



LUMINAIRE TESTING LABORATORY, INC.

SUSTAINING
MEMBER
of the
IESNA

905 Harrison Street · Allentown, PA 18103 · 610-770-1044 · Fax 610-770-8912 · www.LuminaireTesting.com

LTL NUMBER: 18439

DATE: 03-31-2010

PREPARED FOR: PRECISION ARCHITECTURAL LIGHTING

CATALOG NUMBER: MLR-2-4-X-PB-120-T5

LUMINAIRE: EXTRUDED ALUMINUM HOUSING WITH STEEL END CAPS, FORMED WHITE ENAMEL ALUMINUM REFLECTOR, FORMED 31 CELL, 3/4" DEEP SEMI-SPECULAR ALUMINUM LOUVER.

LAMP: TWO 28 WATT T5 LINEAR FLUORESCENT LAMPS RATED AT 2610 LUMENS EACH.

LAMP CATALOG NUMBER: PHILIPS F28T5/841

BALLAST: ONE UNIVERSAL LIGHTING TECHNOLOGIES "ACCU START" B228PUNV-C

MOUNTING: RECESSED

ELECTRICAL VALUES: 120.0VAC, 0.4513A, 54.08W

Candela Distribution

| | 0 | 22.5 | 45 | 67.5 | 90 | 112.5 | 135 | 157.5 | 180 | 202.5 | 225 | 247.5 | 270 | 292.5 | 315 | 337.5 | Flux |
|-----|------|------|------|------|------|-------|------|-------|------|-------|------|-------|------|-------|------|-------|-------|
| 0 | 1253 | 1253 | 1253 | 1253 | 1253 | 1253 | 1253 | 1253 | 1253 | 1253 | 1253 | 1253 | 1253 | 1253 | 1253 | 1253 | |
| 5 | 1245 | 1250 | 1246 | 1247 | 1249 | 1247 | 1246 | 1250 | 1245 | 1250 | 1246 | 1247 | 1249 | 1247 | 1246 | 1250 | 118.4 |
| 15 | 1174 | 1182 | 1186 | 1195 | 1195 | 1195 | 1186 | 1182 | 1174 | 1182 | 1186 | 1195 | 1195 | 1195 | 1186 | 1182 | 334.1 |
| 25 | 1061 | 1063 | 1055 | 1065 | 1071 | 1065 | 1055 | 1063 | 1061 | 1063 | 1055 | 1065 | 1071 | 1065 | 1055 | 1063 | 489.1 |
| 35 | 911 | 904 | 884 | 921 | 955 | 921 | 884 | 904 | 911 | 904 | 884 | 921 | 955 | 921 | 884 | 904 | 568.6 |
| 45 | 711 | 690 | 698 | 706 | 712 | 706 | 698 | 690 | 711 | 690 | 698 | 706 | 712 | 706 | 698 | 690 | 536.9 |
| 55 | 446 | 421 | 382 | 336 | 335 | 336 | 382 | 421 | 446 | 421 | 382 | 336 | 335 | 336 | 382 | 421 | 339.9 |
| 65 | 85 | 85 | 93 | 79 | 78 | 79 | 93 | 85 | 85 | 85 | 93 | 79 | 78 | 79 | 93 | 85 | 95.9 |
| 75 | 17 | 15 | 14 | 17 | 19 | 17 | 14 | 15 | 17 | 15 | 14 | 17 | 19 | 17 | 14 | 15 | 18.3 |
| 85 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.2 |
| 90 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 |
| 105 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 |
| 115 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 |
| 125 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 |
| 135 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 |
| 145 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 |
| 155 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 |
| 165 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 |
| 175 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 |
| 180 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Zonal Lumen Summary

