

Goniophotometric Test Report

Table. Luminous Intesity (cd) in horizontal (rows) and vertical planes (columns).

| | 0 | 15 | 30 | 45 | 60 | 75 | 90 | 105 | 120 | 135 | 150 | 165 | 180 | 195 | 210 | 225 | 240 | 255 | 270 | 285 | 300 | 315 | 330 | 345 | |
|-------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 0.0 | 24 | 25 | 24 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 24 | 25 | 24 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| 2.5 | 25 | 24 | 25 | 25 | 26 | 25 | 27 | 26 | 28 | 26 | 29 | 26 | 29 | 33 | 29 | 33 | 29 | 31 | 28 | 29 | 27 | 28 | 26 | 28 | 28 |
| 5.0 | 33 | 31 | 34 | 31 | 35 | 32 | 33 | 30 | 35 | 33 | 37 | 35 | 38 | 41 | 38 | 40 | 37 | 38 | 35 | 36 | 33 | 35 | 33 | 35 | 35 |
| 7.5 | 42 | 39 | 43 | 40 | 44 | 40 | 45 | 41 | 49 | 44 | 51 | 45 | 49 | 60 | 48 | 57 | 46 | 51 | 43 | 46 | 41 | 43 | 40 | 44 | 44 |
| 10.0 | 74 | 54 | 76 | 61 | 86 | 64 | 110 | 76 | 113 | 82 | 122 | 94 | 132 | 162 | 112 | 133 | 94 | 134 | 92 | 131 | 76 | 99 | 66 | 95 | 95 |
| 12.5 | 164 | 151 | 204 | 155 | 218 | 166 | 203 | 192 | 251 | 204 | 258 | 203 | 230 | 269 | 230 | 301 | 221 | 263 | 199 | 245 | 206 | 234 | 169 | 207 | 207 |
| 15.0 | 295 | 263 | 345 | 316 | 330 | 273 | 335 | 297 | 371 | 377 | 389 | 335 | 350 | 385 | 359 | 393 | 355 | 402 | 352 | 385 | 321 | 376 | 313 | 327 | 327 |
| 17.5 | 375 | 396 | 485 | 424 | 456 | 388 | 499 | 432 | 492 | 472 | 547 | 459 | 586 | 703 | 521 | 609 | 480 | 665 | 529 | 666 | 452 | 461 | 451 | 436 | 436 |
| 20.0 | 727 | 688 | 750 | 623 | 727 | 678 | 813 | 694 | 765 | 728 | 839 | 832 | 934 | 930 | 789 | 779 | 722 | 865 | 871 | 921 | 710 | 735 | 569 | 746 | 746 |
| 22.5 | 862 | 915 | 956 | 844 | 917 | 864 | 866 | 879 | 919 | 911 | 903 | 1027 | 940 | 913 | 827 | 769 | 831 | 921 | 939 | 945 | 946 | 804 | 713 | 846 | 846 |
| 25.0 | 909 | 933 | 939 | 856 | 922 | 872 | 902 | 850 | 926 | 893 | 946 | 975 | 956 | 929 | 874 | 870 | 894 | 938 | 975 | 956 | 931 | 874 | 830 | 882 | 882 |
| 27.5 | 848 | 933 | 956 | 941 | 946 | 879 | 856 | 856 | 935 | 955 | 952 | 951 | 903 | 932 | 910 | 949 | 922 | 925 | 922 | 916 | 934 | 934 | 865 | 889 | 889 |
| 30.0 | 864 | 909 | 994 | 985 | 982 | 896 | 919 | 890 | 975 | 994 | 1001 | 964 | 961 | 994 | 970 | 1008 | 960 | 1008 | 975 | 1001 | 963 | 991 | 928 | 934 | 934 |
| 32.5 | 957 | 985 | 1068 | 1035 | 1032 | 960 | 1008 | 962 | 1060 | 1057 | 1156 | 1056 | 1025 | 1080 | 1118 | 1117 | 1101 | 1123 | 1062 | 1094 | 1050 | 1103 | 1033 | 1037 | 1037 |
| 35.0 | 1003 | 1077 | 1213 | 1151 | 1145 | 1077 | 1140 | 1076 | 1162 | 1185 | 1259 | 1216 | 1354 | 1406 | 1210 | 1246 | 1182 | 1329 | 1353 | 1343 | 1148 | 1202 | 1167 | 1119 | 1119 |
