

Scaled data based on original data using  
LM-79-08 Approved Method: Electrical and Photometric Measurements of Solid-State  
Lighting Products

Test Report Prepared for  
Cooper Lighting Solutions  
(formerly Eaton)

Brand: FAIL-SAFE

Report Number: P27865

Luminaire Tested: **TRO11-LD4-15W-50-OPL-BK-UNV-EDC1**

Test Date: 05/23/16



**Test Information**

Test Method: LM-79-08  
Report Number: P27865  
Test Lab: INNOVATION CENTER(G2)  
Test Date: 05/23/16  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: FAIL-SAFE  
Catalog Number: TRO11-LD4-15W-50-OPL-BK-UNV-EDC1  
Description: TERRAPIN 11" LED WALL MOUNT WITH OPEN OPAL LENS.  
Light Source: (56) NICHIA 5000  
NF2L757DRT  
Ballast/Driver: (1) OSRAM ELECTRONIC DRIVER PROGRAMMED AT 300mA  
OT25W

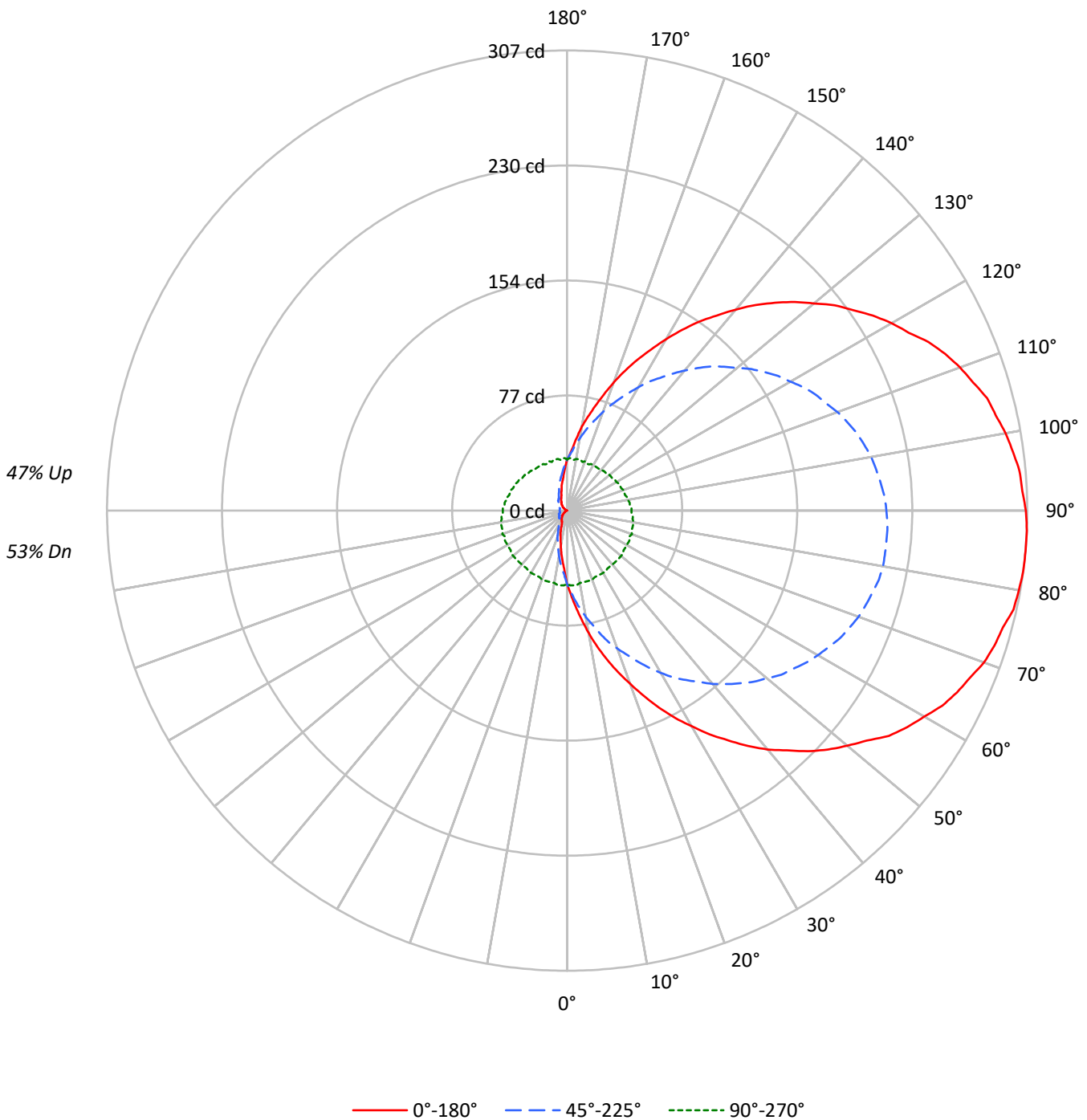
**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 1066.8 lumens  
Efficiency: N/A  
Efficacy: 74.1 lumens/watt  
Spacing Criteria (0/90/45): 2.88 / 1.47 / 2.47  
Luminous Opening: Rectangular w/ Sides (W: 0.92' x L: 0.29' x H: 0.92')  
CIE Type: General Diffuse  
  
Input Watts (W): 14.4  
Input Voltage (V): 120.0  
Input Current (A<sub>in</sub>): 0.120  
Voltage Rise (V): NR  
Power Factor: 0.9963  
Total Harmonic Distortion (THDi): 5.52%  
Frequency (hertz): 60  
Stabilization Time: 0.5 HR  
Operation Time: 24 HR  
Ambient Temperature (°C): 24.5  
Test Distance: 25 FT

