.18 |
| 10 - 20 | 14 | 0.93 | 0.93 |
| 20 - 30 | 34 | 2.26 | 2.26 |
| 30 - 40 | 61 | 4.00 | 4.00 |
| 40 - 50 | 90 | 5.91 | 5.91 |
| 50 - 60 | 117 | 7.71 | 7.71 |
| 60 - 70 | 139 | 9.09 | 9.09 |
| 70 - 80 | 151 | 9.88 | 9.88 |
| 80 - 90 | 153 | 10.05 | 10.05 |
| 90 - 120 | 442 | 29.02 | 29.02 |
| 90 - 130 | 560 | 36.73 | 36.73 |
| 90 - 150 | 711 | 46.64 | 46.64 |
| 90 - 180 | 762 | 50.00 | 50.00 |
| 0 - 180 | 1524 | 100.00 | 100.00 |

Average Luminance (Cd/m²)

| Angle | 0 Degree | 45 Degree | 90 Degree |
|-------|----------|-----------|-----------|
| 45.0 | 563 | 549 | 545 |
| 55.0 | 781 | 764 | 756 |
| 65.0 | 1128 | 1108 | 1097 |
| 75.0 | 1874 | 1845 | 1830 |
| 85.0 | 5482 | 5395 | 5363 |

Luminaire Luminous Flux: 1524

Measured Input Power: 26.02 W

Total Luminaire Efficiency: N/A

Luminaire Luminous Efficacy: 58.6 lm/W

Luminaire Spacing Criterion (0 Degree): 4.5014

Luminaire Spacing Criterion (90 Degree): 4.4471

Category: Up and Down

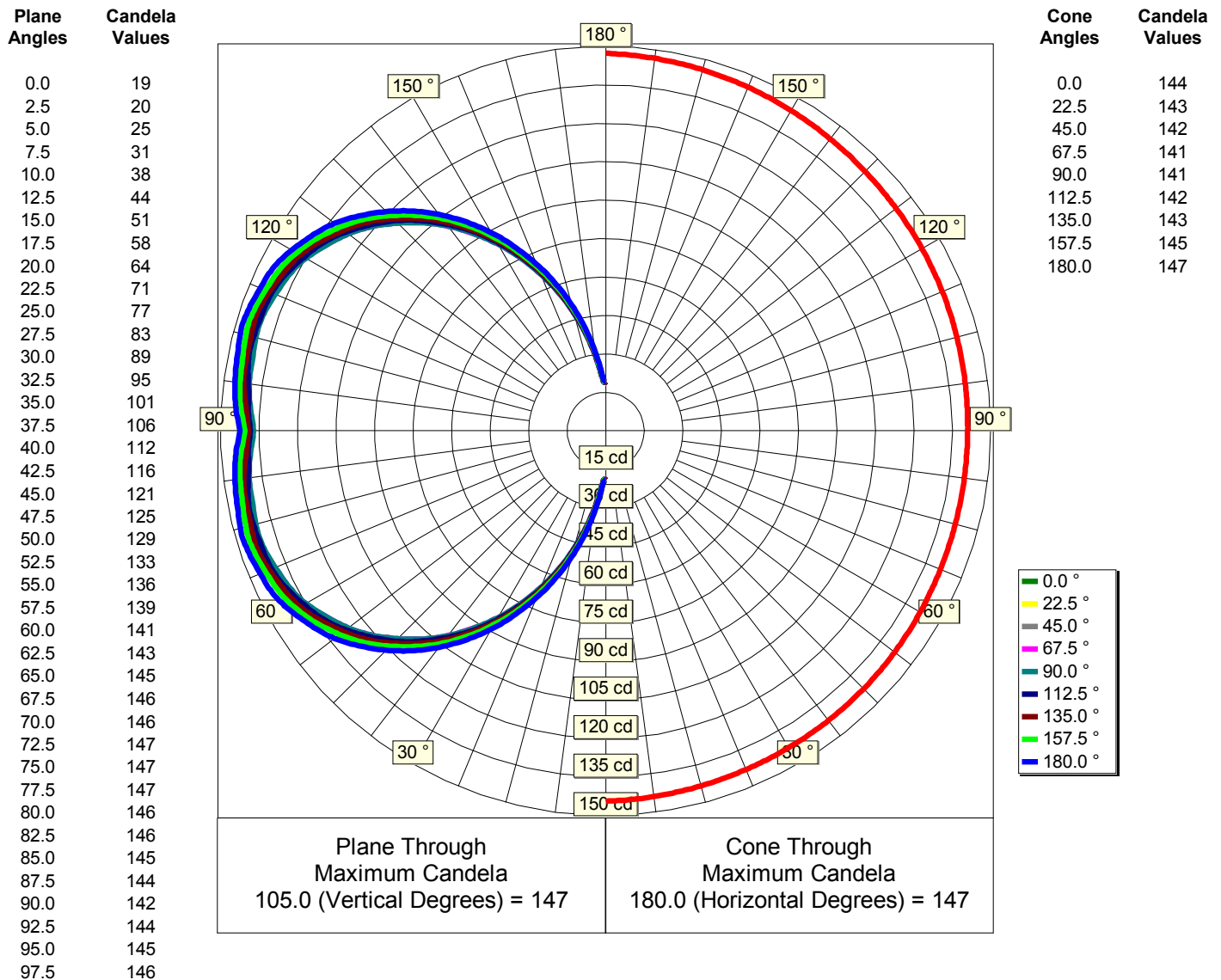


Photometric Report: S2212024-R1

