



UL Verification Services

7826 East Evans Road
Scottsdale, AZ 85260

Integrating Sphere Test Report

Relevant Standards

IES LM-79-2008

ANSI C78.377-2011, ANSI C82.77-2002

CIE 13.3-1995, CIE 15-2004

Prepared For

Architectural Lighting Works

30984 Santana Street

Hayward, CA 94544

Catalog Number

LPR3.5T-DRY-2'-1-HP10-3500K-LLED-120-EXT-AL

Project Number

10194509

Test Number

32497

Test Date

2014-01-17

Prepared By

A handwritten signature in black ink, appearing to read 'Chris Elardo'.

Chris Elardo, Technician

Approved By

A handwritten signature in black ink, appearing to read 'Jim Domigan'.

Jim Domigan, Laboratory Team Leader

The results contained in this report pertain only to the tested sample.

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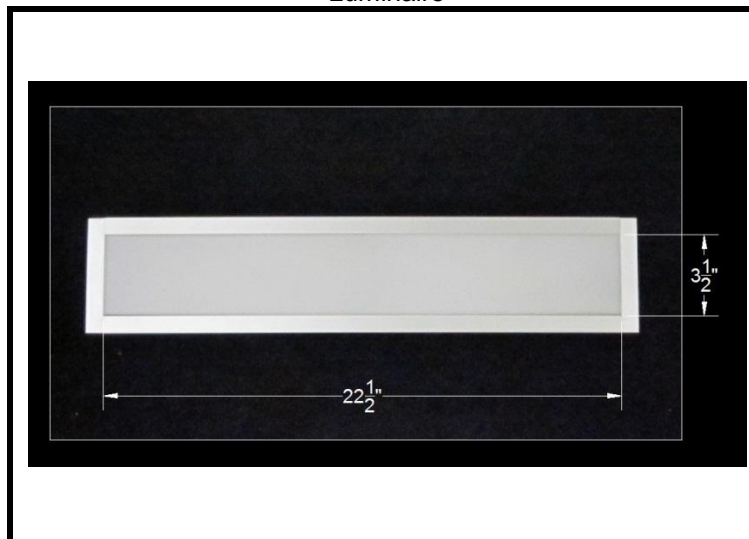


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Luminaire Description: Formed aluminum housing, frosted plastic lens
Catalog Number: LPR3.5T-DRY-2'-1-HP10-3500K-LLED-120-EXT-AL
Lamp: 72 LEDs
Mounting: Downlight
Ballast/Driver: One Thomas Research LED30W-66-C0450 Driver

Luminaire



Summary of Results

Radiant Flux: 4160 mW
Luminous Flux: 1327 Lumens
Luminaire Efficacy: 72.0 Lumens/Watt
CCT: 3366 K
CRI (Ra): 83.5
Chromaticity (x): 0.4129
Chromaticity (y): 0.3943
Chromaticity (u): 0.2391
Chromaticity (v): 0.3426
Duv: 0.0006
S/P Ratio: 1.47

The S/P Ratio is only applicable to low-light-level environments. Caution should be used when applying this factor.

Test Conditions

Test Temperature: 25.5 °C
Voltage: 120.0 VAC
Current: 0.1560 A
Power: 18.44 W
Power Factor: 0.982
Frequency: 60 Hz
Current THD: 5.30 %

Testing was performed in a 2-meter integrating sphere using the 4 π geometry method.

Absorption correction was employed for this measurement.