TEST NUMBER: P27865

CATALOG NUMBER: TRO11-LD4-15W-50-OPL-BK-UNV-EDC1

### Luminous Intensity Polar Plot





TEST NUMBER: P27865

CATALOG NUMBER: TRO11-LD4-15W-50-OPL-BK-UNV-EDC1

**COEFFICIENT OF UTILIZATION - ZONAL CAVITY METHOD:**

|     |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |    |    |    |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|----|----|----|----|----|----|----|----|----|
| RF  | 20  |     |     |     | 20  |     |     |     | 20 |    |    |    | 20 |    |    |    | 20 |    |
| RC  | 80  |     |     |     | 70  |     |     |     | 50 |    |    |    | 30 |    |    |    | 10 | 0  |
| RW  | 70  | 50  | 30  | 10  | 70  | 50  | 30  | 10  | 50 | 30 | 10 | 50 | 30 | 10 | 50 | 30 | 10 | 0  |
| RCR |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |    |    |    |
| 0   | 108 | 108 | 108 | 108 | 100 | 100 | 100 | 100 | 85 | 85 | 85 | 71 | 71 | 71 | 59 | 59 | 59 | 53 |
| 1   | 93  | 86  | 80  | 75  | 85  | 79  | 74  | 69  | 66 | 62 | 59 | 54 | 51 | 48 | 43 | 41 | 39 | 33 |
| 2   | 83  | 72  | 64  | 57  | 75  | 66  | 59  | 53  | 55 | 49 | 44 | 45 | 40 | 36 | 35 | 32 | 29 | 24 |
| 3   | 74  | 62  | 53  | 45  | 67  | 57  | 48  | 42  | 47 | 40 | 35 | 38 | 33 | 29 | 30 | 26 | 22 | 18 |
| 4   | 67  | 54  | 44  | 37  | 61  | 49  | 41  | 34  | 41 | 34 | 28 | 33 | 27 | 23 | 25 | 21 | 18 | 14 |
| 5   | 61  | 47  | 38  | 31  | 56  | 43  | 35  | 28  | 36 | 29 | 24 | 29 | 23 | 19 | 22 | 18 | 15 | 11 |
| 6   | 56  | 42  | 33  | 26  | 51  | 38  | 30  | 24  | 32 | 25 | 20 | 26 | 20 | 16 | 20 | 16 | 12 | 9  |
| 7   | 51  | 38  | 28  | 22  | 47  | 34  | 26  | 20  | 29 | 22 | 17 | 23 | 18 | 14 | 18 | 14 | 11 | 8  |
| 8   | 48  | 34  | 25  | 19  | 43  | 31  | 23  | 18  | 26 | 19 | 15 | 21 | 16 | 12 | 16 | 12 | 9  | 7  |
| 9   | 44  | 31  | 22  | 17  | 40  | 28  | 21  | 15  | 24 | 17 | 13 | 19 | 14 | 10 | 15 | 11 | 8  | 6  |
| 10  | 41  | 28  | 20  | 15  | 38  | 26  | 18  | 14  | 22 | 16 | 11 | 18 | 13 | 9  | 14 | 10 | 7  | 5  |

**AVERAGE LUMINANCE (cd/sqm):**

|     | 0°   | 90°  | 180° |
|-----|------|------|------|
| 0°  | 1973 | 1973 | 1973 |
| 5°  | 2029 | 1858 | 1078 |
| 10° | 2183 | 1703 | 631  |
| 15° | 2330 | 1611 | 385  |
| 20° | 2458 | 1539 | 220  |
| 25° | 2612 | 1454 | 144  |
| 30° | 2742 | 1415 | 116  |
| 35° | 2872 | 1359 | 92   |
| 40° | 3006 | 1343 | 72   |
| 45° | 3120 | 1338 | 55   |
| 50° | 3220 | 1343 | 40   |
| 55° | 3351 | 1330 | 26   |
| 60° | 3436 | 1356 | 25   |
| 65° | 3532 | 1394 | 12   |
| 70° | 3616 | 1445 | 12   |
| 75° | 3678 | 1479 | 12   |
| 80° | 3769 | 1564 | 12   |
| 85° | 3841 | 1635 | 13   |



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**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 4.8    | 0.4       |
| 10°-20°   | 15.5   | 1.5       |
| 20°-30°   | 29.1   | 2.7       |
| 30°-40°   | 45.9   | 4.3       |
| 40°-50°   | 64.5   | 6.0       |
| 50°-60°   | 82.5   | 7.7       |
| 60°-70°   | 98.1   | 9.2       |
| 70°-80°   | 108.9  | 10.2      |
| 80°-90°   | 113.5  | 10.6      |
| 90°-100°  | 111.4  | 10.4      |
| 100°-110° | 103.0  | 9.7       |
| 110°-120° | 89.3   | 8.4       |
| 120°-130° | 72.5   | 6.8       |
| 130°-140° | 54.3   | 5.1       |
| 140°-150° | 36.8   | 3.5       |
| 150°-160° | 22.1   | 2.1       |
| 160°-170° | 11.2   | 1.0       |
| 170°-180° | 3.3    | 0.3       |
| 0°-30°    | 49.4   | 4.6       |
| 0°-40°    | 95.4   | 8.9       |
| 0°-60°    | 242.3  | 22.7      |
| 0°-90°    | 562.9  | 52.8      |
| 90°-120°  | 303.7  | 28.5      |
| 90°-150°  | 467.3  | 43.8      |
| 90°-180°  | 504.0  | 47.2      |
| 0°-180°   | 1066.8 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°  | 45° | 90° | 135° | 180° | Flux |
|------|-----|-----|-----|------|------|------|
| 0°   | 49  | 49  | 49  | 49   | 49   |      |
| 5°   | 64  | 60  | 50  | 39   | 34   | 7    |
| 15°  | 103 | 85  | 49  | 24   | 17   | 30   |
| 25°  | 145 | 111 | 48  | 14   | 8    | 68   |
| 35°  | 187 | 138 | 47  | 9    | 6    | 118  |
| 45°  | 227 | 163 | 47  | 7    | 4    | 176  |
| 55°  | 262 | 184 | 46  | 6    | 2    | 234  |
| 65°  | 287 | 201 | 46  | 6    | 1    | 284  |
| 75°  | 301 | 211 | 45  | 5    | 1    | 319  |
| 85°  | 307 | 214 | 44  | 5    | 1    | 251  |
| 90°  | 306 | 213 | 43  | 5    | 1    | 168  |
| 95°  | 303 | 210 | 42  | 5    | 1    | 246  |
| 105° | 290 | 200 | 40  | 5    | 1    | 306  |
| 115° | 266 | 183 | 39  | 6    | 1    | 263  |
| 125° | 233 | 161 | 37  | 7    | 3    | 209  |
| 135° | 196 | 136 | 36  | 8    | 5    | 152  |
| 145° | 154 | 108 | 35  | 10   | 7    | 97   |
| 155° | 111 | 82  | 34  | 13   | 9    | 52   |
| 165° | 72  | 59  | 35  | 19   | 14   | 21   |
| 175° | 42  | 40  | 35  | 28   | 25   | 4    |
| 180° | 34  | 34  | 34  | 34   | 34   |      |



