**计量技术规范实验报告及不确定度**

LED总光通量标准灯检定规程

**实验报告及不确定度分析**

（2021.05.17）

1. 实验目的

使用副基准级别的LED总光通量标准灯（以下简称标准灯），对工作基准灯级别的LED总光通量标准灯（以下简称被测灯）进行检定，测试新制定的检定规程的可行性。

1. 实验地点及时间

中国计量科学研究院昌平园区14号楼2007室。2021年05月17日。

1. 环境条件

温度21℃，湿度50%。

1. 检定/校准设备

检定装置由设备组成：

1. 副基准级别的LED总光通量标准灯组；
2. 球形光度计，由2.0m 积分球，直流电源和电测仪表组成。
3. 检定/校准人：

校准人：赵伟强 刘慧

1. 被检/校样品信息：

被测灯是工作基准灯级别的LED总光通量标准灯。

1. 检定/校准方法及结果：

检定方法见“LED总光通量标准灯”检定规程草稿。

该检定实验原始记录如下：

灯 号：GT158

灯电流：90.00 mA

|  |  |
| --- | --- |
| 检定项目 | 检定结果 |
| 外观检查 | 良好 |
| *k*v值 | 0.06231 V-1 |
| 规范灯电压值 | 66.3972 V |
| 相关色温 | 3961 K |
| 稳定性 | -0.017 % / 100h |
| 规范灯电压下  总光通量值 | 1168.2 lm |
| 备注 | |

灯 号：GT159

灯电流：90.00 mA

|  |  |
| --- | --- |
| 检定项目 | 检定结果 |
| 外观检查 | 良好 |
| *k*v值 | 0.06141 V-1 |
| 规范灯电压值 | 66.4698 V |
| 相关色温 | 3959 K |
| 稳定性 | -0.013 % / 100h |
| 规范灯电压下  总光通量值 | 1172.8 lm |
| 备注 | |

灯 号：GT162

灯电流：90.00 mA

|  |  |
| --- | --- |
| 检定项目 | 检定结果 |
| 外观检查 | 良好 |
| *k*v值 | 0.05762 V-1 |
| 规范灯电压值 | 66.4415 V |
| 相关色温 | 3939 K |
| 稳定性 | -0.017% / 100h |
| 规范灯电压下  总光通量值 | 1172.8 lm |
| 备注 | |