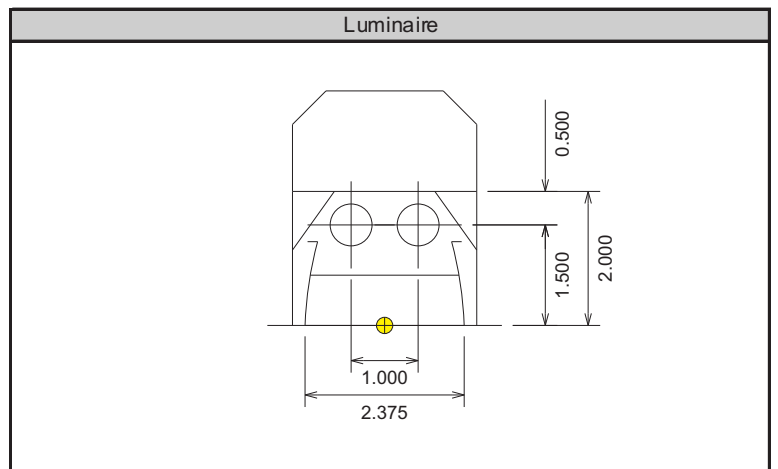
| Zone | Lumens | % of Lamp | % of Luminaire |
|--------|--------|-----------|----------------|
| 0-30 | 941.6 | 18.0% | 37.6% |
| 0-40 | 1510.2 | 28.9% | 60.4% |
| 0-60 | 2387.1 | 45.7% | 95.4% |
| 0-90 | 2502.4 | 47.9% | 100.0% |
| 90-180 | 0.0 | 0.0% | 0.0% |
| 0-180 | 2502.4 | 47.9% | 100.0% |

Total luminaire efficiency: 47.9%

CIE Type: Direct

Spacing Criterion: 0 deg: 1.18 90 deg: 1.20
180 deg: 1.18 270 deg: 1.20

Shielding angle: 0 deg: 32 90 deg: 39



Approved By: _____

THIS REPORT BASED ON LM-41 AND OTHER PERTINENT IESNA PROCEDURES.



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Candela Tabulation (5 degree Vertical Increments)

| | 0 | 22.5 | 45 | 67.5 | 90 | 112.5 | 135 | 157.5 | 180 | 202.5 | 225 | 247.5 | 270 | 292.5 | 315 | 337.5 |
|-----|------|------|------|------|------|-------|------|-------|------|-------|------|-------|------|-------|------|-------|
| 0 | 1253 | 1253 | 1253 | 1253 | 1253 | 1253 | 1253 | 1253 | 1253 | 1253 | 1253 | 1253 | 1253 | 1253 | 1253 | 1253 |
| 5 | 1245 | 1250 | 1246 | 1247 | 1249 | 1247 | 1246 | 1250 | 1245 | 1250 | 1246 | 1247 | 1249 | 1247 | 1246 | 1250 |
| 10 | 1219 | 1225 | 1226 | 1229 | 1229 | 1229 | 1226 | 1225 | 1219 | 1225 | 1226 | 1229 | 1229 | 1229 | 1226 | 1225 |
| 15 | 1174 | 1182 | 1186 | 1195 | 1195 | 1195 | 1186 | 1182 | 1174 | 1182 | 1186 | 1195 | 1195 | 1195 | 1186 | 1182 |
| 20 | 1121 | 1128 | 1129 | 1136 | 1138 | 1136 | 1129 | 1128 | 1121 | 1128 | 1129 | 1136 | 1138 | 1136 | 1129 | 1128 |
| 25 | 1061 | 1063 | 1055 | 1065 | 1071 | 1065 | 1055 | 1063 | 1061 | 1063 | 1055 | 1065 | 1071 | 1065 | 1055 | 1063 |
| 30 | 992 | 990 | 972 | 988 | 1006 | 988 | 972 | 990 | 992 | 990 | 972 | 988 | 1006 | 988 | 972 | 990 |
| 35 | 911 | 904 | 884 | 921 | 955 | 921 | 884 | 904 | 911 | 904 | 884 | 921 | 955 | 921 | 884 | 904 |
| 40 | 818 | 802 | 795 | 845 | 878 | 845 | 795 | 802 | 818 | 802 | 795 | 845 | 878 | 845 | 795 | 802 |
| 45 | 711 | 690 | 698 | 706 | 712 | 706 | 698 | 690 | 711 | 690 | 698 | 706 | 712 | 706 | 698 | 690 |
| 50 | 590 | 565 | 565 | 524 | 523 | 524 | 565 | 565 | 590 | 565 | 565 | 524 | 523 | 524 | 565 | 565 |
| 55 | 446 | 421 | 382 | 336 | 335 | 336 | 382 | 421 | 446 | 421 | 382 | 336 | 335 | 336 | 382 | 421 |
| 60 | 254 | 248 | 214 | 174 | 155 | 174 | 214 | 248 | 254 | 248 | 214 | 174 | 155 | 174 | 214 | 248 |
| 65 | 85 | 85 | 93 | 79 | 78 | 79 | 93 | 85 | 85 | 85 | 93 | 79 | 78 | 79 | 93 | 85 |
| 70 | 37 | 33 | 32 | 39 | 40 | 39 | 32 | 33 | 37 | 33 | 32 | 39 | 40 | 39 | 32 | 33 |
| 75 | 17 | 15 | 14 | 17 | 19 | 17 | 14 | 15 | 17 | 15 | 14 | 17 | 19 | 17 | 14 | 15 |
| 80 | 6 | 5 | 5 | 6 | 7 | 6 | 5 | 5 | 6 | 5 | 5 | 6 | 7 | 6 | 5 | 5 |
| 85 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 90 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 100 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 105 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 110 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 115 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 120 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 125 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 130 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 135 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 140 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 145 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 150 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 155 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 160 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 165 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 170 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 175 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 180 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Zonal Lumen Tabulation (5 degree zones)