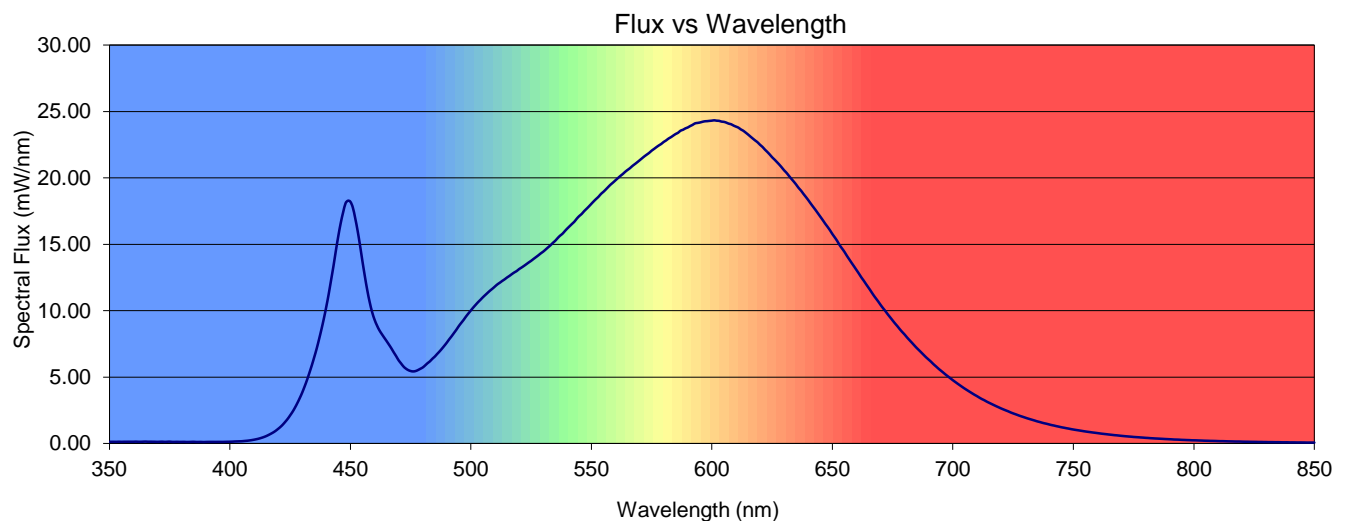
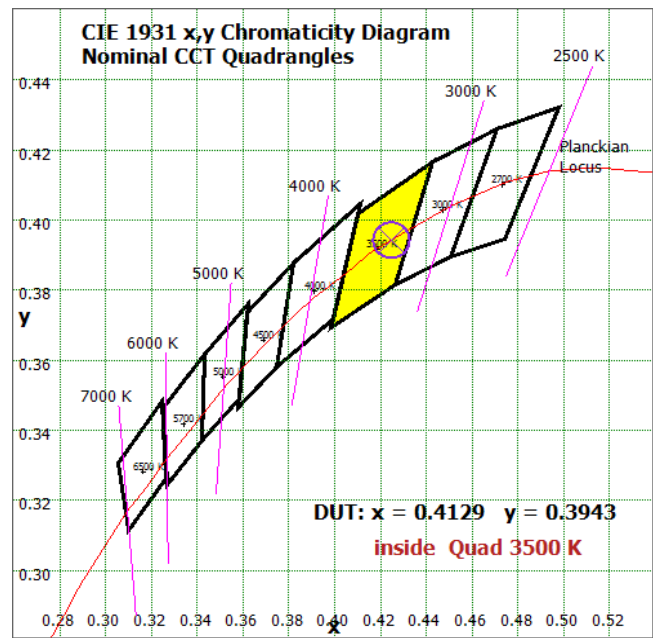
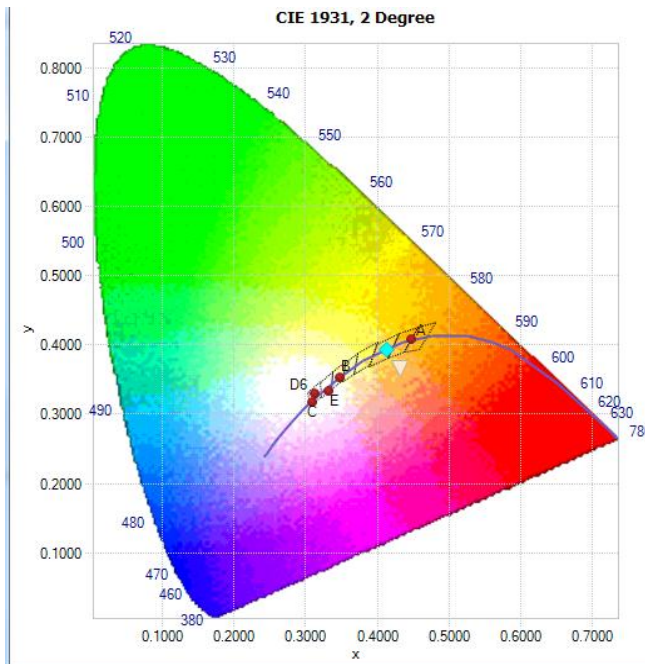


Chromaticity Coordinates

| x | y | u | v | u' | v' | Duv |
|--------|--------|--------|--------|--------|--------|--------|
| 0.4129 | 0.3943 | 0.2391 | 0.3426 | 0.2391 | 0.5139 | 0.0006 |