7.1（a）外观检查

依据规程，对三只被测灯进行了外观检查，结果良好。

7.1（b）*k*v值的实验结果

灯在点燃过程中的光电流和灯电压的关系数据，截取灯点燃60s后的数据，计算出*k*v如下：

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| GT158 | | | GT159 | | | | GT162 | | |
| 运行时间/s | 探测器的光电流/A | 灯电压  /V | 运行时间/s | 探测器的光电流/A | 灯电压  /V | 运行时间/s | | 探测器的光电流/A | 灯电压  /V |
| 2.5 | 8.1096E-07 | 67.05613 | 2.5 | 8.1770E-07 | 67.1378 | 2.5 | | 8.2394E-07 | 67.3757 |
| 7.5 | 8.0351E-07 | 66.86558 | 7.5 | 8.1027E-07 | 66.9465 | 7.5 | | 8.1743E-07 | 67.1889 |
| 12.5 | 7.9792E-07 | 66.73402 | 12.5 | 8.0469E-07 | 66.8145 | 12.5 | | 8.1193E-07 | 67.0436 |
| 17.5 | 7.9413E-07 | 66.64777 | 17.5 | 8.0092E-07 | 66.7280 | 17.5 | | 8.0768E-07 | 66.9359 |
| 22.5 | 7.9158E-07 | 66.59092 | 22.5 | 7.9836E-07 | 66.6705 | 22.5 | | 8.0445E-07 | 66.8562 |
| 27.5 | 7.8982E-07 | 66.55245 | 27.5 | 7.9660E-07 | 66.6317 | 27.5 | | 8.0200E-07 | 66.7972 |
| 32.5 | 7.8861E-07 | 66.52618 | 32.5 | 7.9538E-07 | 66.6048 | 32.5 | | 8.0014E-07 | 66.7532 |
| 37.5 | 7.8774E-07 | 66.50766 | 37.5 | 7.9450E-07 | 66.5858 | 37.5 | | 7.9874E-07 | 66.7203 |
| 42.5 | 7.8711E-07 | 66.49426 | 42.5 | 7.9386E-07 | 66.5720 | 42.5 | | 7.9766E-07 | 66.6953 |
| 47.5 | 7.8665E-07 | 66.48436 | 47.5 | 7.9337E-07 | 66.5618 | 47.5 | | 7.9683E-07 | 66.6762 |
| 52.5 | 7.8628E-07 | 66.47671 | 52.5 | 7.9300E-07 | 66.5538 | 52.5 | | 7.9617E-07 | 66.6613 |
| 57.5 | 7.8599E-07 | 66.47067 | 57.5 | 7.9271E-07 | 66.5476 | 57.5 | | 7.9565E-07 | 66.6496 |
| 62.5 | 7.8575E-07 | 66.46569 | 62.5 | 7.9247E-07 | 66.5424 | 62.5 | | 7.9524E-07 | 66.6403 |
| 67.5 | 7.8555E-07 | 66.46153 | 67.5 | 7.9226E-07 | 66.5381 | 67.5 | | 7.9490E-07 | 66.6326 |
| 72.5 | 7.8538E-07 | 66.45794 | 72.5 | 7.9209E-07 | 66.5345 | 72.5 | | 7.9462E-07 | 66.6263 |
| 77.5 | 7.8522E-07 | 66.45481 | 77.5 | 7.9193E-07 | 66.5312 | 77.5 | | 7.9438E-07 | 66.6209 |
| 82.5 | 7.8509E-07 | 66.45201 | 82.5 | 7.9180E-07 | 66.5284 | 82.5 | | 7.9417E-07 | 66.6163 |
| 87.5 | 7.8496E-07 | 66.44946 | 87.5 | 7.9168E-07 | 66.5258 | 87.5 | | 7.9399E-07 | 66.6123 |
| 92.5 | 7.8485E-07 | 66.44713 | 92.5 | 7.9156E-07 | 66.5235 | 92.5 | | 7.9383E-07 | 66.6088 |
| 97.5 | 7.8474E-07 | 66.44497 | 97.5 | 7.9146E-07 | 66.5213 | 97.5 | | 7.9369E-07 | 66.6057 |
| 102.5 | 7.8465E-07 | 66.44295 | 102.5 | 7.9136E-07 | 66.5193 | 102.5 | | 7.9356E-07 | 66.6028 |
| 107.5 | 7.8456E-07 | 66.44105 | 107.5 | 7.9127E-07 | 66.5174 | 107.5 | | 7.9344E-07 | 66.6002 |
| 112.5 | 7.8446E-07 | 66.43928 | 112.5 | 7.9118E-07 | 66.5156 | 112.5 | | 7.9333E-07 | 66.5978 |
| 117.5 | 7.8439E-07 | 66.43758 | 117.5 | 7.9110E-07 | 66.5139 | 117.5 | | 7.9323E-07 | 66.5956 |
| 122.5 | 7.8431E-07 | 66.43598 | 122.5 | 7.9103E-07 | 66.5123 | 122.7 | | 7.9313E-07 | 66.5935 |
| 127.5 | 7.8423E-07 | 66.43445 | 127.5 | 7.9095E-07 | 66.5108 | 127.5 | | 7.9305E-07 | 66.5916 |
| 132.5 | 7.8417E-07 | 66.43298 | 132.5 | 7.9088E-07 | 66.5094 | 132.5 | | 7.9297E-07 | 66.5898 |
| 137.5 | 7.8410E-07 | 66.43158 | 137.5 | 7.9082E-07 | 66.5080 | 137.5 | | 7.9289E-07 | 66.5881 |
| 142.5 | 7.8403E-07 | 66.43027 | 142.5 | 7.9075E-07 | 66.5067 | 142.5 | | 7.9282E-07 | 66.5865 |
| 147.5 | 7.8397E-07 | 66.42901 | 147.5 | 7.9069E-07 | 66.5054 | 147.5 | | 7.9274E-07 | 66.5849 |
| 152.5 | 7.8391E-07 | 66.42782 | 152.5 | 7.9063E-07 | 66.5042 | 152.5 | | 7.9267E-07 | 66.5834 |
| 157.5 | 7.8386E-07 | 66.42667 | 157.5 | 7.9058E-07 | 66.5030 | 157.5 | | 7.9261E-07 | 66.5820 |
| 162.5 | 7.8380E-07 | 66.42556 | 162.5 | 7.9052E-07 | 66.5019 | 162.5 | | 7.9254E-07 | 66.5806 |
| 167.5 | 7.8375E-07 | 66.42452 | 167.5 | 7.9047E-07 | 66.5008 | 167.5 | | 7.9248E-07 | 66.5793 |
| 172.5 | 7.8370E-07 | 66.42352 | 172.5 | 7.9042E-07 | 66.4997 | 172.5 | | 7.9243E-07 | 66.5780 |
| 177.5 | 7.8366E-07 | 66.42256 | 177.5 | 7.9037E-07 | 66.4987 | 177.5 | | 7.9237E-07 | 66.5768 |
| 182.6 | 7.8361E-07 | 66.42165 | 182.5 | 7.9032E-07 | 66.4977 | 182.5 | | 7.9232E-07 | 66.5757 |
| 187.5 | 7.8357E-07 | 66.42076 | 187.5 | 7.9027E-07 | 66.4967 | 187.5 | | 7.9227E-07 | 66.5745 |
| 192.5 | 7.8353E-07 | 66.41991 | 192.5 | 7.9023E-07 | 66.4958 | 192.5 | | 7.9222E-07 | 66.5734 |
| 197.5 | 7.8349E-07 | 66.41907 | 197.5 | 7.9018E-07 | 66.4949 | 197.5 | | 7.9217E-07 | 66.5723 |
| 202.5 | 7.8345E-07 | 66.41828 | 202.5 | 7.9014E-07 | 66.4940 | 202.5 | | 7.9212E-07 | 66.5713 |
| 207.6 | 7.8341E-07 | 66.41750 | 207.5 | 7.9010E-07 | 66.4932 | 207.5 | | 7.9207E-07 | 66.5703 |
| 212.5 | 7.8337E-07 | 66.41675 | 212.5 | 7.9006E-07 | 66.4924 | 212.5 | | 7.9203E-07 | 66.5693 |
| 217.5 | 7.8334E-07 | 66.41601 | 217.5 | 7.9003E-07 | 66.4915 | 217.5 | | 7.9199E-07 | 66.5684 |