TEST NUMBER: P27865

CATALOG NUMBER: TRO11-LD4-15W-50-OPL-BK-UNV-EDC1

**CANDELA DISTRIBUTION (FULL):**

|        | 0°  | 5°  | 10° | 15° | 20° | 22.5° | 25° | 30° | 35° | 40° | 45° |
|--------|-----|-----|-----|-----|-----|-------|-----|-----|-----|-----|-----|
| 0°     | 49  | 49  | 49  | 49  | 49  | 49    | 49  | 49  | 49  | 49  | 49  |
| 2.5°   | 56  | 56  | 56  | 56  | 56  | 55    | 55  | 55  | 55  | 55  | 54  |
| 5°     | 64  | 64  | 64  | 64  | 63  | 63    | 63  | 62  | 62  | 61  | 60  |
| 7.5°   | 73  | 73  | 73  | 72  | 72  | 71    | 71  | 70  | 69  | 68  | 66  |
| 10°    | 83  | 82  | 81  | 81  | 80  | 79    | 78  | 77  | 76  | 74  | 72  |
| 12.5°  | 93  | 92  | 91  | 90  | 89  | 88    | 87  | 85  | 83  | 81  | 78  |
| 15°    | 103 | 102 | 101 | 101 | 99  | 98    | 97  | 94  | 91  | 88  | 85  |
| 17.5°  | 113 | 112 | 112 | 110 | 108 | 107   | 106 | 103 | 99  | 96  | 92  |
| 20°    | 123 | 123 | 122 | 120 | 118 | 116   | 115 | 111 | 107 | 103 | 98  |
| 22.5°  | 134 | 133 | 132 | 130 | 127 | 125   | 124 | 120 | 115 | 110 | 104 |
| 25°    | 145 | 144 | 143 | 141 | 137 | 135   | 134 | 129 | 124 | 118 | 111 |
| 27.5°  | 156 | 155 | 153 | 151 | 147 | 146   | 143 | 138 | 132 | 125 | 118 |
| 30°    | 166 | 166 | 164 | 162 | 157 | 155   | 153 | 147 | 141 | 133 | 125 |
| 32.5°  | 177 | 176 | 174 | 171 | 167 | 165   | 162 | 156 | 148 | 140 | 132 |
| 35°    | 187 | 186 | 184 | 181 | 176 | 174   | 171 | 164 | 156 | 147 | 138 |
| 37.5°  | 198 | 197 | 195 | 191 | 186 | 184   | 180 | 173 | 164 | 155 | 144 |
| 40°    | 208 | 207 | 205 | 201 | 196 | 193   | 189 | 181 | 172 | 162 | 151 |
| 42.5°  | 217 | 217 | 214 | 210 | 204 | 201   | 198 | 189 | 179 | 169 | 157 |
| 45°    | 227 | 226 | 224 | 219 | 213 | 210   | 206 | 197 | 187 | 176 | 163 |
| 47.5°  | 236 | 235 | 232 | 228 | 222 | 218   | 214 | 205 | 194 | 182 | 169 |
| 50°    | 244 | 243 | 241 | 236 | 229 | 226   | 221 | 212 | 201 | 188 | 174 |
| 52.5°  | 252 | 251 | 248 | 243 | 237 | 233   | 228 | 219 | 207 | 194 | 180 |
| 55°    | 262 | 261 | 255 | 250 | 244 | 240   | 235 | 225 | 213 | 199 | 184 |
| 57.5°  | 269 | 268 | 264 | 258 | 250 | 246   | 241 | 231 | 218 | 204 | 189 |
| 60°    | 275 | 274 | 271 | 266 | 256 | 252   | 247 | 236 | 223 | 209 | 193 |
| 62.5°  | 282 | 280 | 277 | 272 | 264 | 259   | 252 | 241 | 228 | 213 | 197 |
| 65°    | 287 | 286 | 282 | 277 | 270 | 265   | 259 | 246 | 233 | 218 | 201 |
| 67.5°  | 291 | 290 | 287 | 281 | 273 | 269   | 263 | 250 | 236 | 221 | 204 |
| 70°    | 296 | 295 | 291 | 285 | 278 | 273   | 268 | 254 | 240 | 224 | 207 |
| 72.5°  | 299 | 298 | 294 | 288 | 281 | 276   | 271 | 258 | 243 | 227 | 209 |
| 75°    | 301 | 300 | 297 | 291 | 283 | 279   | 273 | 261 | 245 | 229 | 211 |
| 77.5°  | 305 | 303 | 300 | 294 | 286 | 282   | 276 | 263 | 247 | 231 | 213 |
| 80°    | 306 | 305 | 301 | 295 | 288 | 283   | 278 | 265 | 248 | 232 | 214 |
| 82.5°  | 307 | 306 | 302 | 297 | 289 | 284   | 278 | 266 | 249 | 233 | 214 |
| 85°    | 307 | 306 | 302 | 297 | 289 | 284   | 279 | 266 | 249 | 233 | 214 |
| 87.5°  | 307 | 306 | 302 | 297 | 289 | 284   | 278 | 266 | 249 | 232 | 214 |
| 90°    | 306 | 305 | 301 | 296 | 288 | 283   | 277 | 265 | 248 | 232 | 213 |
| 92.5°  | 304 | 303 | 300 | 294 | 286 | 281   | 276 | 264 | 247 | 230 | 212 |
| 95°    | 303 | 301 | 298 | 292 | 285 | 279   | 274 | 261 | 245 | 228 | 210 |
| 97.5°  | 300 | 299 | 296 | 290 | 282 | 278   | 272 | 259 | 243 | 226 | 208 |
| 100°   | 297 | 296 | 293 | 287 | 279 | 275   | 269 | 254 | 240 | 224 | 206 |
| 102.5° | 293 | 292 | 289 | 283 | 275 | 271   | 265 | 251 | 237 | 221 | 203 |
| 105°   | 290 | 288 | 285 | 280 | 272 | 267   | 260 | 247 | 233 | 217 | 200 |
| 107.5° | 284 | 283 | 280 | 274 | 267 | 262   | 254 | 243 | 229 | 213 | 196 |
| 110°   | 279 | 278 | 274 | 269 | 260 | 255   | 249 | 238 | 224 | 209 | 192 |



