

LUXEON[®] Rebel

IES LM-80 Test Report

1. Number of LED light sources tested

Eighty or 160 units per test / 25 units reported. Units reported are selected as follows:

- a) Units are assigned to nominal CCT bins of 2650K, 3000K, 3500K, 4000K, or 6000K.
- b) The first 25 units from each CCT bin are reported. See section 1.4 below for more detail.

2. Description of LED light sources

Devices tested:

LUXEON Rebel p/n: LXM8-PW27 (nominal CCT 2700K)

LUXEON Rebel p/n: LXM8-PW30 (nominal CCT 3000K)

LUXEON Rebel p/n: LXM3-PW61 (nominal CCT 3500K)

LUXEON Rebel p/n: LXM3-PW51 (nominal CCT 4000K)

LUXEON Rebel p/n: LXML-PWC1 (nominal CCT 6000K)

This IES LM-80 Test Report applies to the LUXEON Rebel part numbers in Table 1.

Table I.

| Part Number | Nominal CCT | Part Number | Nominal CCT |
|-------------|-------------|-------------|-------------|
| LXM3-PW8I | 2700K | LXM7-PW40 | 4000K |
| LXM8-PW27 | 2700K | LXW8-PW40 | 4000K |
| LXH8-PW27 | 2700K | LXH7-PW40 | 4000K |
| LXW9-PW27 | 2700K | LXML-PWN1 | 4100K |
| LXM3-PW7I | 3000K | LXML-PWN2 | 4100K |
| LXML-PW7I | 3000K | LXML-PW3I | 5000K |
| LXM8-PW30 | 3000K | LXW8-PW50 | 5000K |
| LXH8-PW30 | 3000K | LXML-PWC1 | 5650K |
| LXW9-PW30 | 3000K | LXML-PWC2 | 5650K |
| LXML-PWW1 | 3050K | LXML-PW2I | 5700K |
| LXM3-PW6I | 3500K | LXML-PW1I | 6500K |
| LXW8-PW35 | 3500K | LXML-PR01 | Royal-Blue |
| LXM3-PW5I | 4000K | LXML-PR02 | Royal-Blue |
| LXML-PW5I | 4000K | | |

3. Description of auxiliary equipment

LUXEON Rebel devices are soldered to reliability stress boards that can accommodate up to 160 devices. LUXEON Rebel LEDs are connected in series strings of up to 20 devices and driven by a constant current source for each series string.

Reliability stress boards are mounted in a thermal chamber which provides water or liquid N₂ cooling to the bottom-side of the reliability stress board.

The reliability stress board is periodically removed from the thermal chamber, allowed to cool to room temperature, and then tested.

The tester consists of a computer-controlled x-y table, integrating sphere, programmable current-source meter, and relay switching-matrix. Each LUXEON Rebel is positioned underneath the integrating sphere and driven with a constant-current pulse. Luminous flux, (u' , v'), and forward voltage are measured for each LUXEON Rebel.

After testing, the reliability stress board is returned to the thermal chamber for additional operation.

4. Operating cycle

LUXEON Rebel LEDs are driven with a constant direct current (DC).

5. Ambient conditions including airflow, temperature, and relative humidity

The case temperature within the thermal chamber was characterized by mounting several thermocouples on a sample reliability stress board at the designated thermal measurement point, as shown in the application brief, [LUXEON Rebel Thermal Measurement Guidelines \(AB33\)](#). In addition, several thermocouples were mounted in the air at a distance of 1.5mm above the reliability stress board. The reliability stress board was then mounted in the thermal chamber and driven at the specified stress condition. The thermocouple readings were monitored. After the thermocouples reached thermal equilibrium, the thermocouple readings were data-logged and averaged together. The relative humidity within the oven was characterized to be <65%.

The photometry measurement temperature is set and monitored to be within 25C +/- 2C with no forced airflow and RH <65%.