| 222.5 | 7.8330E-07 | 66.41528 | 222.5 | 7.8998E-07 | 66.4907 | 222.5 | | 7.9195E-07 | 66.5675 |
| 227.5 | 7.8327E-07 | 66.41455 | 227.5 | 7.8995E-07 | 66.4900 | 227.5 | | 7.9190E-07 | 66.5666 |
| 232.5 | 7.8323E-07 | 66.41384 | 232.5 | 7.8991E-07 | 66.4892 | 232.5 | | 7.9186E-07 | 66.5657 |
| 237.5 | 7.8320E-07 | 66.41312 | 237.5 | 7.8987E-07 | 66.4884 | 237.5 | | 7.9182E-07 | 66.5648 |
| 242.5 | 7.8317E-07 | 66.41245 | 242.5 | 7.8984E-07 | 66.4877 | 242.5 | | 7.9179E-07 | 66.5639 |
| 247.5 | 7.8314E-07 | 66.41183 | 247.5 | 7.8980E-07 | 66.4870 | 247.5 | | 7.9175E-07 | 66.5631 |
| 252.5 | 7.8310E-07 | 66.41120 | 252.5 | 7.8977E-07 | 66.4863 | 252.5 | | 7.9171E-07 | 66.5623 |
| 257.5 | 7.8307E-07 | 66.41062 | 257.5 | 7.8974E-07 | 66.4857 | 257.5 | | 7.9168E-07 | 66.5616 |
| 262.5 | 7.8305E-07 | 66.41001 | 262.5 | 7.8971E-07 | 66.4850 | 262.5 | | 7.9164E-07 | 66.5608 |
| 267.5 | 7.8302E-07 | 66.40943 | 267.5 | 7.8968E-07 | 66.4844 | 267.5 | | 7.9161E-07 | 66.5601 |
| 272.5 | 7.8299E-07 | 66.40885 | 272.5 | 7.8965E-07 | 66.4838 | 272.5 | | 7.9158E-07 | 66.5594 |
| 277.5 | 7.8296E-07 | 66.40827 | 277.5 | 7.8962E-07 | 66.4832 | 277.5 | | 7.9155E-07 | 66.5587 |
| 282.5 | 7.8293E-07 | 66.40771 | 282.5 | 7.8960E-07 | 66.4826 | 282.5 | | 7.9152E-07 | 66.5580 |
| 287.5 | 7.8291E-07 | 66.40717 | 287.5 | 7.8957E-07 | 66.4820 | 287.5 | | 7.9149E-07 | 66.5574 |
| 292.5 | 7.8288E-07 | 66.40664 | 292.5 | 7.8954E-07 | 66.4815 | 292.5 | | 7.9146E-07 | 66.5568 |
| 297.5 | 7.8286E-07 | 66.40613 | 297.5 | 7.8952E-07 | 66.4810 | 297.5 | | 7.9143E-07 | 66.5562 |
| 302.5 | 7.8283E-07 | 66.40563 | 302.5 | 7.8949E-07 | 66.4805 | 302.5 | | 7.9141E-07 | 66.5556 |
| 307.5 | 7.8281E-07 | 66.40514 | 307.5 | 7.8947E-07 | 66.4800 | 307.5 | | 7.9138E-07 | 66.5550 |
| 312.5 | 7.8279E-07 | 66.40465 | 312.5 | 7.8945E-07 | 66.4795 | 312.5 | | 7.9135E-07 | 66.5545 |
| 317.5 | 7.8276E-07 | 66.40417 | 317.5 | 7.8943E-07 | 66.4791 | 317.5 | | 7.9133E-07 | 66.5539 |
| 322.5 | 7.8274E-07 | 66.40371 | 322.5 | 7.8940E-07 | 66.4786 | 322.5 | | 7.9131E-07 | 66.5534 |
| 327.5 | 7.8272E-07 | 66.40326 | 327.5 | 7.8938E-07 | 66.4782 | 327.5 | | 7.9128E-07 | 66.5529 |
| 332.5 | 7.8270E-07 | 66.40281 | 332.5 | 7.8936E-07 | 66.4778 | 332.5 | | 7.9126E-07 | 66.5523 |
| 337.5 | 7.8268E-07 | 66.40238 | 337.5 | 7.8934E-07 | 66.4773 | 337.5 | | 7.9123E-07 | 66.5519 |
| 342.5 | 7.8266E-07 | 66.40197 | 342.5 | 7.8932E-07 | 66.4769 | 342.5 | | 7.9122E-07 | 66.5514 |
| 347.5 | 7.8263E-07 | 66.40157 | 347.5 | 7.8930E-07 | 66.4765 | 347.5 | | 7.9119E-07 | 66.5510 |
| 352.5 | 7.8262E-07 | 66.40118 | 352.5 | 7.8928E-07 | 66.4762 | 352.5 | | 7.9117E-07 | 66.5505 |
| 357.5 | 7.8260E-07 | 66.40080 | 357.5 | 7.8926E-07 | 66.4758 | 357.5 | | 7.9116E-07 | 66.5501 |
| 362.5 | 7.8258E-07 | 66.40043 | 362.5 | 7.8924E-07 | 66.4754 | 362.5 | | 7.9114E-07 | 66.5497 |
| 367.5 | 7.8256E-07 | 66.40008 | 367.5 | 7.8923E-07 | 66.4750 | 367.5 | | 7.9112E-07 | 66.5493 |
| 372.5 | 7.8255E-07 | 66.39972 | 372.5 | 7.8921E-07 | 66.4746 | 372.5 | | 7.9110E-07 | 66.5489 |
| 377.5 | 7.8253E-07 | 66.39939 | 377.5 | 7.8919E-07 | 66.4743 | 377.5 | | 7.9108E-07 | 66.5485 |
| 382.5 | 7.8252E-07 | 66.39908 | 382.5 | 7.8917E-07 | 66.4740 | 382.5 | | 7.9107E-07 | 66.5481 |
| 387.5 | 7.8250E-07 | 66.39876 | 387.5 | 7.8916E-07 | 66.4736 | 387.5 | | 7.9105E-07 | 66.5478 |
| 392.5 | 7.8248E-07 | 66.39846 | 392.5 | 7.8914E-07 | 66.4733 | 392.5 | | 7.9103E-07 | 66.5474 |
| 397.5 | 7.8247E-07 | 66.39816 | 397.5 | 7.8913E-07 | 66.4730 | 397.5 | | 7.9102E-07 | 66.5471 |
| 402.5 | 7.8246E-07 | 66.39790 | 402.5 | 7.8911E-07 | 66.4727 | 402.5 | | 7.9100E-07 | 66.5467 |
| 407.5 | 7.8245E-07 | 66.39762 | 407.5 | 7.8910E-07 | 66.4724 | 407.5 | | 7.9099E-07 | 66.5464 |
| 412.5 | 7.8243E-07 | 66.39735 | 412.5 | 7.8909E-07 | 66.4722 | 412.5 | | 7.9097E-07 | 66.5461 |
| 417.5 | 7.8242E-07 | 66.39708 | 417.5 | 7.8907E-07 | 66.4719 | 417.5 | | 7.9096E-07 | 66.5458 |
| 422.5 | 7.8241E-07 | 66.39683 | 422.6 | 7.8906E-07 | 66.4716 | 422.5 | | 7.9094E-07 | 66.5455 |
| 427.5 | 7.8239E-07 | 66.39656 | 427.6 | 7.8905E-07 | 66.4714 | 427.5 | | 7.9093E-07 | 66.5452 |
| 432.5 | 7.8238E-07 | 66.39634 | 432.5 | 7.8903E-07 | 66.4711 | 432.5 | | 7.9092E-07 | 66.5449 |
| 437.5 | 7.8237E-07 | 66.39610 | 437.5 | 7.8902E-07 | 66.4709 | 437.5 | | 7.9091E-07 | 66.5447 |
| 442.5 | 7.8236E-07 | 66.39587 | 442.5 | 7.8901E-07 | 66.4706 | 442.5 | | 7.9089E-07 | 66.5444 |
| 447.5 | 7.8235E-07 | 66.39564 | 447.5 | 7.8900E-07 | 66.4704 | 447.5 | | 7.9088E-07 | 66.5441 |