| Zone | Lumens | Zone | Lumens | Zone | Lumens | Zone | Lumens |
|-------|--------|-------|--------|---------|--------|---------|--------|
| 0-5 | 29.9 | 45-50 | 253.8 | 90-95 | 0.0 | 135-140 | 0.0 |
| 5-10 | 88.5 | 50-55 | 203.2 | 95-100 | 0.0 | 140-145 | 0.0 |
| 10-15 | 143.1 | 55-60 | 136.6 | 100-105 | 0.0 | 145-150 | 0.0 |
| 15-20 | 191.0 | 60-65 | 67.7 | 105-110 | 0.0 | 150-155 | 0.0 |
| 20-25 | 229.9 | 65-70 | 28.2 | 110-115 | 0.0 | 155-160 | 0.0 |
| 25-30 | 259.2 | 70-75 | 12.8 | 115-120 | 0.0 | 160-165 | 0.0 |
| 30-35 | 279.3 | 75-80 | 5.5 | 120-125 | 0.0 | 165-170 | 0.0 |
| 35-40 | 289.4 | 80-85 | 1.2 | 125-130 | 0.0 | 170-175 | 0.0 |
| 40-45 | 283.2 | 85-90 | 0.0 | 130-135 | 0.0 | 175-180 | 0.0 |



| Coefficients of Utilization - Zonal Cavity Method | | | | | | | | | | | | |
|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Effective Floor Cavity Reflectance 20% | | | | | | | | | | | | |
| Ceiling Cavity Reflectance | 90 | | | | 80 | | | | 70 | | | |
| Wall Reflectance | 70 | 50 | 30 | 10 | 70 | 50 | 30 | 10 | 70 | 50 | 30 | 10 |
| Room Cavity Ratio (RCR) | | | | | | | | | | | | |
| 0 | 0.585 | 0.585 | 0.585 | 0.585 | 0.571 | 0.571 | 0.571 | 0.571 | 0.557 | 0.557 | 0.557 | 0.557 |
| 1 | 0.548 | 0.529 | 0.512 | 0.496 | 0.535 | 0.518 | 0.502 | 0.488 | 0.522 | 0.507 | 0.493 | 0.48 |
| 2 | 0.509 | 0.474 | 0.446 | 0.423 | 0.497 | 0.465 | 0.44 | 0.418 | 0.485 | 0.457 | 0.433 | 0.413 |
| 3 | 0.471 | 0.426 | 0.391 | 0.364 | 0.46 | 0.419 | 0.387 | 0.361 | 0.449 | 0.411 | 0.382 | 0.358 |
| 4 | 0.437 | 0.384 | 0.346 | 0.317 | 0.426 | 0.378 | 0.342 | 0.315 | 0.416 | 0.372 | 0.339 | 0.313 |
| 5 | 0.405 | 0.347 | 0.308 | 0.279 | 0.395 | 0.342 | 0.305 | 0.277 | 0.386 | 0.337 | 0.302 | 0.276 |
| 6 | 0.376 | 0.315 | 0.276 | 0.247 | 0.367 | 0.311 | 0.273 | 0.246 | 0.359 | 0.307 | 0.271 | 0.245 |
| 7 | 0.35 | 0.288 | 0.248 | 0.221 | 0.342 | 0.284 | 0.247 | 0.22 | 0.334 | 0.281 | 0.245 | 0.22 |
| 8 | 0.327 | 0.264 | 0.225 | 0.199 | 0.32 | 0.261 | 0.224 | 0.199 | 0.313 | 0.258 | 0.223 | 0.198 |
| 9 | 0.306 | 0.243 | 0.206 | 0.181 | 0.299 | 0.241 | 0.205 | 0.18 | 0.293 | 0.238 | 0.203 | 0.18 |
| 10 | 0.287 | 0.225 | 0.189 | 0.165 | 0.281 | 0.223 | 0.188 | 0.164 | 0.275 | 0.22 | 0.187 | 0.164 |