| 37.5 | 1390 | 1351 | 1438 | 1283 | 1386 | 1333 | 1464 | 1313 | 1395 | 1374 | 1487 | 1470 | 1510 | 1523 | 1423 | 1444 | 1394 | 1480 | 1536 | 1503 | 1370 | 1429 | 1265 | 1359 | 1359 |
| 40.0 | 1475 | 1526 | 1527 | 1510 | 1476 | 1437 | 1543 | 1436 | 1479 | 1507 | 1564 | 1575 | 1603 | 1595 | 1497 | 1474 | 1479 | 1565 | 1620 | 1580 | 1459 | 1473 | 1343 | 1454 | 1454 |
| 42.5 | 1571 | 1603 | 1594 | 1547 | 1545 | 1513 | 1636 | 1514 | 1545 | 1559 | 1614 | 1636 | 1697 | 1615 | 1539 | 1503 | 1531 | 1611 | 1721 | 1624 | 1518 | 1508 | 1404 | 1498 | 1498 |
| 45.0 | 1626 | 1640 | 1617 | 1597 | 1570 | 1546 | 1673 | 1538 | 1568 | 1591 | 1627 | 1663 | 1713 | 1590 | 1542 | 1499 | 1549 | 1610 | 1744 | 1633 | 1546 | 1520 | 1421 | 1533 | 1533 |
| 47.5 | 1595 | 1624 | 1602 | 1595 | 1565 | 1546 | 1643 | 1532 | 1554 | 1585 | 1592 | 1634 | 1638 | 1515 | 1503 | 1451 | 1512 | 1536 | 1677 | 1560 | 1530 | 1490 | 1407 | 1493 | 1493 |
| 50.0 | 1517 | 1544 | 1535 | 1554 | 1497 | 1478 | 1579 | 1463 | 1479 | 1524 | 1515 | 1560 | 1570 | 1445 | 1433 | 1386 | 1444 | 1463 | 1605 | 1475 | 1453 | 1420 | 1349 | 1421 | 1421 |
| 52.5 | 1437 | 1466 | 1457 | 1476 | 1423 | 1404 | 1483 | 1391 | 1400 | 1449 | 1436 | 1473 | 1482 | 1351 | 1357 | 1314 | 1363 | 1382 | 1508 | 1391 | 1378 | 1348 | 1281 | 1347 | 1347 |
| 55.0 | 1349 | 1383 | 1376 | 1400 | 1340 | 1326 | 1364 | 1312 | 1316 | 1365 | 1348 | 1376 | 1387 | 1256 | 1269 | 1235 | 1282 | 1296 | 1381 | 1302 | 1300 | 1267 | 1216 | 1263 | 1263 |
| 57.5 | 1255 | 1294 | 1287 | 1309 | 1253 | 1246 | 1220 | 1230 | 1228 | 1282 | 1262 | 1278 | 1272 | 1167 | 1188 | 1162 | 1200 | 1204 | 1234 | 1211 | 1216 | 1196 | 1143 | 1180 | 1180 |
| 60.0 | 1120 | 1204 | 1205 | 1233 | 1174 | 1164 | 1084 | 1149 | 1153 | 1198 | 1178 | 1191 | 1119 | 1097 | 1107 | 1085 | 1117 | 1141 | 1095 | 1141 | 1131 | 1116 | 1070 | 1102 | 1102 |
| 62.5 | 964 | 1142 | 1125 | 1149 | 1119 | 1127 | 991 | 1113 | 1104 | 1111 | 1097 | 1137 | 976 | 1056 | 1032 | 1001 | 1049 | 1077 | 997 | 1070 | 1069 | 1031 | 996 | 1063 | 1063 |
| 65.0 | 896 | 1101 | 1074 | 1060 | 1064 | 1042 | 954 | 1005 | 1034 | 1021 | 1043 | 1057 | 936 | 922 | 986 | 910 | 995 | 934 | 948 | 943 | 1016 | 947 | 954 | 984 | 984 |
| 67.5 | 884 | 966 | 987 | 973 | 924 | 905 | 915 | 883 | 893 | 942 | 915 | 903 | 880 | 793 | 850 | 780 | 851 | 822 | 911 | 836 | 880 | 843 | 883 | 832 | 832 |
| 70.0 | 790 | 835 | 819 | 847 | 793 | 796 | 802 | 781 | 760 | 799 | 768 | 787 | 770 | 685 | 724 | 673 | 734 | 713 | 797 | 725 | 752 | 708 | 770 | 727 | 727 |