| 452.5 | 7.8234E-07 | 66.39543 | 452.6 | 7.8899E-07 | 66.4701 | 452.5 | | 7.9087E-07 | 66.5439 |
| 457.5 | 7.8233E-07 | 66.39522 | 457.6 | 7.8898E-07 | 66.4699 | 457.5 | | 7.9086E-07 | 66.5436 |
| 462.5 | 7.8232E-07 | 66.39502 | 462.5 | 7.8897E-07 | 66.4697 | 462.5 | | 7.9085E-07 | 66.5434 |
| 467.5 | 7.8231E-07 | 66.39483 | 467.5 | 7.8895E-07 | 66.4695 | 467.5 | | 7.9084E-07 | 66.5432 |
| 472.5 | 7.8230E-07 | 66.39464 | 472.6 | 7.8894E-07 | 66.4693 | 472.5 | | 7.9083E-07 | 66.5429 |
| 477.5 | 7.8229E-07 | 66.39445 | 477.6 | 7.8894E-07 | 66.4691 | 477.5 | | 7.9082E-07 | 66.5427 |
| 482.5 | 7.8228E-07 | 66.39428 | 482.5 | 7.8893E-07 | 66.4689 | 482.5 | | 7.9081E-07 | 66.5425 |
| 487.5 | 7.8227E-07 | 66.39410 | 487.6 | 7.8891E-07 | 66.4687 | 487.5 | | 7.9080E-07 | 66.5423 |
| 492.5 | 7.8226E-07 | 66.39394 | 492.6 | 7.8891E-07 | 66.4685 | 492.5 | | 7.9079E-07 | 66.5421 |
| 497.5 | 7.8226E-07 | 66.39378 | 497.5 | 7.8890E-07 | 66.4684 | 497.5 | | 7.9078E-07 | 66.5419 |
| 502.5 | 7.8225E-07 | 66.39361 | 502.5 | 7.8889E-07 | 66.4682 | 502.5 | | 7.9077E-07 | 66.5417 |
| 507.5 | 7.8224E-07 | 66.39346 | 507.5 | 7.8888E-07 | 66.4680 | 507.5 | | 7.9076E-07 | 66.5416 |
| 512.5 | 7.8223E-07 | 66.39332 | 512.5 | 7.8887E-07 | 66.4679 | 512.5 | | 7.9076E-07 | 66.5414 |
| 517.5 | 7.8223E-07 | 66.39317 | 517.5 | 7.8887E-07 | 66.4677 | 517.5 | | 7.9075E-07 | 66.5412 |
| 522.5 | 7.8222E-07 | 66.39305 | 522.5 | 7.8886E-07 | 66.4676 | 522.5 | | 7.9074E-07 | 66.5411 |
| 527.5 | 7.8221E-07 | 66.39291 | 527.5 | 7.8885E-07 | 66.4674 | 527.5 | | 7.9073E-07 | 66.5409 |
| 532.5 | 7.8221E-07 | 66.39276 | 532.5 | 7.8884E-07 | 66.4673 | 532.5 | | 7.9072E-07 | 66.5407 |
| 537.5 | 7.8220E-07 | 66.39263 | 537.5 | 7.8884E-07 | 66.4671 | 537.5 | | 7.9072E-07 | 66.5406 |
| 542.5 | 7.8220E-07 | 66.39251 | 542.5 | 7.8883E-07 | 66.4670 | 542.5 | | 7.9071E-07 | 66.5404 |
| 547.5 | 7.8219E-07 | 66.39239 | 547.5 | 7.8883E-07 | 66.4669 | 547.5 | | 7.9070E-07 | 66.5403 |
| 552.5 | 7.8218E-07 | 66.39228 | 552.5 | 7.8882E-07 | 66.4667 | 552.5 | | 7.9070E-07 | 66.5401 |
| 557.5 | 7.8218E-07 | 66.39215 | 557.5 | 7.8881E-07 | 66.4666 | 557.5 | | 7.9069E-07 | 66.5400 |
| 562.5 | 7.8217E-07 | 66.39203 | 562.5 | 7.8881E-07 | 66.4665 | 562.5 | | 7.9068E-07 | 66.5398 |
| 567.5 | 7.8217E-07 | 66.39192 | 567.5 | 7.8880E-07 | 66.4664 | 567.5 | | 7.9068E-07 | 66.5397 |
| 572.5 | 7.8216E-07 | 66.39181 | 572.5 | 7.8880E-07 | 66.4663 | 572.5 | | 7.9068E-07 | 66.5396 |
| 577.5 | 7.8215E-07 | 66.39170 | 577.5 | 7.8879E-07 | 66.4661 | 577.5 | | 7.9067E-07 | 66.5394 |
| 582.5 | 7.8215E-07 | 66.39160 | 582.5 | 7.8878E-07 | 66.4660 | 582.5 | | 7.9066E-07 | 66.5393 |
| 587.5 | 7.8214E-07 | 66.39149 | 587.5 | 7.8878E-07 | 66.4659 | 587.5 | | 7.9066E-07 | 66.5392 |
| 592.5 | 7.8214E-07 | 66.39139 | 592.5 | 7.8878E-07 | 66.4658 | 592.5 | | 7.9065E-07 | 66.5391 |
| 597.5 | 7.8213E-07 | 66.39129 | 597.5 | 7.8877E-07 | 66.4657 | 597.5 | | 7.9064E-07 | 66.5390 |
| 602.5 | 7.8213E-07 | 66.39120 | 602.5 | 7.8876E-07 | 66.4656 | 602.5 | | 7.9064E-07 | 66.5389 |
| 607.5 | 7.8212E-07 | 66.39110 | 607.5 | 7.8876E-07 | 66.4655 | 607.5 | | 7.9064E-07 | 66.5388 |
| 612.5 | 7.8212E-07 | 66.39100 | 612.5 | 7.8875E-07 | 66.4654 | 612.5 | | 7.9063E-07 | 66.5386 |
| 617.5 | 7.8211E-07 | 66.39092 | 617.5 | 7.8875E-07 | 66.4654 | 617.5 | | 7.9063E-07 | 66.5386 |
| 622.5 | 7.8211E-07 | 66.39083 | 622.5 | 7.8875E-07 | 66.4653 | 622.5 | | 7.9062E-07 | 66.5384 |
| 627.5 | 7.8211E-07 | 66.39076 | 627.5 | 7.8875E-07 | 66.4652 | 627.5 | | 7.9061E-07 | 66.5384 |
| 632.5 | 7.8210E-07 | 66.39068 | 632.5 | 7.8874E-07 | 66.4652 | 632.5 | | 7.9061E-07 | 66.5382 |
| 637.5 | 7.8210E-07 | 66.39061 | 637.5 | 7.8874E-07 | 66.4651 | 637.5 | | 7.9061E-07 | 66.5382 |
| 642.5 | 7.8210E-07 | 66.39055 | 642.5 | 7.8873E-07 | 66.4650 | 642.5 | | 7.9060E-07 | 66.5381 |
| 647.5 | 7.8209E-07 | 66.39047 | 647.5 | 7.8873E-07 | 66.4649 | 647.5 | | 7.9060E-07 | 66.5380 |
| 652.5 | 7.8209E-07 | 66.39042 | 652.5 | 7.8873E-07 | 66.4649 | 652.5 | | 7.9060E-07 | 66.5379 |
| 657.5 | 7.8209E-07 | 66.39036 | 657.5 | 7.8872E-07 | 66.4648 | 657.5 | | 7.9059E-07 | 66.5378 |
| 662.5 | 7.8208E-07 | 66.39031 | 662.5 | 7.8872E-07 | 66.4648 | 662.5 | | 7.9059E-07 | 66.5378 |
| 667.5 | 7.8208E-07 | 66.39027 | 667.5 | 7.8872E-07 | 66.4647 | 667.5 | | 7.9058E-07 | 66.5377 |
| 672.5 | 7.8208E-07 | 66.39021 | 672.5 | 7.8871E-07 | 66.4646 | 672.5 | | 7.9058E-07 | 66.5376 |
| 677.5 | 7.8207E-07 | 66.39017 | 677.5 | 7.8871E-07 | 66.4646 | 677.5 | | 7.9058E-07 | 66.5375 |