Color Rendering Index Detail

| Ra (CRI) | R1 | R2 | R3 | R4 | R5 | R6 | R7 | R8 | R9 | R10 | R11 | R12 | R13 | R14 |
|----------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 83.5 | 81.6 | 89.6 | 95.6 | 82.0 | 81.6 | 85.8 | 86.2 | 65.9 | 18.0 | 75.6 | 80.3 | 68.9 | 83.2 | 97.6 |





Spectral Power Distribution

| λ (nm) | mW/nm | λ (nm) | mW/nm | λ (nm) | mW/nm | λ (nm) | mW/nm | λ (nm) | mW/nm | λ (nm) | mW/nm | λ (nm) | mW/nm |
|----------------|-------|----------------|-------|----------------|-------|----------------|-------|----------------|-------|----------------|-------|----------------|--------|
| 350 | 0.128 | 422 | 1.43 | 494 | 8.57 | 566 | 20.7 | 638 | 18.8 | 710 | 3.57 | 782 | 0.402 |
| 351 | 0.129 | 423 | 1.64 | 495 | 8.84 | 567 | 20.9 | 639 | 18.6 | 711 | 3.46 | 783 | 0.392 |
| 352 | 0.129 | 424 | 1.86 | 496 | 9.08 | 568 | 21.0 | 640 | 18.3 | 712 | 3.35 | 784 | 0.380 |
| 353 | 0.127 | 425 | 2.12 | 497 | 9.31 | 569 | 21.2 | 641 | 18.1 | 713 | 3.26 | 785 | 0.371 |
| 354 | 0.134 | 426 | 2.39 | 498 | 9.57 | 570 | 21.3 | 642 | 17.8 | 714 | 3.16 | 786 | 0.361 |
| 355 | 0.126 | 427 | 2.70 | 499 | 9.80 | 571 | 21.5 | 643 | 17.6 | 715 | 3.07 | 787 | 0.351 |
| 356 | 0.132 | 428 | 3.05 | 500 | 10.0 | 572 | 21.6 | 644 | 17.3 | 716 | 2.98 | 788 | 0.340 |
| 357 | 0.132 | 429 | 3.43 | 501 | 10.2 | 573 | 21.8 | 645 | 17.1 | 717 | 2.90 | 789 | 0.331 |
| 358 | 0.134 | 430 | 3.83 | 502 | 10.4 | 574 | 21.9 | 646 | 16.8 | 718 | 2.81 | 790 | 0.322 |
| 359 | 0.133 | 431 | 4.29 | 503 | 10.6 | 575 | 22.0 | 647 | 16.6 | 719 | 2.73 | 791 | 0.311 |
| 360 | 0.133 | 432 | 4.78 | 504 | 10.8 | 576 | 22.2 | 648 | 16.3 | 720 | 2.64 | 792 | 0.299 |
| 361 | 0.141 | 433 | 5.33 | 505 | 11.0 | 577 | 22.3 | 649 | 16.1 | 721 | 2.57 | 793 | 0.295 |
| 362 | 0.131 | 434 | 5.89 | 506 | 11.2 | 578 | 22.4 | 650 | 15.8 | 722 | 2.49 | 794 | 0.287 |
| 363 | 0.130 | 435 | 6.50 | 507 | 11.4 | 579 | 22.6 | 651 | 15.5 | 723 | 2.42 | 795 | 0.276 |
| 364 | 0.138 | 436 | 7.13 | 508 | 11.5 | 580 | 22.7 | 652 | 15.3 | 724 | 2.34 | 796 | 0.269 |
| 365 | 0.145 | 437 | 7.85 | 509 | 11.7 | 581 | 22.8 | 653 | 14.9 | 725 | 2.27 | 797 | 0.261 |
| 366 | 0.135 | 438 | 8.60 | 510 | 11.8 | 582 | 23.0 | 654 | 14.7 | 726 | 2.20 | 798 | 0.255 |
| 367 | 0.136 | 439 | 9.41 | 511 | 12.0 | 583 | 23.1 | 655 | 14.4 | 727 | 2.14 | 799 | 0.246 |
| 368 | 0.133 | 440 | 10.3 | 512 | 12.1 | 584 | 23.2 | 656 | 14.1 | 728 | 2.07 | 800 | 0.240 |
| 369 | 0.131 | 441 | 11.2 | 513 | 12.2 | 585 | 23.3 | 657 | 13.9 | 729 | 2.01 | 801 | 0.236 |