6. Case and ambient temperatures (ambient temperature measured 1.5mm above reliability stress board)

In all cases, both T_s and T_A meet or exceed the IES LM-80-08 limits.

7. Drive current of the LED light source during lifetime test

See tables.

8. Initial luminous flux and forward voltage at photometric measurement current

See tables.

9. Lumen maintenance for data for each individual light source along with median value, standard deviation, minimum and maximum lumen maintenance value for all of the light sources

See tables.

10. Observation of LED light source failures including the failure conditions and time of failure

No failures observed in devices reported.

11. LED light source monitoring interval

Units were tested at 0, 24, 168, 500, 1000, then at 1000-hour intervals after 1000 hours.

12. Photometric measurement uncertainty

Long-term measurement uncertainty is based on reproducibility tests done over a period of one year, calculated to $k = 2$ coverage (i.e. 95% coverage)

Luminous Flux (Φ_v) $\pm 2\%$

Forward Voltage (V_f) $\pm 0.4\%$

1976 UCS color space, u' $\pm 0.1\%$

1976 UCS color space, v' $\pm 0.2\%$

Note: u' and v' measurement accuracy may vary by color point location.

Note: $k = 2$ coverage means that the numbers cited represent ± 2 standard deviations of measurement uncertainty based on reproducibility tests done over a period of one year.

13. Chromaticity shift reported over the measurement time

See tables.

14. Sampling Method/Sample size

IES LM-80 tests require LED samples to be operated at a minimum of a single current and three temperatures of 55C, 85C and a third temperature picked by the LED manufacturer. Philips Lumileds has picked the third temperature in the range of 105C and 120C, depending on the maximum ratings of the LED.

LED samples for IES LM-80 testing consist of units built from a minimum of three manufacturing lots with each manufacturing lot built from different wafer lots built on non-consecutive days. These manufacturing lots are picked to represent a wide parametric distribution. Samples from each of these manufacturing lots are soldered to all of the reliability stress boards for a given set of IES LM-80 tests. A typical IES LM-80 test might consist of up to two 40-unit CCT color bins distributed across one 80-LED reliability stress board, or up to four 40-unit CCT color bins distributed across two 80-LED reliability stress boards. Then the first 25 consecutive units out of the larger 40-unit sample set are reported. These 25 unit samples include samples from all of the same manufacturing lots which were used to populate the reliability stress boards.

Notes

Data is for reference only and is not an endorsement to exceed the Data Sheet operating conditions.

The TM21 extrapolations are based on the IESNA TM21 draft dated April 1st 2011. The TM-21 lumen maintenance model is based on the flux data normalized to 1 at 0 hours and the use of an exponential model for flux(time):

Flux(time) = $B \exp[-\alpha \text{ time}]$, where normally $B \cong 1$, and $\alpha > 0$.

An L70 extrapolation less than 0 means that the model predicts an increasing flux output with time, i.e. $\alpha < 0$ (see graphs). Generally, this means that additional test time is needed to determine the long-term lumen maintenance behavior.

The current EPA limits of 91.8% or 94.1% at 6,000 hours are based on the flux data normalized to 1 at 0 hours and the use of a simple exponential model for flux(time):

Flux(time) = $\exp[-\alpha \text{ time}]$ where α is calculated based on the 6,000 hour flux measurement only.

By comparison, the TM-21 method uses a least-squares curve fit of all of the data from 1,000 to 6,000 hours to the exponential model, with the added parameter B.

r^2 is a measure of the goodness of fit of the data to the exponential model. r^2 varies from 0 to 1, where 1 is an excellent curve fit. r^2 is normally less than 1 due to the random measurement uncertainty of the flux data at each time point. For more information, please see Microsoft Excel help for function RSQ(..).