| 682.5 | 7.8207E-07 | 66.39011 | 682.5 | 7.8871E-07 | 66.4645 | 682.5 | | 7.9058E-07 | 66.5375 |
| 687.5 | 7.8207E-07 | 66.39006 | 687.5 | 7.8870E-07 | 66.4644 | 687.5 | | 7.9057E-07 | 66.5374 |
| 692.5 | 7.8207E-07 | 66.39002 | 692.5 | 7.8870E-07 | 66.4644 | 692.5 | | 7.9057E-07 | 66.5373 |
| 697.5 | 7.8207E-07 | 66.38997 | 697.5 | 7.8870E-07 | 66.4644 | 697.5 | | 7.9057E-07 | 66.5373 |
| 702.5 | 7.8206E-07 | 66.38990 | 702.5 | 7.8869E-07 | 66.4643 | 702.5 | | 7.9057E-07 | 66.5372 |
| 707.5 | 7.8206E-07 | 66.38985 | 707.5 | 7.8869E-07 | 66.4642 | 707.5 | | 7.9056E-07 | 66.5371 |
| 712.5 | 7.8206E-07 | 66.38980 | 712.5 | 7.8869E-07 | 66.4642 | 712.5 | | 7.9056E-07 | 66.5371 |
| 717.5 | 7.8206E-07 | 66.38974 | 717.5 | 7.8869E-07 | 66.4641 | 717.5 | | 7.9056E-07 | 66.5370 |
| 722.5 | 7.8205E-07 | 66.38971 | 722.5 | 7.8869E-07 | 66.4641 | 722.6 | | 7.9055E-07 | 66.5370 |
| 727.5 | 7.8205E-07 | 66.38967 | 727.5 | 7.8868E-07 | 66.4641 | 727.5 | | 7.9055E-07 | 66.5369 |
| 732.5 | 7.8205E-07 | 66.38963 | 732.5 | 7.8868E-07 | 66.4640 | 732.5 | | 7.9054E-07 | 66.5369 |
| 737.5 | 7.8204E-07 | 66.38957 | 737.5 | 7.8868E-07 | 66.4639 | 737.5 | | 7.9054E-07 | 66.5368 |
| 742.5 | 7.8204E-07 | 66.38953 | 742.5 | 7.8868E-07 | 66.4639 | 742.6 | | 7.9054E-07 | 66.5367 |
| 747.5 | 7.8204E-07 | 66.38949 | 747.5 | 7.8868E-07 | 66.4639 | 747.6 | | 7.9054E-07 | 66.5367 |
| 752.5 | 7.8204E-07 | 66.38945 | 752.5 | 7.8867E-07 | 66.4638 | 752.6 | | 7.9054E-07 | 66.5367 |
| 757.5 | 7.8204E-07 | 66.38941 | 757.5 | 7.8867E-07 | 66.4638 | 757.6 | | 7.9053E-07 | 66.5366 |
| 762.5 | 7.8203E-07 | 66.38937 | 762.5 | 7.8867E-07 | 66.4638 | 762.6 | | 7.9053E-07 | 66.5366 |
| 767.5 | 7.8203E-07 | 66.38935 | 767.5 | 7.8867E-07 | 66.4637 | 767.6 | | 7.9053E-07 | 66.5365 |
| 772.5 | 7.8203E-07 | 66.38931 | 772.5 | 7.8867E-07 | 66.4637 | 772.6 | | 7.9052E-07 | 66.5365 |
| 777.5 | 7.8203E-07 | 66.38927 | 777.5 | 7.8866E-07 | 66.4637 | 777.6 | | 7.9053E-07 | 66.5364 |
| 782.5 | 7.8203E-07 | 66.38923 | 782.5 | 7.8866E-07 | 66.4636 | 782.6 | | 7.9052E-07 | 66.5364 |
| 787.5 | 7.8203E-07 | 66.38920 | 787.5 | 7.8866E-07 | 66.4636 | 787.6 | | 7.9053E-07 | 66.5364 |
| 792.5 | 7.8202E-07 | 66.38916 | 792.5 | 7.8866E-07 | 66.4636 | 792.6 | | 7.9052E-07 | 66.5363 |
| 797.5 | 7.8202E-07 | 66.38913 | 797.5 | 7.8866E-07 | 66.4635 | 797.6 | | 7.9052E-07 | 66.5363 |
| 802.5 | 7.8202E-07 | 66.38912 | 802.5 | 7.8866E-07 | 66.4635 | 802.6 | | 7.9052E-07 | 66.5362 |
| 807.5 | 7.8202E-07 | 66.38907 | 807.5 | 7.8865E-07 | 66.4635 | 807.6 | | 7.9052E-07 | 66.5362 |
| 812.5 | 7.8202E-07 | 66.38904 | 812.5 | 7.8865E-07 | 66.4635 | 812.6 | | 7.9052E-07 | 66.5362 |
| 817.5 | 7.8201E-07 | 66.38901 | 817.5 | 7.8865E-07 | 66.4634 | 817.6 | | 7.9051E-07 | 66.5361 |
| 822.5 | 7.8201E-07 | 66.38899 | 822.5 | 7.8865E-07 | 66.4634 | 822.6 | | 7.9051E-07 | 66.5361 |
| 827.5 | 7.8201E-07 | 66.38896 | 827.5 | 7.8865E-07 | 66.4634 | 827.6 | | 7.9051E-07 | 66.5361 |
| 832.5 | 7.8201E-07 | 66.38893 | 832.5 | 7.8865E-07 | 66.4634 | 832.6 | | 7.9051E-07 | 66.5360 |
| 837.5 | 7.8201E-07 | 66.38892 | 837.5 | 7.8864E-07 | 66.4633 | 837.6 | | 7.9051E-07 | 66.5360 |
| 842.5 | 7.8201E-07 | 66.38890 | 842.5 | 7.8864E-07 | 66.4633 | 842.6 | | 7.9050E-07 | 66.5360 |
| 847.5 | 7.8201E-07 | 66.38887 | 847.5 | 7.8864E-07 | 66.4633 | 847.6 | | 7.9050E-07 | 66.5359 |
| 852.5 | 7.8201E-07 | 66.38885 | 852.5 | 7.8864E-07 | 66.4633 | 852.6 | | 7.9050E-07 | 66.5359 |
| 857.5 | 7.8201E-07 | 66.38884 | 857.5 | 7.8864E-07 | 66.4632 | 857.6 | | 7.9050E-07 | 66.5359 |
| 862.5 | 7.8200E-07 | 66.38880 | 862.5 | 7.8864E-07 | 66.4632 | 862.6 | | 7.9050E-07 | 66.5359 |
| 867.5 | 7.8200E-07 | 66.38879 | 867.5 | 7.8864E-07 | 66.4632 | 867.6 | | 7.9050E-07 | 66.5358 |
| 872.5 | 7.8200E-07 | 66.38876 | 872.5 | 7.8864E-07 | 66.4632 | 872.6 | | 7.9050E-07 | 66.5358 |
| 877.5 | 7.8200E-07 | 66.38876 | 877.5 | 7.8864E-07 | 66.4632 | 877.6 | | 7.9049E-07 | 66.5358 |
| 882.5 | 7.8200E-07 | 66.38873 | 882.5 | 7.8863E-07 | 66.4631 | 882.6 | | 7.9049E-07 | 66.5358 |
| 887.5 | 7.8200E-07 | 66.38871 | 887.5 | 7.8863E-07 | 66.4631 | 887.6 | | 7.9049E-07 | 66.5357 |
| 892.5 | 7.8200E-07 | 66.38868 | 892.5 | 7.8863E-07 | 66.4631 | 892.6 | | 7.9049E-07 | 66.5357 |
| 897.5 | 7.8199E-07 | 66.38866 | 897.5 | 7.8863E-07 | 66.4631 | 897.6 | | 7.9049E-07 | 66.5357 |
| 902.5 | 7.8199E-07 | 66.38864 | 902.5 | 7.8863E-07 | 66.4631 | 902.6 | | 7.9049E-07 | 66.5357 |
| *k*v值计算结果：  GT158: 0.06231 V-1  GT159: 0.06141 V-1  GT162: 0.05762 V-1 | | | | | | | | | |