| 72.5 | 692 | 735 | 710 | 741 | 686 | 691 | 696 | 678 | 653 | 723 | 679 | 677 | 656 | 576 | 616 | 580 | 622 | 601 | 680 | 613 | 641 | 625 | 658 | 633 | 633 |
| 75.0 | 560 | 639 | 627 | 632 | 600 | 585 | 517 | 573 | 569 | 596 | 575 | 562 | 475 | 448 | 530 | 469 | 537 | 468 | 494 | 483 | 552 | 508 | 578 | 524 | 524 |
| 77.5 | 417 | 520 | 478 | 517 | 456 | 452 | 415 | 437 | 408 | 481 | 417 | 425 | 378 | 364 | 381 | 364 | 374 | 356 | 396 | 366 | 397 | 401 | 446 | 387 | 387 |
| 80.0 | 330 | 377 | 354 | 407 | 342 | 352 | 323 | 342 | 313 | 347 | 316 | 332 | 296 | 261 | 288 | 259 | 285 | 270 | 305 | 280 | 298 | 287 | 336 | 297 | 297 |
| 82.5 | 252 | 283 | 270 | 291 | 257 | 262 | 239 | 253 | 231 | 253 | 234 | 244 | 208 | 169 | 198 | 159 | 201 | 175 | 221 | 196 | 216 | 207 | 242 | 221 | 221 |
| 85.0 | 152 | 199 | 171 | 199 | 147 | 177 | 117 | 158 | 105 | 155 | 84 | 128 | 51 | 30 | 43 | 32 | 44 | 29 | 62 | 37 | 77 | 66 | 132 | 85 | 85 |
| 87.5 | 25 | 35 | 30 | 34 | 26 | 27 | 22 | 24 | 19 | 21 | 19 | 21 | 21 | 21 | 23 | 22 | 21 | 19 | 20 | 18 | 18 | 18 | 23 | 20 | 20 |
| 90.0 | 17 | 21 | 21 | 21 | 19 | 19 | 17 | 17 | 16 | 15 | 16 | 17 | 18 | 20 | 21 | 21 | 19 | 18 | 17 | 16 | 15 | 16 | 16 | 16 | 16 |
| 92.5 | 18 | 19 | 20 | 20 | 19 | 18 | 18 | 18 | 18 | 17 | 18 | 19 | 20 | 22 | 23 | 23 | 20 | 20 | 18 | 18 | 17 | 17 | 16 | 17 | 17 |
| 95.0 | 20 | 21 | 22 | 21 | 21 | 20 | 19 | 19 | 20 | 19 | 20 | 21 | 22 | 24 | 25 | 24 | 22 | 21 | 20 | 19 | 19 | 19 | 18 | 19 | 19 |
| 97.5 | 22 | 23 | 24 | 24 | 23 | 21 | 21 | 22 | 22 | 21 | 22 | 23 | 24 | 25 | 26 | 26 | 24 | 23 | 21 | 21 | 20 | 21 | 19 | 21 | 21 |
| 100.0 | 23 | 25 | 26 | 25 | 24 | 23 | 22 | 23 | 23 | 23 | 23 | 25 | 25 | 27 | 28 | 27 | 25 | 25 | 23 | 22 | 22 | 22 | 21 | 22 | 22 |
| 102.5 | 25 | 26 | 27 | 26 | 25 | 24 | 23 | 24 | 25 | 24 | 25 | 26 | 27 | 28 | 29 | 28 | 27 | 26 | 24 | 24 | 24 | 23 | 21 | 23 | 23 |
| 105.0 | 26 | 27 | 28 | 28 | 26 | 25 | 24 | 25 | 25 | 25 | 25 | 26 | 26 | 26 | 28 | 27 | 26 | 25 | 24 | 23 | 24 | 23 | 22 | 22 | 22 |
| 107.5 | 24 | 26 | 27 | 27 | 25 | 23 | 22 | 24 | 24 | 24 | 24 | 25 | 25 | 25 | 27 | 26 | 25 | 24 | 23 | 22 | 23 | 22 | 21 | 21 | 21 |
| 110.0 | 23 | 25 | 27 | 26 | 24 | 22 | 21 | 22 | 22 | 23 | 23 | 24 | 24 | 24 | 26 | 25 | 24 | 24 | 23 | 22 | 22 | 20 | 19 | 20 | 20 |
| 112.5 | 22 | 24 | 26 | 25 | 23 | 21 | 20 | 21 | 21 | 22 | 22 | 24 | 23 | 24 | 26 | 25 | 24 | 24 | 23 | 22 | 21 | 19 | 18 | 18 | 18 |
| 115.0 | 20 | 22 | 25 | 23 | 21 | 19 | 19 | 20 | 20 | 21 | 22 | 24 | 24 | 25 | 26 | 26 | 25 | 24 | 23 | 21 | 20 | 19 | 17 | 16 | 16 |