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SUMMARY

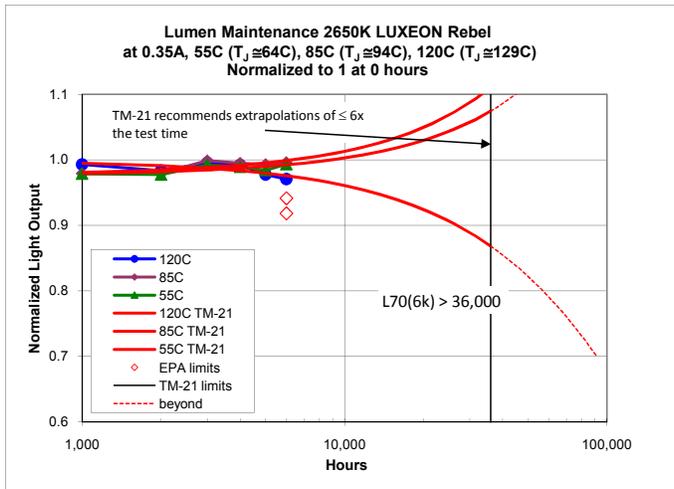
LUXEON Rebel CCT = 2650K, I_f = 0.35A

Normalized Flux

| | 0 | 24 | 168 | 500 | 1000 | 2000 | 3000 | 4000 | 5000 | 6000 | 7000 | 8000 | 9000 | 10000 | alpha | B | r2 | :L70 |
|---------------------------------------------------------------|------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|------|------|------|-------|-------------|--------|-------|-------------------------------------|
| DATA SET 1 T _s = T _{AIR} = 120C | median = 1.0000 | 0.9906 | 0.9851 | 0.9875 | 0.9934 | 0.9836 | 0.9957 | 0.9929 | 0.9787 | 0.9731 | | | | | | | | |
| | average = 1.0000 | 0.9905 | 0.9849 | 0.9881 | 0.9929 | 0.9835 | 0.9951 | 0.9918 | 0.9775 | 0.9705 | | | | | 3.8895E-06 | 0.9987 | 0.532 | 91,365 |
| | st dev = 0.0000 | 0.0015 | 0.0018 | 0.0042 | 0.0055 | 0.0062 | 0.0064 | 0.0059 | 0.0056 | 0.0071 | | | | | | | | TM-21 L ₇₀ (6k) > 36,000 |
| | min = 1.0000 | 0.9878 | 0.9814 | 0.9816 | 0.9827 | 0.9727 | 0.9828 | 0.9794 | 0.9648 | 0.9522 | | | | | | | | |
| | max = 1.0000 | 0.9934 | 0.9879 | 1.0002 | 1.0050 | 0.9947 | 1.0070 | 1.0029 | 0.9874 | 0.9804 | | | | | | | | |
| DATA SET 2 T _s = T _{AIR} = 85C | median = 1.0000 | 0.9904 | 0.9862 | 0.9817 | 0.9792 | 0.9783 | 0.9987 | 0.9951 | 0.9927 | 0.9958 | | | | | | | | |
| | average = 1.0000 | 0.9907 | 0.9866 | 0.9826 | 0.9789 | 0.9787 | 0.9986 | 0.9947 | 0.9927 | 0.9957 | | | | | -3.5416E-06 | 0.9777 | 0.553 | -94,328 |
| | st dev = 0.0000 | 0.0024 | 0.0030 | 0.0032 | 0.0032 | 0.0037 | 0.0060 | 0.0057 | 0.0057 | 0.0064 | | | | | | | | TM-21 L ₇₀ (6k) > 36,000 |
| | min = 1.0000 | 0.9860 | 0.9812 | 0.9769 | 0.9742 | 0.9720 | 0.9896 | 0.9849 | 0.9818 | 0.9858 | | | | | | | | |
| | max = 1.0000 | 0.9966 | 0.9958 | 0.9902 | 0.9862 | 0.9850 | 1.0111 | 1.0060 | 1.0049 | 1.0092 | | | | | | | | |
| DATA SET 3 T _s = T _{AIR} = 55C | median = 1.0000 | 0.9904 | 0.9848 | 0.9802 | 0.9774 | 0.9767 | 0.9906 | 0.9870 | 0.9823 | 0.9918 | | | | | | | | |
| | average = 1.0000 | 0.9906 | 0.9855 | 0.9824 | 0.9786 | 0.9772 | 0.9921 | 0.9890 | 0.9840 | 0.9934 | | | | | -2.6419E-06 | 0.9766 | 0.501 | -126,051 |
| | st dev = 0.0000 | 0.0031 | 0.0066 | 0.0080 | 0.0072 | 0.0073 | 0.0059 | 0.0064 | 0.0070 | 0.0068 | | | | | | | | TM-21 L ₇₀ (6k) > 36,000 |
| | min = 1.0000 | 0.9857 | 0.9742 | 0.9668 | 0.9673 | 0.9659 | 0.9852 | 0.9814 | 0.9762 | 0.9870 | | | | | | | | |
| | max = 1.0000 | 0.9971 | 1.0104 | 1.0070 | 1.0003 | 0.9972 | 1.0082 | 1.0053 | 1.0005 | 1.0119 | | | | | | | | |