7.1 (c) 规范灯电压值的实验结果

根据规程规定，控制室内环境温度，使得球内环境温度处于（25±1）℃，在2.0m积分球内测试了被测灯的灯端电压值，在预热15分钟后，记录灯端电压值。实验结果记录如下：

GT158: 66.39721 V

GT159: 66.46979 V

GT162: 66.44150 V

7.1(d) 相关色温测试的实验结果

根据规程规定，使用光谱总辐射通量标准灯定标带光谱辐射计的球形光度计（积分式光谱辐射计），被测灯按规定的工作电流依次在积分球内点燃，测量其平均颜色温度。相关数据如下：

|  |  |  |  |
| --- | --- | --- | --- |
|  | GT158 | GT159 | GT162 |
| CCT [K] | 3961.139312 | 3959.320727 | 3939.002441 |
| ColorCoordinates/x | 0.385610572 | 0.38575597 | 0.385731682 |
| ColorCoordinates/y | 0.390029924 | 0.390299317 | 0.387469296 |
| ColorCoordinates/z | 0.224359504 | 0.223944713 | 0.226799022 |
| ColorCoordinates/u | 0.223246706 | 0.223235829 | 0.224322332 |
| ColorCoordinates/v1976 | 0.508061837 | 0.508196364 | 0.506998894 |
| PeakWavelength [nm] | 447.9646886 | 447.4406209 | 447.9325118 |
| CentroidWavelength [nm] | 564.9496771 | 564.8990839 | 564.9756648 |
| DominantWavelength [nm] | 577.0542821 | 577.0301399 | 577.6521666 |

因此，可得GT158、GT159和GT159相关色温的测试结果分别是3961K，3959K和3939 K。

7.1（e）长期稳定性的实验结果

依据规程，测试灯的长期稳定稳定测试数据如下：

|  |  |  |  |
| --- | --- | --- | --- |
| GT158 | | | |
| 测试次数 | 灯电压/V | 规范灯电压下的总光通量/lm | 累计点燃  时间/h |
| 1 | 66.3972 | 1168.7 | 0 |
| 2 | 66.3955 | 1168.0 | 209 |
| 3 | 66.3884 | 1167.8 | 452 |

按规程规定的计算可得

|  |  |  |  |
| --- | --- | --- | --- |
| GT159 | | | |
| 测试次数 | 灯电压/V | 规范灯电压下的总光通量/lm | 累计点燃  时间/h |
| 1 | 66.4698 | 1178.9 | 0 |
| 2 | 66.4741 | 1178.1 | 209 |
| 3 | 66.4661 | 1178.2 | 452 |

按规程规定的计算可得

|  |  |  |  |
| --- | --- | --- | --- |
| GT162 | | | |
| 测试次数 | 灯电压/V | 规范灯电压下的总光通量/lm | 累计点燃  时间/h |
| 1 | 66.5412 | 1174.9 | 0 |
| 2 | 66.5454 | 1174.3 | 209 |
| 3 | 66.5381 | 1174.0 | 452 |

按规程规定的计算可得

7.1（f）规范灯电压下总光通量值的检定结果

依据检定规程，被测灯在规范电压下总光通量的检定结果 GT158是1168.2 lm, GT159是1172.7 lm, GT162是1169.9 lm。原始记录如下：