Table. Measurement results of the main luminous parameters

| Luminous flux | Input power | Luminous efficacy | LOR | DWFF | Luminous intensity (g=0) |
|---------------|-------------|-------------------|---------|--------|--------------------------|
| 5466.1 lm | 54.10 W | 101.0 lm/W | 100.0 % | 98.3 % | 24 cd |

Table. Electrical parameters during the light measurements.

| | P _{in} | PF | V _{in} | I _f |
|----------------|-----------------|--------|-----------------|----------------|
| Value | 54.13 W | 0.9710 | 230.7 V | 0.2410 A |
| St.dev. | NaN % | NaN % | NaN % | NaN % |

Table. Maximum Luminous Intensity and its direction

| I _v | g | C plane |
|----------------|-------|---------|
| 1744 cd | 45.0° | 90.0° |

Table. Beam widths at two perpendicular planes

| | Beam angle, FWHM, 50% (deg) | Beam angle, 10% (deg) | Effective beam direction from g=0 |
|----------------|-----------------------------|-----------------------|-----------------------------------|
| C0-180 | 260.6° | 277.3° | -0.7° |
| C90-270 | 261.5° | 276.1° | -0.5° |

Figure. Polar curve of the angular Luminous Intensity distribution at two perpendicular C planes and at C plane with maximum Luminous Intensity.

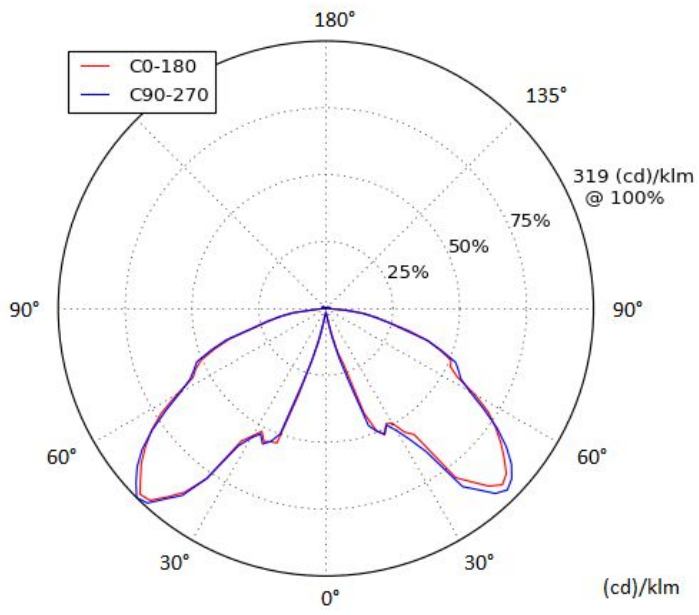


Figure. Luminous Intensity distribution in cartesian diagram at all measured C planes.

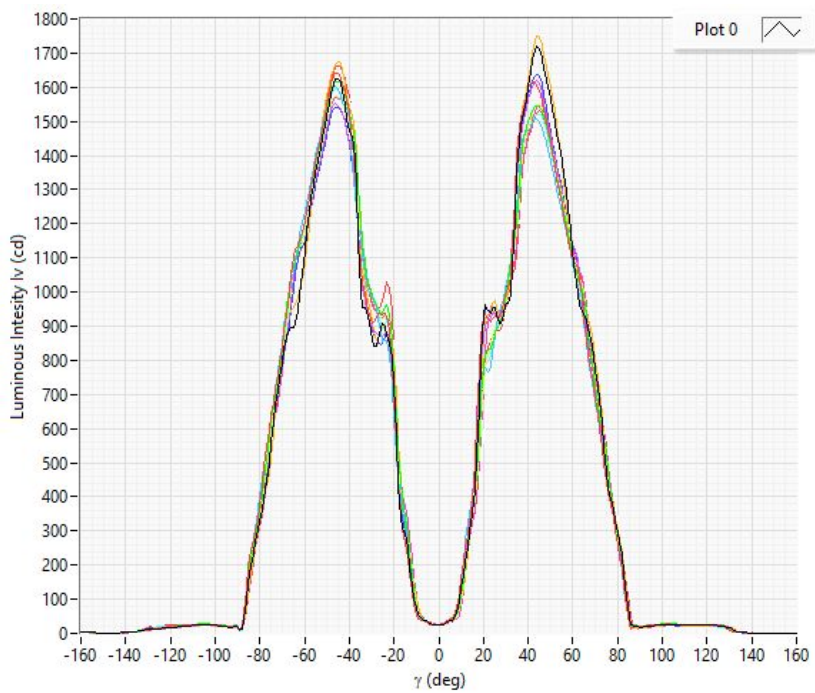


Figure. Isocandela as a function of C plane at gamma angle with maximum luminous intensity