Prepared for: ANDlight · Test Date: 02 December 2022

Luminaire: Column Series · Lumcat: COL-175-2-P-V-30K

Luminous Intensity - Polar Curve for each Plane(1)





Photometric Report: S2212024-R1

Prepared for: ANDlight · Test Date: 02 December 2022

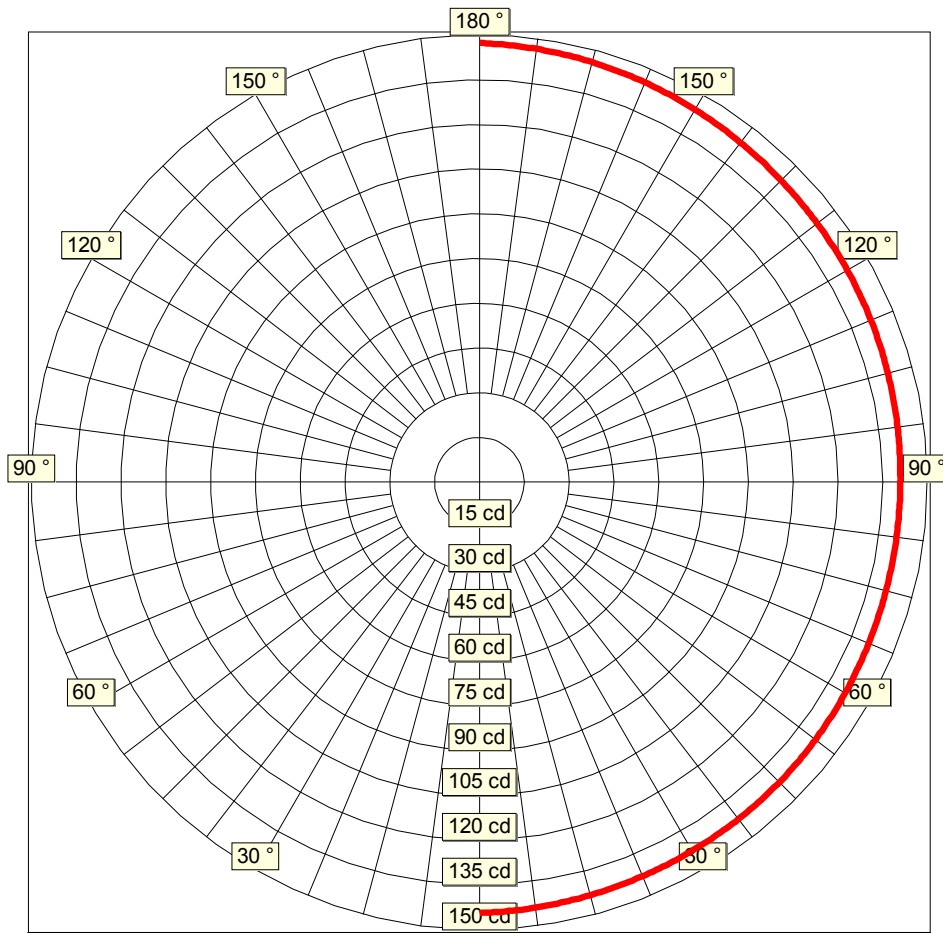
Luminaire: Column Series · Lumcat: COL-175-2-P-V-30K

Luminous Intensity - Polar Curve for each Plane(2)

Plane
Angles

| Plane Angles | Candela Values |
|-----------------|-------------------|
| 100.0 | 146 |
| 102.5 | 147 |
| 105.0 | 147 |
| 107.5 | 147 |
| 110.0 | 146 |
| 112.5 | 146 |
| 115.0 | 145 |
| 117.5 | 143 |
| 120.0 | 141 |
| 122.5 | 139 |
| 125.0 | 136 |
| 127.5 | 133 |
| 130.0 | 129 |
| 132.5 | 125 |
| 135.0 | 121 |
| 137.5 | 116 |
| 140.0 | 112 |
| 142.5 | 106 |
| 145.0 | 101 |
| 147.5 | 95 |
| 150.0 | 89 |
| 152.5 | 83 |
| 155.0 | 77 |
| 157.5 | 71 |
| 160.0 | 64 |
| 162.5 | 58 |
| 165.0 | 51 |
| 167.5 | 44 |
| 170.0 | 38 |
| 172.5 | 31 |
| 175.0 | 25 |
| 177.5 | 20 |
| 180.0 | 19 |