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| LED总光通量检定原始记录（二） | | | | | | | | | | |
|  |  |  | |  |  |  |  | 共 页 第 页 | | |
| 检验类别 | | | 检定 | | | | | | | |
| 技术依据 | | | 本检定规程草稿 | | | | | | | |
| 检测主要设备 | | | 标准灯组及其级别：GT133等副基准级别的LED总光通量标准灯 | | | | | | | |
| 积分球系统装置：2.0 m积分球系统 | | | | | | | |
| 光度测量系统：Inphora光度探头、CAS140D光谱辐射计 | | | | | | | |
| 供电电源：吉时利 2430、2460、2200 | | | | | | | |
| 实验条件 | | | 系统预热时间：30 mins | | | | | | | |
| 标准灯光通量常数 | 基本信息 | | | | 标准值相关参数 | | | 实验结果 | | |
| 灯号 | 灯电流/mA | | 规范灯电压值  /V | 总光通量-电压温度系数*k*v  /V-1 | 规范灯电压下的总通量值  /lm | 灯电压  /V | 光电流计读数 | 光通量常数*C* | 相对偏差 |
|
| GT133 | 90.00 | | 66.5417 | 0.05464 | 1157.0 | 66.6353 | 7.7909E-07 | 1.4927E+09 | -0.02% |
| GT138-HX | 90.00 | | 65.6709 | 0.06830 | 1001.3 | 65.7687 | 6.7508E-07 | 1.4931E+09 | 0.02% |
| GT140 | 90.00 | | 66.3639 | 0.06397 | 1176.4 | 66.4545 | 7.9244E-07 | 1.4931E+09 | 0.02% |
| GT141 | 90.00 | | 66.3243 | 0.06543 | 1173.5 | 66.4128 | 7.9056E-07 | 1.4930E+09 | 0.01% |
| GT143 | 90.00 | | 66.3530 | 0.06237 | 1148.6 | 66.4486 | 7.7416E-07 | 1.4925E+09 | -0.02% |
| GT157 | 90.00 | | 66.3780 | 0.05948 | 1175.5 | 66.4706 | 7.9175E-07 | 1.4929E+09 | 0.00% |
|  |  | |  |  |  |  | 平均 | 1.4929E+09 |  |
| 光通量常数平均值= 1.4929E+09 ，最大相对偏差 +0.02% | | | | | | | | | |
| 备注 |  | | | | | | | | | |
| 检定员：赵伟强 核验员： 刘慧 温度： 21 ℃ 湿度： 50 %RH | | | | | | | | | | |
| 实验地点： 昌平-14-2007 实验日期： 2021年05月17日 | | | | | | | | | | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| LED发光强度检定原始记录（三） | | | | | | | | | | | | | | | | |
| 共 页 第 页 | | | | | | | | | | | | | | | | |
| 基本信息 | | 标准值相关参数 | | 实验结果 | | | | | | | | | | | | |
| 灯号 | 灯电流  /mA | 规范灯电压值  /V | 总光通量-电压温度系数*k*v  /V-1 | 轮次 | 灯电压  /V | 光电流计  读数 | 总光通量测试值  /lm | | | | 规范灯电压下的总光通量值/lm | 两轮偏差 | | | | |
|
| GT158 | 90.00 | 66.3972 | 0.06231 | 第一轮 | 66.3886 | 7.8199E-07 | 1167.4 | | | | 1168.0 |  | | | | |
| 第二轮 | 66.3927 | 7.8235E-07 | 1168.0 | | | | 1168.3 | 0.020% | | | | |
| 第三轮 |  |  |  | | | |  |  | | | | |
| 平均 | 66.3907 |  | 1167.7 | | | | 1168.2 |  | | | | |
| GT159 | 90.00 | 66.4698 | 0.06141 | 第一轮 | 66.4631 | 7.8863E-07 | 1177.3 | | | | 1172.5 |  | | | | |
| 第二轮 | 66.4723 | 7.8930E-07 | 1178.3 | | | | 1172.8 | 0.028% | | | | |
| 第三轮 |  |  |  | | | |  |  | | | | |
| 平均 | 66.4677 |  | 1177.8 | | | | 1172.7 |  | | | | |
| GT162 | 90.00 | 66.4415 | 0.05762 | 第一轮 | 66.5357 | 7.9049E-07 | 1180.1 | | | | 1169.9 |  | | | | |
| 第二轮 | 66.5419 | 7.9072E-07 | 1180.5 | | | | 1169.8 | -0.009% | | | | |
| 第三轮 |  |  |  | | | |  |  | | | | |
| 平均 | 66.5388 |  | 1180.3 | | | | 1169.9 |  | | | | |
|  |  |  |  | 第一轮 |  |  |  | | | |  |  | | | | |
| 第二轮 |  |  |  | | | |  |  | | | | |
| 第三轮 |  |  |  | | | |  |  | | | | |
| 平均 |  |  |  | | | |  |  | | | | |
| 备注 |  | | | | | | | | | | | | | | | |
| 检定员： 赵伟强 核验员：刘慧 温度： 21 ℃ 湿度： 50 %RH | | | | | | | | | | | | | | |
| 实验地点：昌平-14-2007 实验日期： 2021年05月17日 | | | | | | | |  |  |  | | |  |  | |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| LED总光通量检定原始记录（四） | | | | | | | | | | | |
| 共 页 第 页 | | | | | | | | | | | |
| 灯号 | 灯电流/mA | 规范电压值/V | 总光通量-电压温度系数*k*v /V-1 | 当前灯电压/V | 当前总光通量测试值/lm | 规范灯电压下的总光通量值/lm | 前次规范灯电压下的总光通量值 /lm | 年变化率 | 外检检查 | 结论(定级) |
| GT158 | 90.00 | 66.3972 | 0.06231 | 66.3907 | 1167.7 | 1168.2 |  |  | 良好 | 首检 |
| GT159 | 90.00 | 66.4698 | 0.06141 | 66.4677 | 1177.8 | 1172.7 |  |  | 良好 | 首检 |
| GT162 | 90.00 | 66.4415 | 0.05762 | 66.5388 | 1180.3 | 1169.9 |  |  | 良好 | 首检 |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 检定员： 赵伟强 核验员： 刘慧 温度： 21 ℃ 湿度： 50 %RH | | | | | |
| 实验地点：昌平-14-2007 实验日期： 2021年05月17日 |  |  |  |  |  | |