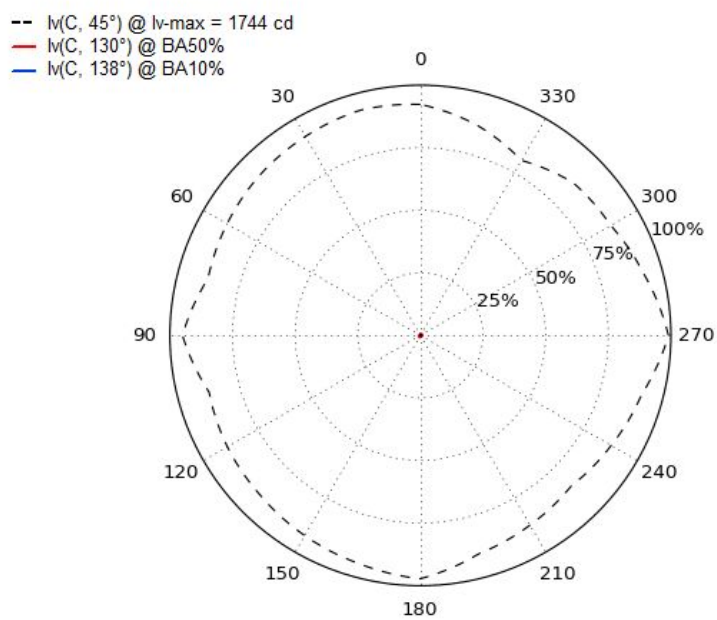


Table. Zonal lumen summary

| | Lumens | Relative lumens (%) |
|----------------|---------------|----------------------------|
| 0-20 | 121.70 | 2.23 |
| 0-30 | 537.90 | 9.84 |
| 0-40 | 1316.10 | 24.08 |
| 0-60 | 3697.60 | 67.65 |
| 0-80 | 5232.20 | 95.72 |
| 0-90 | 5374.00 | 98.32 |
| 10-90 | 5368.90 | 98.22 |
| 20-40 | 1194.40 | 21.85 |
| 20-50 | 2397.00 | 43.85 |
| 40-70 | 3345.70 | 61.21 |
| 40-90 | 4057.90 | 74.24 |
| 60-80 | 1534.60 | 28.07 |
| 60-90 | 1676.40 | 30.67 |
| 70-80 | 570.40 | 10.44 |
| 80-90 | 141.80 | 2.59 |
| 90-110 | 48.50 | 0.89 |
| 90-120 | 70.10 | 1.28 |
| 90-130 | 86.40 | 1.58 |
| 90-150 | 91.40 | 1.67 |
| 90-180 | 92.10 | 1.68 |
| 110-180 | 43.60 | 0.80 |
| 0-180 | 5466.10 | 100.00 |