Candela
Values



Cone
Angles

Candela
Values

Plane Through
Maximum Candela
105.0 (Vertical Degrees) = 147

Cone Through
Maximum Candela
180.0 (Horizontal Degrees) = 147



IES File Headers

IESNA:LM-63
 [ISSUEDATE] 02 December 2022
 [TESTLAB] Spectra Lux
 [TEST] S2212024-R1
 [MANUFAC] ANDlight
 [LUMCAT] COL-175-2-P-V-30K
 [LUMINAIRE] Column Series
 [LAMP] Clusters of Nichia LEDs c/w Meanwell Driver PWM-90-24 @ 120.00V
 [_BURNING] Axial (1,524 Luminaire Lumens)
 [_OPTICS] None
 [_LENS] (2) Acrylic Diffusers
 [_HOUSING] (2) Facetted Vertical Cylinders
 [_NOMINAL COLOR] 3000 K
 [_DRIVE CURRENT] N.K.

Candela Table

Lateral Angles

| | 0.0 | 22.5 | 45.0 | 67.5 | 90.0 | 112.5 | 135.0 | 157.5 | 180.0 |
|--------------------------------------|------|------|------|------|------|-------|-------|-------|-------|
| V e r t i c a l | 0.0 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 |
| | 2.5 | 20 | 20 | 20 | 19 | 20 | 20 | 20 | 20 |
| | 5.0 | 25 | 24 | 24 | 23 | 24 | 24 | 24 | 25 |
| | 7.5 | 31 | 30 | 29 | 29 | 29 | 30 | 30 | 31 |
| | 10.0 | 37 | 36 | 35 | 35 | 36 | 36 | 37 | 38 |
| | 12.5 | 43 | 42 | 42 | 41 | 42 | 42 | 43 | 44 |
| | 15.0 | 50 | 49 | 48 | 47 | 48 | 49 | 50 | 51 |
| | 17.5 | 56 | 55 | 54 | 54 | 55 | 55 | 56 | 58 |
| | 20.0 | 63 | 61 | 61 | 60 | 61 | 61 | 63 | 64 |
| | 22.5 | 69 | 68 | 67 | 66 | 67 | 68 | 69 | 71 |
| | 25.0 | 75 | 74 | 73 | 72 | 73 | 74 | 75 | 77 |
| | 27.5 | 82 | 80 | 79 | 78 | 79 | 80 | 82 | 83 |
| | 30.0 | 87 | 86 | 85 | 84 | 85 | 86 | 87 | 89 |
| | 32.5 | 93 | 92 | 91 | 90 | 91 | 92 | 93 | 95 |
| | 35.0 | 99 | 97 | 96 | 95 | 96 | 97 | 99 | 101 |
| | 37.5 | 104 | 103 | 101 | 101 | 102 | 103 | 104 | 106 |
| | 40.0 | 109 | 107 | 106 | 106 | 107 | 108 | 109 | 112 |
| | 42.5 | 114 | 112 | 111 | 110 | 111 | 112 | 114 | 116 |
| | 45.0 | 119 | 117 | 116 | 115 | 116 | 117 | 119 | 121 |
| A n g l e s | 47.5 | 123 | 121 | 120 | 119 | 120 | 121 | 123 | 125 |
| | 50.0 | 126 | 125 | 124 | 123 | 124 | 125 | 127 | 129 |
| | 52.5 | 130 | 128 | 127 | 126 | 127 | 129 | 131 | 133 |
| | 55.0 | 133 | 132 | 131 | 129 | 131 | 132 | 134 | 136 |
| | 57.5 | 136 | 135 | 133 | 132 | 133 | 135 | 137 | 139 |
| | 60.0 | 138 | 137 | 135 | 135 | 136 | 137 | 139 | 141 |
| | 62.5 | 140 | 139 | 138 | 137 | 138 | 139 | 141 | 143 |
| | 65.0 | 142 | 140 | 139 | 138 | 140 | 140 | 142 | 145 |
| | 67.5 | 144 | 142 | 141 | 139 | 141 | 142 | 143 | 146 |
| | 70.0 | 144 | 143 | 141 | 141 | 141 | 143 | 144 | 146 |
| | 72.5 | 144 | 143 | 142 | 141 | 142 | 143 | 145 | 147 |
| | 75.0 | 144 | 143 | 142 | 141 | 142 | 143 | 145 | 147 |
| | 77.5 | 145 | 143 | 142 | 141 | 142 | 143 | 144 | 147 |
| | 80.0 | 144 | 143 | 141 | 141 | 141 | 143 | 144 | 146 |
| | 82.5 | 143 | 142 | 141 | 140 | 140 | 142 | 144 | 146 |
| | 85.0 | 142 | 141 | 140 | 139 | 140 | 141 | 143 | 145 |
| | 87.5 | 142 | 140 | 140 | 138 | 138 | 140 | 142 | 144 |
| | 90.0 | 141 | 140 | 139 | 137 | 138 | 139 | 141 | 142 |