1. 测量不确定度评定实例：

对副基准的LED总光通量标准灯组，在球形光度计里标定工作基准LED总光通量标准灯组，进行不确定度评定。

8.1 检定方法

上一级已标定的副基准LED总光通量标准灯组（下面简称标准灯）和被检定的工作基准LED总光通量标准灯（下面简称被测灯），在球形光度计里按照本检定规程的相关规定顺序点燃，将它们各自的光电读数相互比较，计算出被测灯的在规范电压下的总光通量量值。

标准灯和被测灯的种类、外形、相关色温、功率及光分布均接近，无需要作V(λ)失配修正、非线性修正和吸收修正。检定过程中系统稳定，无需作不稳定性修正。实验室环境温度稳定在22℃附近。

8.2 数学模型

用球形光度计测量，被测灯总光通量量值计算模型：

式中： ——被测灯在规范电压下的总光通量值；

——第*j*次测量所得的被测灯在规范电压下的总光通量值，由(G.2)式计算得；

——被测灯的测量次数；

——该被测灯的光电读数电压系数值；

——该被测灯的规范电压值；

——该被测灯第*j*次测量时的当前电压值；

——标准灯光通量常数（*i* =1，2，…，*n*）的平均值，由（G.3）式计算可得；

——第i支标准灯在规范电压下的总光通量值；

——第*i*支标准灯的测量电压值；

——第*i*支标准灯的规范电压值；

——第*i*支标准灯的系数值；

——第*i*支标准灯的光电读数值；

——标准灯数量；

8.3 引入的不确定度分量评定

根据经验，的不确定度主要包含四个分量。

1. 上一级已标定的LED总光通量标准灯组的不确定度。根据校准结果为，*k*=2。相应的标准不确定度是

，B类方法评定。

1. 因当前使用的电测系统与标定标准灯量值时的电测系统不同，因此供给电流存在差异。估计最大的差异为0.03%。对直流LED，在小范围，光通量对电流的灵敏系数接近1。因此电测系统中电流的变化，带入的不确定度分量是

，B类评定。

1. 因当前使用与标定标准灯量值时的环境温度存在不同，受环境温度影响，标准灯的量值存在变化，采用规范电压法进行量值修正。本实例环境温度是22℃，与规范值的环境温度相差3℃。根据经验，其修正量相对光通量值的百分比值是0.51 %。估计测量电压差异最大约0.01%。且*k*v值自身的不确定度约10 %。估计规范电压法的光通量修正值，引入的相对不确定度是 ，估计均匀分布，则修正后的环境温度差异带来的光通量常数不确定度是

，B类评定。

1. 测量过程中，由于各种随机因素的影响，使得各只标准灯的光通量常数不一致。本次测量用了6只标准灯，它们的常数（*i* =1，2，…，*n*）分别是1.4927E+09、1.4931E+09、1.4931E+09、1.4930E+09、1.4925E+09和1.4929E+09，平均值是1.4930E+09。使用极差法计算的光强常数平均值的相对实验室标准差，用A类方法评定的相对标准不确定度为

，A类评定

G.4 被测灯量值引入的不确定分量评定

根据经验，的不确定度主要包含四个分量。

1. 由于各种随机因素的影响，被测灯量值的读数的重复性。被测灯测量12个读数（*j* =1，2，…，*p*）,为7.8201E-07、7.8201E-07、7.8200E-07、7.8200E-07、7.8200E-07、7.8200E-07、7.8200E-07、7.8200E-07、7.8200E-07、7.8199E-07、7.8199E-07、7.8199E-07。7平均值为7.8200E-07。使用贝塞尔公式计算的光通量常数平均值的相对实验室标准差，用A类方法评定的相对标准不确定度为
2. 灯在重复点燃，其实际光通量有一定起伏，根据经验，对于被测灯，其灯量值变化范围不超过0.03%，均匀分布。因此认为灯光通量量值分散性引入的不确定度是
3. 因当前使用的电测系统测量供给电流值存在偏差。估计最大的差异为0.03%，均匀分布。对直流LED，在小范围，光通量对电流的灵敏系数是1。因此电测系统中电流的变化，带入的不确定度分量是

，B类评定。

1. 测量过程中，LED总光通量标准灯的空间分布接近均匀，但依然存在微小的差别，由于积分球内部空间响应的不一致，使得光通量读数存在一定起伏。根据经验，对于LED总光通量标准灯，该起伏不超过0.1%，认为均匀分布，因此积分球不均匀性带来的不确定度分量是

0.03%，B类评定。

8.5 被测灯量值规范电压法修正引入的不确定分量评定

1. 因当前的被测灯量值时的环境温度与规范电压测量温度值存在不同，受环境温度影响，被测灯的量值存在变化，采用规范电压法进行量值修正。本实例环境温度是22℃，与规范值的环境温度相差3℃。根据经验，其修正量相对光通量值的百分比值是0.51 %。估计测量电压差异最大约0.01%。且*k*v值自身的不确定度约10 %。估计规范电压法的光通量修正值，引入的相对不确定度是 0.051%，估计均匀分布，则被测灯规范电压法修正引入的不确定分量是

，B类评定。

8.6 标准不确定度分量评定结果

表8.1 相对标准不确定度分量表

**表8.1 LED标准灯总光通量值标准不确定度来源的评定值**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 不确定度来源 | | 相对标准不确定度 | 灵敏系数 | 类别 |
| 标准灯组 | 上一级标准灯光通量值 | 0.20% | 1 | B |
| 电测系统（电流） | 0.01% | 1 | B |
| 温度修正（系数和电压） | 0.015% | 1 | B |
| 标准灯的测量重复性 | 0.02% | 1 | A |
| 被测灯 | 被测灯的测量重复性 | 0.01% | 1 | A |
| 被测灯重复点燃时的分散性 | 0.01% | 1 | B |
| 电测系统（电流） | 0.01% | 1 | B |
| 积分球空间响应 | 0.03% | 1 | B |
| 被测灯规范电压法修正  （系数和电压） | 0.015% | 1 | B |

8.7. 单支被测灯校准结果的相对合成标准器不确定度

上述各不确定度来源独立，不相关。相对合成标准不确定度的计算公式简化为

8.8 扩展不确定度的评定

取包含因子*k*=2，则扩展不确定度为

8.9 测量不确定度报告

用LBDT-200型副基准灯，在2.0 m积分球内标定LBDT-200型工作基准灯的z总光通量值的测量结果不确定度为：

结论：不确定度符合规程草稿中表2中工作基准灯的要求

1. 结论：

实验数据表明，本规程草稿所规定的检定操作原理正确，实际可行。