| 370 | 0.124 | 442 | 12.3 | 514 | 12.4 | 586 | 23.4 | 658 | 13.6 | 730 | 1.95 | 802 | 0.228 |
| 371 | 0.132 | 443 | 13.4 | 515 | 12.5 | 587 | 23.6 | 659 | 13.3 | 731 | 1.89 | 803 | 0.223 |
| 372 | 0.136 | 444 | 14.5 | 516 | 12.6 | 588 | 23.6 | 660 | 13.1 | 732 | 1.83 | 804 | 0.215 |
| 373 | 0.124 | 445 | 15.6 | 517 | 12.8 | 589 | 23.7 | 661 | 12.8 | 733 | 1.78 | 805 | 0.208 |
| 374 | 0.133 | 446 | 16.6 | 518 | 12.9 | 590 | 23.8 | 662 | 12.5 | 734 | 1.73 | 806 | 0.205 |
| 375 | 0.141 | 447 | 17.4 | 519 | 13.0 | 591 | 23.9 | 663 | 12.3 | 735 | 1.67 | 807 | 0.197 |
| 376 | 0.123 | 448 | 18.1 | 520 | 13.1 | 592 | 24.0 | 664 | 12.0 | 736 | 1.62 | 808 | 0.195 |
| 377 | 0.121 | 449 | 18.3 | 521 | 13.2 | 593 | 24.1 | 665 | 11.7 | 737 | 1.57 | 809 | 0.190 |
| 378 | 0.127 | 450 | 18.2 | 522 | 13.4 | 594 | 24.1 | 666 | 11.5 | 738 | 1.52 | 810 | 0.183 |
| 379 | 0.121 | 451 | 17.8 | 523 | 13.5 | 595 | 24.2 | 667 | 11.2 | 739 | 1.48 | 811 | 0.177 |
| 380 | 0.123 | 452 | 17.0 | 524 | 13.6 | 596 | 24.2 | 668 | 10.9 | 740 | 1.43 | 812 | 0.176 |
| 381 | 0.125 | 453 | 16.0 | 525 | 13.8 | 597 | 24.3 | 669 | 10.7 | 741 | 1.39 | 813 | 0.171 |
| 382 | 0.115 | 454 | 14.9 | 526 | 13.9 | 598 | 24.3 | 670 | 10.4 | 742 | 1.35 | 814 | 0.164 |
| 383 | 0.117 | 455 | 13.7 | 527 | 14.0 | 599 | 24.3 | 671 | 10.2 | 743 | 1.31 | 815 | 0.160 |
| 384 | 0.125 | 456 | 12.6 | 528 | 14.2 | 600 | 24.3 | 672 | 9.97 | 744 | 1.27 | 816 | 0.157 |
| 385 | 0.129 | 457 | 11.6 | 529 | 14.3 | 601 | 24.3 | 673 | 9.72 | 745 | 1.23 | 817 | 0.151 |
| 386 | 0.117 | 458 | 10.6 | 530 | 14.4 | 602 | 24.3 | 674 | 9.50 | 746 | 1.19 | 818 | 0.149 |
| 387 | 0.116 | 459 | 9.91 | 531 | 14.6 | 603 | 24.3 | 675 | 9.27 | 747 | 1.16 | 819 | 0.148 |
| 388 | 0.121 | 460 | 9.34 | 532 | 14.8 | 604 | 24.2 | 676 | 9.04 | 748 | 1.12 | 820 | 0.140 |
| 389 | 0.110 | 461 | 8.90 | 533 | 14.9 | 605 | 24.2 | 677 | 8.83 | 749 | 1.09 | 821 | 0.136 |
| 390 | 0.116 | 462 | 8.54 | 534 | 15.1 | 606 | 24.2 | 678 | 8.60 | 750 | 1.05 | 822 | 0.134 |
| 391 | 0.121 | 463 | 8.25 | 535 | 15.3 | 607 | 24.1 | 679 | 8.39 | 751 | 1.02 | 823 | 0.131 |
| 392 | 0.122 | 464 | 7.98 | 536 | 15.5 | 608 | 24.0 | 680 | 8.20 | 752 | 0.995 | 824 | 0.126 |
| 393 | 0.122 | 465 | 7.72 | 537 | 15.6 | 609 | 23.9 | 681 | 7.98 | 753 | 0.967 | 825 | 0.124 |
| 394 | 0.120 | 466 | 7.45 | 538 | 15.8 | 610 | 23.9 | 682 | 7.78 | 754 | 0.935 | 826 | 0.122 |
| 395 | 0.122 | 467 | 7.17 | 539 | 16.0 | 611 | 23.8 | 683 | 7.59 | 755 | 0.908 | 827 | 0.116 |