TEST NUMBER: P27865

CATALOG NUMBER: TRO11-LD4-15W-50-OPL-BK-UNV-EDC1

**CANDELA DISTRIBUTION (continued):**

|        | 0°  | 5°  | 10° | 15° | 20° | 22.5° | 25° | 30° | 35° | 40° | 45° |
|--------|-----|-----|-----|-----|-----|-------|-----|-----|-----|-----|-----|
| 112.5° | 273 | 272 | 268 | 263 | 253 | 249   | 244 | 232 | 219 | 204 | 187 |
| 115°   | 266 | 265 | 262 | 255 | 247 | 242   | 238 | 227 | 214 | 199 | 183 |
| 117.5° | 257 | 256 | 253 | 248 | 241 | 236   | 231 | 221 | 208 | 194 | 178 |
| 120°   | 250 | 249 | 245 | 241 | 234 | 229   | 225 | 214 | 202 | 188 | 172 |
| 122.5° | 242 | 241 | 238 | 233 | 226 | 222   | 217 | 207 | 195 | 182 | 167 |
| 125°   | 233 | 233 | 230 | 225 | 218 | 214   | 210 | 200 | 188 | 175 | 161 |
| 127.5° | 225 | 224 | 221 | 217 | 210 | 206   | 202 | 192 | 181 | 169 | 155 |
| 130°   | 215 | 215 | 212 | 208 | 201 | 198   | 193 | 184 | 173 | 162 | 148 |
| 132.5° | 206 | 205 | 203 | 199 | 193 | 189   | 185 | 176 | 166 | 155 | 142 |
| 135°   | 196 | 196 | 193 | 189 | 184 | 180   | 176 | 168 | 158 | 148 | 136 |
| 137.5° | 186 | 185 | 183 | 179 | 174 | 171   | 167 | 159 | 150 | 140 | 129 |
| 140°   | 175 | 175 | 172 | 169 | 164 | 161   | 157 | 150 | 141 | 132 | 122 |
| 142.5° | 164 | 164 | 161 | 158 | 154 | 151   | 148 | 141 | 133 | 124 | 115 |
| 145°   | 154 | 153 | 151 | 148 | 144 | 142   | 138 | 132 | 125 | 117 | 108 |
| 147.5° | 143 | 143 | 140 | 138 | 134 | 132   | 129 | 123 | 117 | 110 | 102 |
| 150°   | 132 | 132 | 130 | 128 | 124 | 122   | 120 | 115 | 109 | 102 | 95  |
| 152.5° | 121 | 121 | 119 | 117 | 113 | 112   | 110 | 106 | 100 | 94  | 88  |
| 155°   | 111 | 110 | 108 | 107 | 104 | 102   | 101 | 97  | 92  | 87  | 82  |
| 157.5° | 101 | 100 | 99  | 97  | 95  | 94    | 92  | 89  | 85  | 81  | 76  |
| 160°   | 91  | 91  | 89  | 88  | 86  | 85    | 84  | 81  | 78  | 74  | 70  |
| 162.5° | 81  | 81  | 80  | 79  | 77  | 76    | 75  | 73  | 70  | 67  | 64  |
| 165°   | 72  | 72  | 71  | 70  | 69  | 68    | 68  | 66  | 64  | 62  | 59  |
| 167.5° | 64  | 64  | 63  | 63  | 62  | 61    | 61  | 59  | 58  | 56  | 54  |
| 170°   | 57  | 56  | 56  | 55  | 55  | 54    | 54  | 53  | 52  | 51  | 49  |
| 172.5° | 49  | 49  | 49  | 48  | 48  | 48    | 48  | 47  | 46  | 46  | 45  |
| 175°   | 42  | 43  | 43  | 42  | 42  | 42    | 42  | 42  | 41  | 41  | 40  |
| 177.5° | 37  | 37  | 37  | 37  | 37  | 37    | 37  | 37  | 37  | 37  | 37  |
| 180°   | 34  | 34  | 34  | 34  | 34  | 34    | 34  | 34  | 34  | 34  | 34  |