Delta u' v'

| | 0 | 24 | 168 | 500 | 1000 | 2000 | 3000 | 4000 | 5000 | 6000 | 7000 | 8000 | 9000 | 10000 |
|---------------------------------------------------------------|------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|------|------|------|-------|
| DATA SET 1 T _s = T _{AIR} = 120C | median = 0.0000 | 0.0010 | 0.0016 | 0.0021 | 0.0025 | 0.0030 | 0.0030 | 0.0029 | 0.0023 | 0.0017 | | | | |
| | average = 0.0000 | 0.0011 | 0.0016 | 0.0022 | 0.0026 | 0.0030 | 0.0030 | 0.0029 | 0.0023 | 0.0016 | | | | |
| | st dev = 0.0000 | 0.0001 | 0.0001 | 0.0001 | 0.0002 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0003 | | | | |
| | min = 0.0000 | 0.0009 | 0.0014 | 0.0020 | 0.0022 | 0.0027 | 0.0028 | 0.0026 | 0.0019 | 0.0008 | | | | |
| | max = 0.0000 | 0.0012 | 0.0017 | 0.0023 | 0.0029 | 0.0032 | 0.0032 | 0.0031 | 0.0025 | 0.0019 | | | | |
| DATA SET 2 T _s = T _{AIR} = 85C | median = 0.0000 | 0.0013 | 0.0019 | 0.0023 | 0.0026 | 0.0031 | 0.0038 | 0.0038 | 0.0037 | 0.0038 | | | | |
| | average = 0.0000 | 0.0013 | 0.0019 | 0.0023 | 0.0026 | 0.0032 | 0.0038 | 0.0038 | 0.0038 | 0.0039 | | | | |
| | st dev = 0.0000 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | | | | |
| | min = 0.0000 | 0.0012 | 0.0017 | 0.0022 | 0.0024 | 0.0029 | 0.0035 | 0.0035 | 0.0035 | 0.0034 | | | | |
| | max = 0.0000 | 0.0015 | 0.0021 | 0.0025 | 0.0028 | 0.0035 | 0.0042 | 0.0042 | 0.0042 | 0.0042 | | | | |
| DATA SET 3 T _s = T _{AIR} = 55C | median = 0.0000 | 0.0014 | 0.0020 | 0.0023 | 0.0027 | 0.0031 | 0.0036 | 0.0039 | 0.0041 | 0.0043 | | | | |
| | average = 0.0000 | 0.0014 | 0.0020 | 0.0023 | 0.0027 | 0.0030 | 0.0036 | 0.0039 | 0.0041 | 0.0043 | | | | |
| | st dev = 0.0000 | 0.0001 | 0.0001 | 0.0002 | 0.0002 | 0.0001 | 0.0001 | 0.0001 | 0.0002 | 0.0002 | | | | |
| | min = 0.0000 | 0.0012 | 0.0014 | 0.0016 | 0.0020 | 0.0026 | 0.0034 | 0.0038 | 0.0038 | 0.0041 | | | | |
| | max = 0.0000 | 0.0015 | 0.0021 | 0.0025 | 0.0029 | 0.0032 | 0.0038 | 0.0043 | 0.0045 | 0.0047 | | | | |