Figure. Cumulative luminous flux

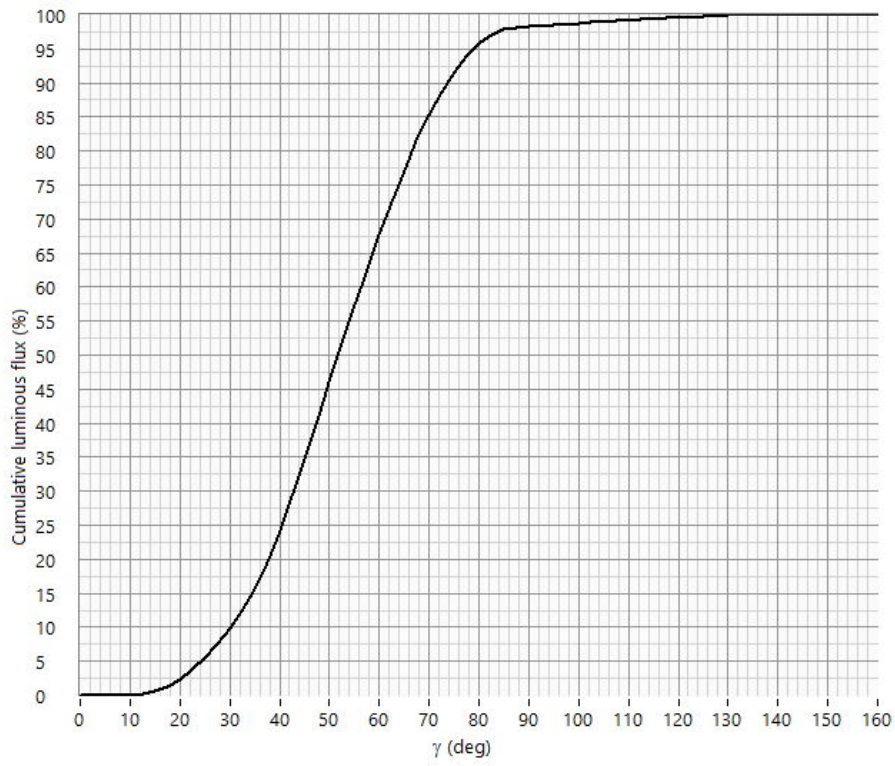
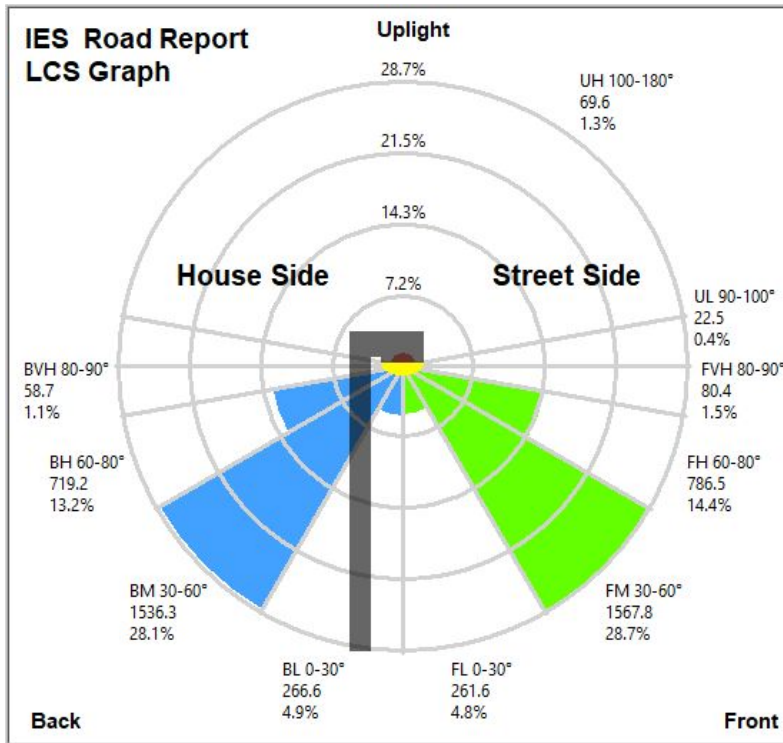


Figure. IES Road Report LCS Graph | Backlight, Uplight and Glare (BUG) Classification | Cutoff Classification



| BUG Rating | B2 | U2 | G1 |
|----------------------|---------------|----|------------------------|
| Forward Light | Lumens | | Rel. Lumens (%) |
| FL 0-30° | 261.6 | | 4.8% |
| FM 30-60° | 1567.8 | | 28.7% |
| FH 60-80° | 786.5 | | 14.4% |
| FVH 80-90° | 80.4 | | 1.5% |
| Back Light | | | |
| BL 0-30° | 266.6 | | 4.9% |
| BM 30-60° | 1536.3 | | 28.1% |
| BH 60-80° | 719.2 | | 13.2% |
| BVH 80-90° | 58.7 | | 1.1% |
| Up Light | | | |
| UL 90-100° | 22.5 | | 0.4% |
| UH 100-180° | 69.6 | | 1.3% |

| Cutoff Classification: | | cutoff |
|--------------------------|---------------|-------------|
| Max cd/klm, gamma >= 90° | | 5.3 |
| Max cd/klm, gamma >= 80° | | 74.4 |
| | Lumens | Lumens (%) |
| Downward Street side | 2696.3 | 49.4 |
| Downward House side | 2580.8 | 47.3 |
| Downward Total | 5277.1 | 96.7 |
| Upward Street side | 44.7 | 0.8 |
| Upward House side | 45.8 | 0.9 |
| Upward Total | 90.5 | 1.7 |
| Total Lumens | 5367.6 | 98.4 |

Table. Luminance at different angles based on the defined luminous areas and measured luminous intensities.