TEST NUMBER: P27865

CATALOG NUMBER: TRO11-LD4-15W-50-OPL-BK-UNV-EDC1

**CANDELA DISTRIBUTION (continued):**

|        | 50° | 55° | 60° | 65° | 67.5° | 70° | 75° | 80° | 85° | 90° | 95° |
|--------|-----|-----|-----|-----|-------|-----|-----|-----|-----|-----|-----|
| 0°     | 49  | 49  | 49  | 49  | 49    | 49  | 49  | 49  | 49  | 49  | 49  |
| 2.5°   | 54  | 54  | 53  | 53  | 52    | 52  | 52  | 51  | 50  | 50  | 49  |
| 5°     | 59  | 58  | 57  | 56  | 56    | 55  | 54  | 52  | 51  | 50  | 48  |
| 7.5°   | 65  | 63  | 61  | 59  | 59    | 58  | 56  | 54  | 52  | 50  | 48  |
| 10°    | 70  | 67  | 65  | 63  | 61    | 60  | 57  | 55  | 52  | 49  | 47  |
| 12.5°  | 76  | 72  | 69  | 66  | 64    | 63  | 59  | 56  | 53  | 49  | 46  |
| 15°    | 81  | 77  | 74  | 69  | 68    | 65  | 61  | 57  | 53  | 49  | 46  |
| 17.5°  | 87  | 82  | 78  | 73  | 70    | 68  | 63  | 58  | 54  | 49  | 45  |
| 20°    | 93  | 87  | 82  | 76  | 73    | 70  | 65  | 59  | 54  | 49  | 44  |
| 22.5°  | 99  | 92  | 86  | 79  | 76    | 73  | 66  | 60  | 54  | 48  | 43  |
| 25°    | 104 | 97  | 90  | 83  | 79    | 75  | 68  | 61  | 55  | 48  | 42  |
| 27.5°  | 110 | 103 | 95  | 86  | 82    | 78  | 70  | 62  | 55  | 48  | 42  |
| 30°    | 116 | 108 | 99  | 90  | 85    | 81  | 72  | 63  | 55  | 48  | 41  |
| 32.5°  | 122 | 113 | 103 | 93  | 88    | 83  | 73  | 64  | 56  | 48  | 41  |
| 35°    | 128 | 117 | 107 | 96  | 90    | 85  | 75  | 65  | 56  | 47  | 40  |
| 37.5°  | 134 | 122 | 111 | 99  | 93    | 88  | 76  | 66  | 56  | 47  | 39  |
| 40°    | 139 | 127 | 115 | 102 | 96    | 90  | 78  | 67  | 57  | 47  | 39  |
| 42.5°  | 144 | 132 | 118 | 105 | 99    | 92  | 80  | 68  | 57  | 47  | 38  |
| 45°    | 150 | 136 | 122 | 108 | 101   | 94  | 81  | 69  | 57  | 47  | 38  |
| 47.5°  | 155 | 140 | 126 | 111 | 103   | 96  | 82  | 69  | 58  | 47  | 38  |
| 50°    | 160 | 145 | 129 | 113 | 106   | 98  | 84  | 70  | 58  | 47  | 37  |
| 52.5°  | 164 | 149 | 132 | 116 | 108   | 100 | 85  | 71  | 58  | 47  | 37  |
| 55°    | 169 | 152 | 135 | 118 | 110   | 102 | 86  | 71  | 58  | 46  | 36  |
| 57.5°  | 173 | 156 | 138 | 120 | 112   | 103 | 87  | 72  | 58  | 46  | 36  |
| 60°    | 176 | 159 | 140 | 122 | 113   | 105 | 88  | 72  | 58  | 46  | 36  |
| 62.5°  | 180 | 162 | 143 | 124 | 115   | 106 | 89  | 73  | 58  | 46  | 35  |
| 65°    | 183 | 164 | 145 | 126 | 116   | 107 | 89  | 73  | 59  | 46  | 35  |
| 67.5°  | 186 | 167 | 147 | 127 | 117   | 108 | 90  | 73  | 59  | 45  | 35  |
| 70°    | 189 | 169 | 149 | 128 | 119   | 109 | 91  | 74  | 59  | 46  | 35  |
| 72.5°  | 191 | 171 | 150 | 129 | 119   | 110 | 91  | 74  | 58  | 45  | 34  |
| 75°    | 192 | 172 | 151 | 130 | 120   | 110 | 91  | 74  | 58  | 45  | 34  |
| 77.5°  | 193 | 173 | 152 | 131 | 120   | 110 | 91  | 74  | 58  | 45  | 34  |
| 80°    | 194 | 174 | 152 | 131 | 121   | 111 | 91  | 74  | 58  | 45  | 33  |
| 82.5°  | 195 | 174 | 152 | 131 | 121   | 110 | 91  | 73  | 58  | 44  | 33  |
| 85°    | 195 | 174 | 152 | 131 | 120   | 110 | 90  | 73  | 57  | 44  | 33  |
| 87.5°  | 194 | 173 | 152 | 130 | 120   | 109 | 90  | 72  | 57  | 43  | 32  |
| 90°    | 193 | 173 | 151 | 129 | 119   | 109 | 89  | 72  | 56  | 43  | 32  |
| 92.5°  | 192 | 171 | 150 | 128 | 118   | 108 | 89  | 71  | 56  | 43  | 32  |
| 95°    | 191 | 170 | 149 | 127 | 117   | 107 | 88  | 70  | 55  | 42  | 31  |
| 97.5°  | 189 | 168 | 147 | 126 | 116   | 106 | 87  | 70  | 55  | 42  | 31  |
| 100°   | 187 | 166 | 145 | 124 | 114   | 104 | 86  | 69  | 54  | 41  | 31  |
| 102.5° | 184 | 164 | 143 | 122 | 113   | 103 | 85  | 68  | 53  | 41  | 31  |
| 105°   | 181 | 161 | 141 | 120 | 111   | 101 | 83  | 67  | 53  | 40  | 31  |
| 107.5° | 178 | 158 | 138 | 118 | 109   | 100 | 82  | 66  | 52  | 40  | 30  |
| 110°   | 174 | 155 | 135 | 116 | 107   | 98  | 81  | 65  | 51  | 40  | 30  |





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CATALOG NUMBER: TRO11-LD4-15W-50-OPL-BK-UNV-EDC1

**CANDELA DISTRIBUTION (continued):**

|        | 50° | 55° | 60° | 65° | 67.5° | 70° | 75° | 80° | 85° | 90° | 95° |
|--------|-----|-----|-----|-----|-------|-----|-----|-----|-----|-----|-----|
| 112.5° | 170 | 151 | 132 | 113 | 104   | 95  | 79  | 64  | 51  | 39  | 30  |
| 115°   | 165 | 147 | 129 | 111 | 102   | 93  | 77  | 63  | 50  | 39  | 30  |
| 117.5° | 161 | 143 | 125 | 108 | 99    | 91  | 76  | 62  | 49  | 39  | 30  |
| 120°   | 156 | 139 | 122 | 105 | 97    | 89  | 74  | 60  | 48  | 38  | 30  |
| 122.5° | 151 | 135 | 118 | 102 | 94    | 87  | 72  | 59  | 48  | 38  | 30  |
| 125°   | 146 | 130 | 114 | 99  | 91    | 84  | 71  | 58  | 47  | 37  | 29  |
| 127.5° | 140 | 125 | 110 | 96  | 89    | 82  | 69  | 57  | 46  | 37  | 29  |
| 130°   | 135 | 120 | 106 | 92  | 86    | 79  | 67  | 55  | 45  | 37  | 29  |
| 132.5° | 129 | 116 | 102 | 89  | 83    | 77  | 65  | 54  | 45  | 36  | 29  |
| 135°   | 123 | 111 | 98  | 86  | 80    | 74  | 63  | 53  | 44  | 36  | 29  |
| 137.5° | 117 | 106 | 94  | 83  | 77    | 71  | 61  | 52  | 43  | 36  | 29  |
| 140°   | 111 | 100 | 90  | 79  | 74    | 69  | 59  | 50  | 42  | 35  | 29  |
| 142.5° | 105 | 95  | 85  | 76  | 71    | 66  | 57  | 49  | 42  | 35  | 29  |
| 145°   | 99  | 90  | 81  | 72  | 68    | 63  | 55  | 48  | 41  | 35  | 30  |
| 147.5° | 94  | 86  | 77  | 69  | 65    | 61  | 54  | 47  | 40  | 35  | 30  |
| 150°   | 88  | 81  | 73  | 66  | 62    | 59  | 52  | 46  | 40  | 35  | 30  |
| 152.5° | 82  | 76  | 69  | 62  | 59    | 56  | 50  | 44  | 39  | 35  | 30  |
| 155°   | 77  | 71  | 65  | 59  | 56    | 54  | 48  | 43  | 39  | 34  | 31  |
| 157.5° | 71  | 66  | 61  | 56  | 54    | 52  | 47  | 42  | 38  | 34  | 31  |
| 160°   | 66  | 62  | 58  | 54  | 51    | 49  | 45  | 42  | 38  | 35  | 31  |
| 162.5° | 61  | 58  | 54  | 50  | 49    | 47  | 44  | 40  | 37  | 34  | 32  |
| 165°   | 56  | 54  | 51  | 48  | 47    | 45  | 42  | 40  | 37  | 35  | 32  |
| 167.5° | 52  | 50  | 48  | 45  | 44    | 43  | 41  | 39  | 37  | 35  | 33  |
| 170°   | 48  | 46  | 45  | 43  | 42    | 41  | 40  | 38  | 36  | 35  | 33  |
| 172.5° | 44  | 43  | 42  | 40  | 40    | 39  | 38  | 37  | 36  | 34  | 33  |
| 175°   | 40  | 39  | 39  | 38  | 38    | 38  | 37  | 36  | 35  | 35  | 34  |
| 177.5° | 37  | 37  | 36  | 36  | 36    | 36  | 36  | 35  | 35  | 35  | 34  |
| 180°   | 34  | 34  | 34  | 34  | 34    | 34  | 34  | 34  | 34  | 34  | 34  |