| 396 | 0.122 | 468 | 6.86 | 540 | 16.2 | 612 | 23.7 | 684 | 7.39 | 756 | 0.881 | 828 | 0.117 |
| 397 | 0.121 | 469 | 6.57 | 541 | 16.4 | 613 | 23.6 | 685 | 7.19 | 757 | 0.856 | 829 | 0.111 |
| 398 | 0.127 | 470 | 6.27 | 542 | 16.5 | 614 | 23.4 | 686 | 7.02 | 758 | 0.830 | 830 | 0.110 |
| 399 | 0.130 | 471 | 6.04 | 543 | 16.7 | 615 | 23.3 | 687 | 6.83 | 759 | 0.808 | 831 | 0.105 |
| 400 | 0.135 | 472 | 5.80 | 544 | 16.9 | 616 | 23.1 | 688 | 6.65 | 760 | 0.785 | 832 | 0.105 |
| 401 | 0.140 | 473 | 5.64 | 545 | 17.1 | 617 | 23.0 | 689 | 6.47 | 761 | 0.759 | 833 | 0.103 |
| 402 | 0.152 | 474 | 5.53 | 546 | 17.3 | 618 | 22.8 | 690 | 6.31 | 762 | 0.736 | 834 | 0.0979 |
| 403 | 0.158 | 475 | 5.46 | 547 | 17.5 | 619 | 22.7 | 691 | 6.15 | 763 | 0.715 | 835 | 0.100 |
| 404 | 0.165 | 476 | 5.43 | 548 | 17.7 | 620 | 22.5 | 692 | 5.96 | 764 | 0.694 | 836 | 0.0938 |
| 405 | 0.173 | 477 | 5.45 | 549 | 17.9 | 621 | 22.3 | 693 | 5.81 | 765 | 0.672 | 837 | 0.0902 |
| 406 | 0.190 | 478 | 5.53 | 550 | 18.0 | 622 | 22.1 | 694 | 5.64 | 766 | 0.653 | 838 | 0.0898 |
| 407 | 0.207 | 479 | 5.62 | 551 | 18.2 | 623 | 22.0 | 695 | 5.49 | 767 | 0.629 | 839 | 0.0902 |
| 408 | 0.228 | 480 | 5.72 | 552 | 18.4 | 624 | 21.8 | 696 | 5.34 | 768 | 0.616 | 840 | 0.0829 |
| 409 | 0.255 | 481 | 5.88 | 553 | 18.6 | 625 | 21.6 | 697 | 5.19 | 769 | 0.595 | 841 | 0.0851 |
| 410 | 0.288 | 482 | 6.04 | 554 | 18.8 | 626 | 21.4 | 698 | 5.05 | 770 | 0.576 | 842 | 0.0813 |
| 411 | 0.324 | 483 | 6.19 | 555 | 18.9 | 627 | 21.2 | 699 | 4.91 | 771 | 0.559 | 843 | 0.0774 |
| 412 | 0.368 | 484 | 6.38 | 556 | 19.1 | 628 | 21.0 | 700 | 4.77 | 772 | 0.542 | 844 | 0.0803 |
| 413 | 0.422 | 485 | 6.54 | 557 | 19.3 | 629 | 20.8 | 701 | 4.63 | 773 | 0.527 | 845 | 0.0773 |
| 414 | 0.482 | 486 | 6.74 | 558 | 19.5 | 630 | 20.6 | 702 | 4.50 | 774 | 0.513 | 846 | 0.0762 |
| 415 | 0.553 | 487 | 6.93 | 559 | 19.6 | 631 | 20.4 | 703 | 4.37 | 775 | 0.495 | 847 | 0.0696 |
| 416 | 0.640 | 488 | 7.14 | 560 | 19.8 | 632 | 20.1 | 704 | 4.25 | 776 | 0.482 | 848 | 0.0721 |
| 417 | 0.735 | 489 | 7.36 | 561 | 20.0 | 633 | 19.9 | 705 | 4.12 | 777 | 0.469 | 849 | 0.0719 |
| 418 | 0.838 | 490 | 7.59 | 562 | 20.1 | 634 | 19.7 | 706 | 4.01 | 778 | 0.456 | 850 | 0.0693 |
| 419 | 0.958 | 491 | 7.85 | 563 | 20.3 | 635 | 19.5 | 707 | 3.89 | 779 | 0.443 | | |
| 420 | 1.10 | 492 | 8.07 | 564 | 20.5 | 636 | 19.2 | 708 | 3.78 | 780 | 0.428 | | |
| 421 | 1.25 | 493 | 8.33 | 565 | 20.6 | 637 | 19.0 | 709 | 3.67 | 781 | 0.417 | | |