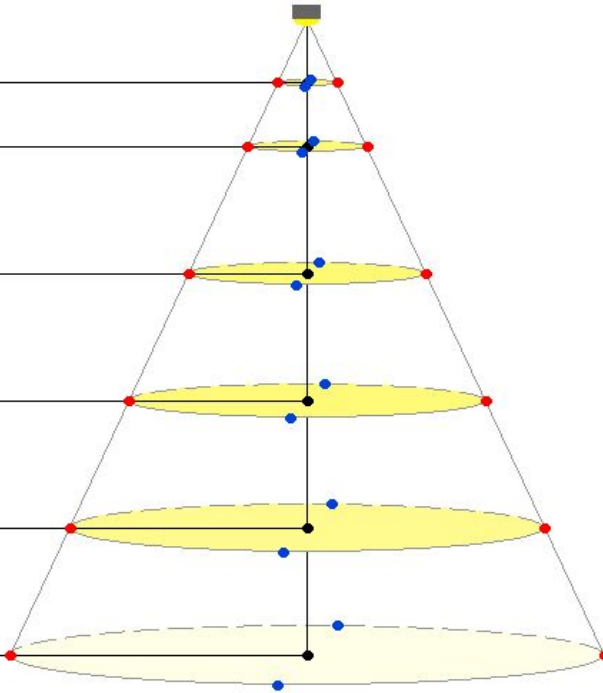
| | C 0 | C 45 | C 90 |
|-------------|------------|-------------|-------------|
| g 0 | 1565 | 1620 | 1624 |
| g 45 | 149396 | 146672 | 153693 |
| g 55 | 152785 | 158530 | 154461 |
| g 65 | 137701 | 162946 | 146631 |
| g 75 | 140648 | 158575 | 129721 |
| g 85 | 113593 | 148313 | 87316 |

CONE DIAGRAM

- Cone is limited by the beam angle at the planes of C0 and C90
- H = Mounting Height
- D = Cone diameter
- Ev Edge = Illuminance at the edge of the cone of the C0/90 plane
- Ev Center = Illuminance at the center of the cone

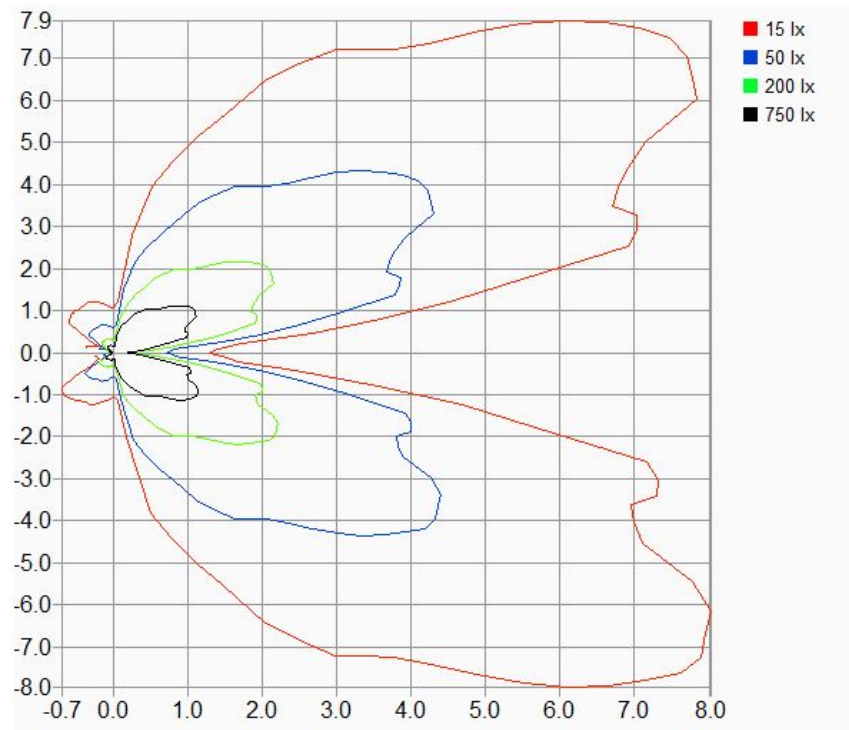
| H (m) Ev at g = 0 | Width Ev at edge | |
|------------------------|--------------------|---------|
| | C0-180 | C90-270 |

| | | |
|--------------------|-------------------|-------------------|
| 0.50 m 98 lx | 3.5 m 49 lx | 3.5 m 49 lx |
| 1.0 m 25 lx | 7.0 m 12 lx | 7.0 m 12 lx |
| 2.0 m 6.2 lx | 14 m 3.1 lx | 14 m 3.1 lx |
| 3.0 m 2.8 lx | 21 m 1.4 lx | 21 m 1.4 lx |
| 4.0 m 1.6 lx | 28 m 0.78 lx | 28 m 0.78 lx |
| 5.0 m 0.99 lx | 35 m 0.50 lx | 35 m 0.50 lx |