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**CANDELA DISTRIBUTION (continued):**

|        | 100° | 105° | 110° | 112.5° | 115° | 120° | 125° | 130° | 135° | 140° | 145° |
|--------|------|------|------|--------|------|------|------|------|------|------|------|
| 0°     | 49   | 49   | 49   | 49     | 49   | 49   | 49   | 49   | 49   | 49   | 49   |
| 2.5°   | 48   | 48   | 47   | 47     | 46   | 45   | 45   | 44   | 43   | 43   | 42   |
| 5°     | 47   | 46   | 45   | 44     | 43   | 42   | 41   | 40   | 39   | 38   | 37   |
| 7.5°   | 46   | 44   | 42   | 41     | 40   | 39   | 37   | 36   | 35   | 33   | 32   |
| 10°    | 45   | 42   | 40   | 39     | 38   | 36   | 34   | 32   | 31   | 29   | 28   |
| 12.5°  | 43   | 40   | 38   | 36     | 35   | 33   | 31   | 29   | 27   | 26   | 24   |
| 15°    | 42   | 39   | 36   | 34     | 33   | 30   | 28   | 26   | 24   | 22   | 21   |
| 17.5°  | 41   | 37   | 34   | 32     | 31   | 28   | 25   | 23   | 21   | 19   | 18   |
| 20°    | 39   | 35   | 32   | 30     | 28   | 25   | 23   | 20   | 19   | 17   | 15   |
| 22.5°  | 38   | 34   | 30   | 28     | 26   | 23   | 20   | 18   | 16   | 14   | 13   |
| 25°    | 37   | 32   | 28   | 26     | 24   | 21   | 18   | 16   | 14   | 13   | 11   |
| 27.5°  | 36   | 31   | 27   | 25     | 23   | 19   | 17   | 14   | 12   | 11   | 10   |
| 30°    | 35   | 30   | 25   | 23     | 21   | 18   | 15   | 13   | 11   | 10   | 9    |
| 32.5°  | 34   | 29   | 24   | 22     | 20   | 16   | 14   | 12   | 10   | 9    | 8    |
| 35°    | 33   | 27   | 23   | 20     | 18   | 15   | 12   | 10   | 9    | 8    | 8    |
| 37.5°  | 32   | 27   | 21   | 19     | 17   | 14   | 11   | 9    | 8    | 8    | 7    |
| 40°    | 32   | 26   | 20   | 18     | 16   | 13   | 10   | 9    | 8    | 7    | 7    |
| 42.5°  | 31   | 25   | 19   | 17     | 15   | 12   | 10   | 8    | 8    | 7    | 7    |
| 45°    | 30   | 24   | 19   | 16     | 14   | 11   | 9    | 8    | 7    | 7    | 6    |
| 47.5°  | 30   | 23   | 18   | 15     | 14   | 11   | 9    | 8    | 7    | 7    | 6    |
| 50°    | 29   | 22   | 17   | 15     | 13   | 10   | 8    | 8    | 7    | 6    | 6    |
| 52.5°  | 28   | 22   | 16   | 14     | 12   | 9    | 8    | 8    | 7    | 6    | 5    |
| 55°    | 28   | 21   | 16   | 14     | 12   | 9    | 8    | 7    | 6    | 6    | 5    |
| 57.5°  | 27   | 21   | 15   | 13     | 11   | 9    | 8    | 7    | 6    | 6    | 5    |
| 60°    | 27   | 20   | 15   | 13     | 11   | 9    | 8    | 7    | 6    | 5    | 5    |
| 62.5°  | 27   | 20   | 14   | 12     | 11   | 8    | 8    | 7    | 6    | 5    | 4    |
| 65°    | 26   | 19   | 14   | 12     | 10   | 9    | 8    | 7    | 6    | 5    | 4    |
| 67.5°  | 26   | 19   | 14   | 11     | 10   | 8    | 7    | 7    | 6    | 5    | 4    |
| 70°    | 26   | 19   | 13   | 11     | 10   | 8    | 8    | 7    | 6    | 5    | 4    |
| 72.5°  | 25   | 18   | 13   | 11     | 10   | 8    | 7    | 6    | 5    | 5    | 4    |
| 75°    | 25   | 18   | 13   | 11     | 9    | 8    | 7    | 6    | 5    | 4    | 4    |
| 77.5°  | 25   | 18   | 13   | 11     | 9    | 8    | 7    | 6    | 5    | 4    | 3    |
| 80°    | 25   | 18   | 13   | 11     | 9    | 8    | 7    | 6    | 5    | 4    | 3    |
| 82.5°  | 24   | 17   | 12   | 11     | 9    | 8    | 7    | 6    | 5    | 4    | 3    |
| 85°    | 24   | 17   | 12   | 10     | 9    | 8    | 7    | 6    | 5    | 4    | 3    |
| 87.5°  | 24   | 17   | 12   | 10     | 9    | 8    | 7    | 6    | 5    | 4    | 3    |
| 90°    | 23   | 17   | 12   | 10     | 9    | 8    | 7    | 6    | 5    | 4    | 3    |
| 92.5°  | 23   | 17   | 12   | 10     | 9    | 8    | 7    | 6    | 5    | 4    | 3    |
| 95°    | 23   | 17   | 12   | 10     | 9    | 8    | 7    | 6    | 5    | 4    | 3    |
| 97.5°  | 23   | 17   | 12   | 10     | 9    | 8    | 7    | 6    | 5    | 4    | 3    |
| 100°   | 23   | 17   | 12   | 10     | 9    | 8    | 7    | 6    | 5    | 4    | 3    |
| 102.5° | 23   | 17   | 12   | 11     | 9    | 8    | 7    | 6    | 5    | 4    | 3    |
| 105°   | 23   | 17   | 12   | 11     | 9    | 8    | 7    | 6    | 5    | 4    | 3    |
| 107.5° | 23   | 17   | 12   | 11     | 9    | 8    | 7    | 6    | 5    | 5    | 4    |
| 110°   | 23   | 17   | 12   | 11     | 10   | 8    | 7    | 6    | 6    | 5    | 4    |