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Lateral Angles

| | 0.0 | 22.5 | 45.0 | 67.5 | 90.0 | 112.5 | 135.0 | 157.5 | 180.0 | |
|--------------------------------------|-------|------|------|------|------|-------|-------|-------|-------|-----|
| V e r t i c a l | 92.5 | 142 | 140 | 140 | 138 | 138 | 139 | 140 | 142 | 144 |
| | 95.0 | 142 | 141 | 140 | 139 | 139 | 140 | 141 | 143 | 145 |
| | 97.5 | 143 | 142 | 141 | 140 | 140 | 140 | 142 | 144 | 146 |
| | 100.0 | 144 | 143 | 141 | 141 | 140 | 141 | 143 | 144 | 146 |
| | 102.5 | 145 | 143 | 142 | 141 | 140 | 142 | 143 | 144 | 147 |
| | 105.0 | 144 | 143 | 142 | 141 | 141 | 142 | 143 | 145 | 147 |
| | 107.5 | 144 | 143 | 142 | 141 | 141 | 142 | 143 | 145 | 147 |
| | 110.0 | 144 | 143 | 141 | 141 | 140 | 141 | 143 | 144 | 146 |
| | 112.5 | 144 | 142 | 141 | 139 | 139 | 141 | 142 | 143 | 146 |
| | 115.0 | 142 | 140 | 139 | 138 | 138 | 140 | 140 | 142 | 145 |
| | 117.5 | 140 | 139 | 138 | 137 | 137 | 138 | 139 | 141 | 143 |
| | 120.0 | 138 | 137 | 135 | 135 | 135 | 136 | 137 | 139 | 141 |
| | 122.5 | 136 | 135 | 133 | 132 | 132 | 133 | 135 | 137 | 139 |
| | 125.0 | 133 | 132 | 131 | 129 | 129 | 131 | 132 | 134 | 136 |
| | 127.5 | 130 | 128 | 127 | 126 | 126 | 127 | 129 | 131 | 133 |
| | 130.0 | 126 | 125 | 124 | 123 | 123 | 124 | 125 | 127 | 129 |
| | 132.5 | 123 | 121 | 120 | 119 | 119 | 120 | 121 | 123 | 125 |
| | 135.0 | 119 | 117 | 116 | 115 | 115 | 116 | 117 | 119 | 121 |
| A n g l e s | 137.5 | 114 | 112 | 111 | 110 | 110 | 111 | 112 | 114 | 116 |
| | 140.0 | 109 | 107 | 106 | 106 | 106 | 107 | 108 | 109 | 112 |
| | 142.5 | 104 | 103 | 101 | 101 | 101 | 102 | 103 | 104 | 106 |
| | 145.0 | 99 | 97 | 96 | 95 | 95 | 96 | 97 | 99 | 101 |
| | 147.5 | 93 | 92 | 91 | 90 | 90 | 91 | 92 | 93 | 95 |
| | 150.0 | 87 | 86 | 85 | 84 | 84 | 85 | 86 | 87 | 89 |
| | 152.5 | 82 | 80 | 79 | 78 | 78 | 79 | 80 | 82 | 83 |
| | 155.0 | 75 | 74 | 73 | 72 | 72 | 73 | 74 | 75 | 77 |
| | 157.5 | 69 | 68 | 67 | 66 | 66 | 67 | 68 | 69 | 71 |
| | 160.0 | 63 | 61 | 61 | 60 | 60 | 61 | 61 | 63 | 64 |
| | 162.5 | 56 | 55 | 54 | 54 | 54 | 55 | 55 | 56 | 58 |
| | 165.0 | 50 | 49 | 48 | 47 | 48 | 48 | 49 | 50 | 51 |
| | 167.5 | 43 | 42 | 42 | 41 | 41 | 42 | 42 | 43 | 44 |
| | 170.0 | 37 | 36 | 35 | 35 | 35 | 36 | 36 | 37 | 38 |
| | 172.5 | 31 | 30 | 29 | 29 | 29 | 29 | 30 | 30 | 31 |
| | 175.0 | 25 | 24 | 24 | 23 | 24 | 24 | 24 | 24 | 25 |
| | 177.5 | 20 | 20 | 20 | 19 | 20 | 20 | 20 | 20 | 20 |
| | 180.0 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 |