| Ceiling Cavity Reflectance | 50 | | | | 30 | | | 10 | | | 0 |
|----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Wall Reflectance | 70 | 50 | 30 | 10 | 50 | 30 | 10 | 50 | 30 | 10 | 0 |
| Room Cavity Ratio (RCR) | | | | | | | | | | | |
| 0 | 0.533 | 0.533 | 0.533 | 0.533 | 0.51 | 0.51 | 0.51 | 0.489 | 0.489 | 0.489 | 0.479 |
| 1 | 0.5 | 0.487 | 0.476 | 0.465 | 0.469 | 0.46 | 0.451 | 0.452 | 0.445 | 0.438 | 0.429 |
| 2 | 0.464 | 0.44 | 0.421 | 0.404 | 0.425 | 0.409 | 0.395 | 0.412 | 0.398 | 0.386 | 0.377 |
| 3 | 0.429 | 0.398 | 0.373 | 0.352 | 0.385 | 0.364 | 0.346 | 0.374 | 0.356 | 0.341 | 0.331 |
| 4 | 0.398 | 0.36 | 0.332 | 0.309 | 0.35 | 0.325 | 0.305 | 0.34 | 0.319 | 0.301 | 0.292 |
| 5 | 0.369 | 0.327 | 0.297 | 0.273 | 0.318 | 0.292 | 0.27 | 0.31 | 0.287 | 0.268 | 0.259 |
| 6 | 0.343 | 0.299 | 0.267 | 0.243 | 0.291 | 0.263 | 0.241 | 0.284 | 0.259 | 0.24 | 0.231 |
| 7 | 0.32 | 0.274 | 0.242 | 0.218 | 0.267 | 0.238 | 0.217 | 0.261 | 0.235 | 0.215 | 0.207 |
| 8 | 0.3 | 0.252 | 0.22 | 0.197 | 0.246 | 0.217 | 0.196 | 0.241 | 0.215 | 0.195 | 0.187 |
| 9 | 0.281 | 0.233 | 0.201 | 0.179 | 0.228 | 0.199 | 0.178 | 0.223 | 0.197 | 0.177 | 0.169 |
| 10 | 0.265 | 0.216 | 0.185 | 0.164 | 0.212 | 0.183 | 0.163 | 0.207 | 0.181 | 0.162 | 0.155 |

Average Luminance Table (cd/m²)

| | 0 | 45 | 90 |
|----|-------|-------|-------|
| 0 | 14412 | 14412 | 14412 |
| 45 | 11570 | 11352 | 11578 |
| 55 | 8937 | 7670 | 6716 |
| 65 | 2313 | 2527 | 2116 |
| 75 | 769 | 601 | 860 |
| 85 | 0 | 0 | 8 |

THIS TEST WAS CONDUCTED USING RELATIVE PHOTOMETRY TECHNIQUES ACCORDING TO STANDARD IESNA PROCEDURES. THE USER MUST THEREFORE USE CAUTION IN THE FOLLOWING SITUATIONS: 1) THIS TEST WAS PERFORMED USING A SPECIFIC BALLAST/LAMP COMBINATION. EXTRAPOLATION OF THESE DATA FOR OTHER BALLAST/LAMP COMBINATIONS MAY PRODUCE ERRONEOUS RESULTS. 2) ACCORDING TO IESNA PROCEDURES, THE BALLAST(S) AND LAMP(S) ARE PRESUMED TO PRODUCE 100% OF RATED OUTPUT. AN APPROPRIATE BALLAST FACTOR MUST BE APPLIED TO THE LUMEN OUTPUT RATINGS AND LUMINOUS INTENSITY VALUES GIVEN. 3) THIS TEST WAS CONDUCTED IN A CONTROLLED LABORATORY ENVIRONMENT WHERE THE AMBIENT TEMPERATURE WAS HELD AT 25 °C ±1°C. FIELD PERFORMANCE MAY DIFFER PARTICULARLY IN REGARDS TO CHANGE IN LUMINOUS OUTPUT AS A RESULT OF DIFFERENCE IN AMBIENT TEMPERATURE AND METHOD OF MOUNTING THE LUMINAIRE.