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**CANDELA DISTRIBUTION (continued):**

|        | 100° | 105° | 110° | 112.5° | 115° | 120° | 125° | 130° | 135° | 140° | 145° |
|--------|------|------|------|--------|------|------|------|------|------|------|------|
| 112.5° | 22   | 17   | 13   | 11     | 10   | 8    | 8    | 7    | 6    | 5    | 4    |
| 115°   | 23   | 17   | 13   | 11     | 10   | 9    | 8    | 7    | 6    | 5    | 4    |
| 117.5° | 23   | 17   | 13   | 12     | 10   | 9    | 8    | 7    | 6    | 5    | 5    |
| 120°   | 23   | 18   | 14   | 12     | 11   | 9    | 8    | 7    | 7    | 6    | 5    |
| 122.5° | 23   | 18   | 14   | 12     | 11   | 9    | 8    | 8    | 7    | 6    | 5    |
| 125°   | 23   | 18   | 14   | 13     | 11   | 10   | 9    | 8    | 7    | 6    | 6    |
| 127.5° | 23   | 18   | 15   | 13     | 12   | 10   | 9    | 8    | 7    | 7    | 6    |
| 130°   | 23   | 19   | 15   | 13     | 12   | 10   | 9    | 8    | 8    | 7    | 6    |
| 132.5° | 24   | 19   | 15   | 14     | 13   | 11   | 9    | 9    | 8    | 7    | 7    |
| 135°   | 24   | 19   | 16   | 14     | 13   | 11   | 10   | 9    | 8    | 8    | 7    |
| 137.5° | 24   | 20   | 16   | 15     | 14   | 12   | 10   | 9    | 9    | 8    | 8    |
| 140°   | 24   | 20   | 17   | 16     | 14   | 12   | 11   | 10   | 9    | 8    | 8    |
| 142.5° | 25   | 21   | 18   | 16     | 15   | 13   | 11   | 10   | 9    | 9    | 8    |
| 145°   | 25   | 21   | 18   | 17     | 16   | 14   | 12   | 11   | 10   | 9    | 9    |
| 147.5° | 26   | 22   | 19   | 18     | 16   | 14   | 13   | 11   | 10   | 10   | 9    |
| 150°   | 26   | 23   | 20   | 18     | 17   | 15   | 14   | 12   | 11   | 10   | 10   |
| 152.5° | 27   | 23   | 21   | 19     | 18   | 16   | 15   | 13   | 12   | 11   | 10   |
| 155°   | 27   | 24   | 22   | 20     | 19   | 17   | 16   | 14   | 13   | 12   | 11   |
| 157.5° | 28   | 25   | 23   | 22     | 20   | 19   | 17   | 16   | 14   | 13   | 13   |
| 160°   | 29   | 26   | 24   | 23     | 22   | 20   | 18   | 17   | 16   | 15   | 14   |
| 162.5° | 29   | 27   | 25   | 24     | 23   | 21   | 20   | 18   | 17   | 16   | 15   |
| 165°   | 30   | 28   | 26   | 25     | 24   | 23   | 21   | 20   | 19   | 18   | 17   |
| 167.5° | 31   | 29   | 27   | 27     | 26   | 25   | 23   | 22   | 21   | 20   | 19   |
| 170°   | 32   | 30   | 29   | 28     | 27   | 26   | 25   | 24   | 23   | 22   | 22   |
| 172.5° | 32   | 31   | 30   | 29     | 29   | 28   | 27   | 26   | 25   | 24   | 24   |
| 175°   | 33   | 32   | 31   | 31     | 31   | 30   | 29   | 28   | 28   | 27   | 27   |
| 177.5° | 34   | 33   | 33   | 33     | 33   | 32   | 32   | 31   | 31   | 30   | 30   |
| 180°   | 34   | 34   | 34   | 34     | 34   | 34   | 34   | 34   | 34   | 34   | 34   |