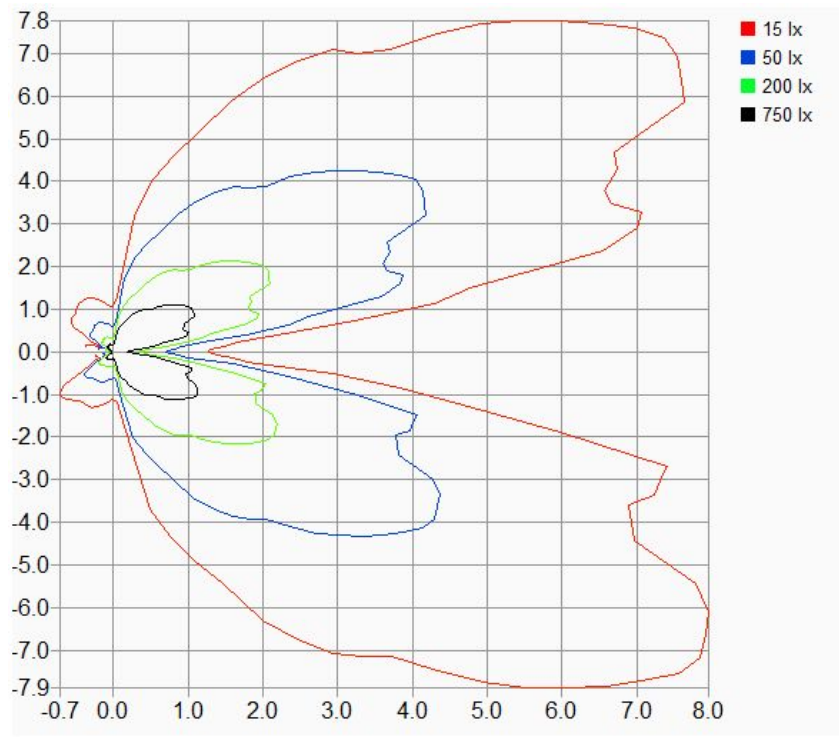


Beam angle determined by Field Illuminance, $E_v(0deg) * 50\%$. C0-180: 148.1 deg, C90-270: 148.1 deg

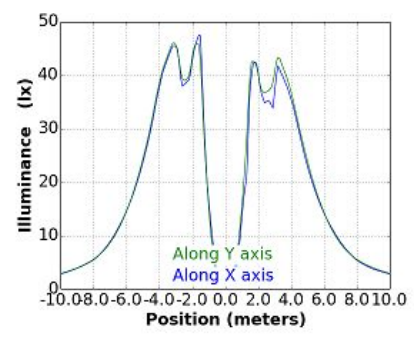
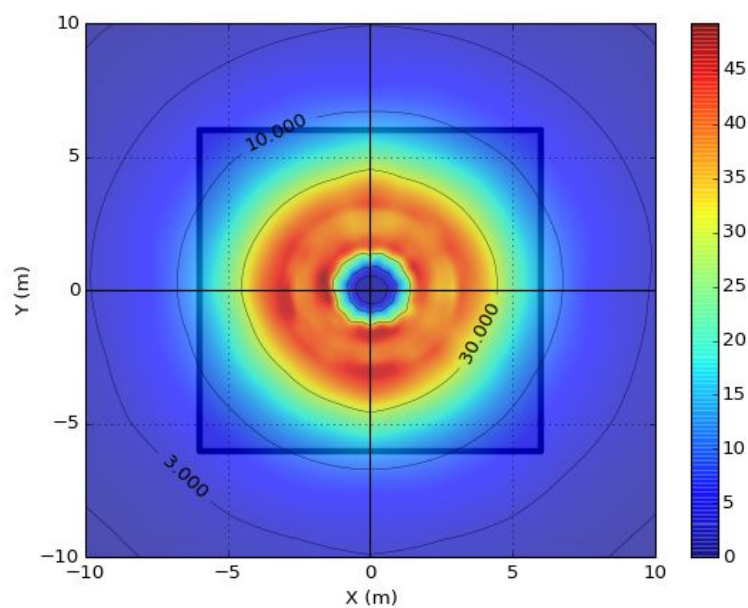
Vertical isolux



Horizontal isolux



Illumination uniformity figures at the perpendicular plane to the lamp axis.
Mounting height of 4.00 m.
C rotation of 0.0 deg. Gamma rotation of 0.0 deg.
Maintenance factor = 1.00.
Nr of lamps: X = 1 pcs, Y = 1 pcs.
Distance between lamps: X = 1.00 meters, Y = 1.00 meters.



Average Ev: 25 lx
Uniformity: 6.6 %
Max Ev: 49 lx
Min Ev: 1.6 lx
Power Consumption: 0.05 kW