TEST NUMBER: P27865

CATALOG NUMBER: TRO11-LD4-15W-50-OPL-BK-UNV-EDC1

**CANDELA DISTRIBUTION (continued):**

|        | 150° | 155° | 157.5° | 160° | 165° | 170° | 175° | 180° |
|--------|------|------|--------|------|------|------|------|------|
| 0°     | 49   | 49   | 49     | 49   | 49   | 49   | 49   | 49   |
| 2.5°   | 42   | 41   | 41     | 41   | 41   | 41   | 40   | 40   |
| 5°     | 36   | 36   | 35     | 35   | 35   | 35   | 34   | 34   |
| 7.5°   | 31   | 31   | 30     | 30   | 30   | 29   | 29   | 29   |
| 10°    | 27   | 26   | 26     | 25   | 25   | 24   | 24   | 24   |
| 12.5°  | 23   | 22   | 22     | 21   | 21   | 20   | 20   | 20   |
| 15°    | 20   | 19   | 18     | 18   | 17   | 17   | 17   | 17   |
| 17.5°  | 17   | 16   | 15     | 15   | 14   | 14   | 14   | 14   |
| 20°    | 14   | 13   | 13     | 12   | 12   | 12   | 11   | 11   |
| 22.5°  | 12   | 11   | 11     | 10   | 10   | 10   | 9    | 9    |
| 25°    | 10   | 10   | 9      | 9    | 9    | 8    | 8    | 8    |
| 27.5°  | 9    | 8    | 8      | 8    | 8    | 8    | 8    | 8    |
| 30°    | 8    | 8    | 8      | 8    | 7    | 7    | 7    | 7    |
| 32.5°  | 8    | 7    | 7      | 7    | 7    | 7    | 7    | 7    |
| 35°    | 7    | 7    | 7      | 7    | 7    | 6    | 6    | 6    |
| 37.5°  | 7    | 7    | 7      | 6    | 6    | 6    | 6    | 6    |
| 40°    | 7    | 6    | 6      | 6    | 6    | 5    | 5    | 5    |
| 42.5°  | 6    | 6    | 6      | 5    | 5    | 5    | 5    | 5    |
| 45°    | 6    | 5    | 5      | 5    | 5    | 5    | 4    | 4    |
| 47.5°  | 6    | 5    | 5      | 5    | 4    | 4    | 4    | 4    |
| 50°    | 5    | 5    | 4      | 4    | 4    | 4    | 3    | 3    |
| 52.5°  | 5    | 4    | 4      | 4    | 4    | 3    | 3    | 3    |
| 55°    | 5    | 4    | 4      | 4    | 3    | 3    | 3    | 2    |
| 57.5°  | 4    | 4    | 3      | 3    | 3    | 2    | 2    | 2    |
| 60°    | 4    | 3    | 3      | 3    | 2    | 2    | 2    | 2    |
| 62.5°  | 4    | 3    | 3      | 3    | 2    | 2    | 1    | 1    |
| 65°    | 4    | 3    | 3      | 2    | 2    | 2    | 1    | 1    |
| 67.5°  | 3    | 3    | 2      | 2    | 1    | 1    | 1    | 1    |
| 70°    | 3    | 2    | 2      | 2    | 1    | 1    | 1    | 1    |
| 72.5°  | 3    | 2    | 2      | 2    | 1    | 1    | 1    | 1    |
| 75°    | 3    | 2    | 2      | 2    | 1    | 1    | 1    | 1    |
| 77.5°  | 3    | 2    | 2      | 1    | 1    | 1    | 1    | 1    |
| 80°    | 3    | 2    | 2      | 1    | 1    | 1    | 1    | 1    |
| 82.5°  | 2    | 2    | 1      | 1    | 1    | 1    | 1    | 1    |
| 85°    | 2    | 1    | 1      | 1    | 1    | 1    | 1    | 1    |
| 87.5°  | 2    | 1    | 1      | 1    | 1    | 1    | 1    | 1    |
| 90°    | 2    | 1    | 1      | 1    | 1    | 1    | 1    | 1    |
| 92.5°  | 2    | 1    | 1      | 1    | 1    | 1    | 1    | 1    |
| 95°    | 2    | 1    | 1      | 1    | 1    | 1    | 1    | 1    |
| 97.5°  | 2    | 2    | 1      | 1    | 1    | 1    | 1    | 1    |
| 100°   | 2    | 2    | 1      | 1    | 1    | 1    | 1    | 1    |
| 102.5° | 2    | 2    | 1      | 1    | 1    | 1    | 1    | 1    |
| 105°   | 2    | 2    | 1      | 1    | 1    | 1    | 1    | 1    |
| 107.5° | 3    | 2    | 2      | 1    | 1    | 1    | 1    | 1    |
| 110°   | 3    | 2    | 2      | 1    | 1    | 1    | 1    | 0    |



TEST NUMBER: P27865

CATALOG NUMBER: TRO11-LD4-15W-50-OPL-BK-UNV-EDC1

**CANDELA DISTRIBUTION (continued):**

|        | 150° | 155° | 157.5° | 160° | 165° | 170° | 175° | 180° |
|--------|------|------|--------|------|------|------|------|------|
| 112.5° | 3    | 2    | 2      | 2    | 1    | 1    | 1    | 1    |
| 115°   | 4    | 3    | 2      | 2    | 2    | 1    | 1    | 1    |
| 117.5° | 4    | 3    | 3      | 3    | 2    | 2    | 2    | 1    |
| 120°   | 4    | 4    | 3      | 3    | 3    | 2    | 2    | 2    |
| 122.5° | 5    | 4    | 4      | 3    | 3    | 3    | 2    | 2    |
| 125°   | 5    | 4    | 4      | 4    | 3    | 3    | 3    | 3    |
| 127.5° | 5    | 5    | 4      | 4    | 4    | 4    | 3    | 3    |
| 130°   | 6    | 5    | 5      | 5    | 4    | 4    | 4    | 4    |
| 132.5° | 6    | 6    | 5      | 5    | 5    | 5    | 4    | 4    |
| 135°   | 7    | 6    | 6      | 6    | 5    | 5    | 5    | 5    |
| 137.5° | 7    | 7    | 6      | 6    | 6    | 6    | 5    | 5    |
| 140°   | 7    | 7    | 7      | 7    | 6    | 6    | 6    | 6    |
| 142.5° | 8    | 7    | 7      | 7    | 7    | 7    | 6    | 6    |
| 145°   | 8    | 8    | 8      | 8    | 7    | 7    | 7    | 7    |
| 147.5° | 9    | 8    | 8      | 8    | 8    | 8    | 8    | 7    |
| 150°   | 9    | 9    | 9      | 9    | 8    | 8    | 8    | 8    |
| 152.5° | 10   | 9    | 9      | 9    | 9    | 9    | 9    | 9    |
| 155°   | 11   | 10   | 10     | 10   | 10   | 9    | 9    | 9    |
| 157.5° | 12   | 11   | 11     | 11   | 11   | 10   | 10   | 10   |
| 160°   | 13   | 13   | 12     | 12   | 12   | 12   | 11   | 11   |
| 162.5° | 15   | 14   | 14     | 13   | 13   | 13   | 13   | 13   |
| 165°   | 16   | 16   | 15     | 15   | 15   | 15   | 15   | 14   |
| 167.5° | 19   | 18   | 18     | 17   | 17   | 17   | 17   | 17   |
| 170°   | 21   | 20   | 20     | 20   | 19   | 19   | 19   | 19   |
| 172.5° | 23   | 23   | 22     | 22   | 22   | 22   | 22   | 21   |
| 175°   | 26   | 26   | 25     | 25   | 25   | 25   | 25   | 25   |
| 177.5° | 30   | 30   | 29     | 29   | 29   | 29   | 29   | 29   |
| 180°   | 34   | 34   | 34     | 34   | 34   | 34   | 34   | 34   |

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