SUMMARY, Continued

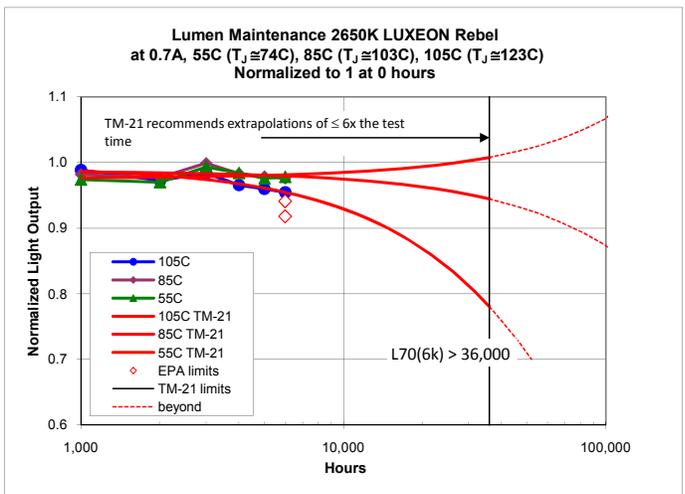
LUXEON Rebel CCT = 2650K, I_F = 0.7A

Normalized Flux

| | | 0 | 24 | 168 | 500 | 1000 | 2000 | 3000 | 4000 | 5000 | 6000 | 7000 | 8000 | 9000 | 10000 | alpha | B | r2 | :L70 | | |
|------------|------------------------------------------|-----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|------|------|-------|-------|-------------|--------|-------|----------|-------------------------------------|
| DATA SET 4 | T _S = T _{AIR} = 105C | median = | 1.0000 | 0.9935 | 0.9872 | 0.9970 | 0.9902 | 0.9737 | 0.9834 | 0.9656 | 0.9601 | 0.9542 | | | | | | | | | |
| | | average = | 1.0000 | 0.9937 | 0.9880 | 0.9967 | 0.9888 | 0.9729 | 0.9840 | 0.9657 | 0.9600 | 0.9545 | | | | | 6.7205E-06 | 0.9940 | 0.821 | 52,177 | |
| | | st dev = | 0.0000 | 0.0024 | 0.0035 | 0.0052 | 0.0074 | 0.0063 | 0.0082 | 0.0076 | 0.0074 | 0.0082 | | | | | | | | | TM-21 L ₇₀ (6k) > 36,000 |
| | | min = | 1.0000 | 0.9901 | 0.9832 | 0.9887 | 0.9713 | 0.9581 | 0.9677 | 0.9517 | 0.9468 | 0.9387 | | | | | | | | | |
| | | max = | 1.0000 | 1.0017 | 0.9986 | 1.0070 | 1.0011 | 0.9838 | 1.0032 | 0.9832 | 0.9778 | 0.9743 | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| DATA SET 5 | T _S = T _{AIR} = 85C | median = | 1.0000 | 0.9959 | 0.9880 | 0.9872 | 0.9812 | 0.9775 | 0.9984 | 0.9842 | 0.9793 | 0.9758 | | | | | | | | | |
| | | average = | 1.0000 | 0.9966 | 0.9884 | 0.9879 | 0.9819 | 0.9772 | 0.9990 | 0.9831 | 0.9785 | 0.9759 | | | | | 1.2179E-06 | 0.9868 | 0.070 | 281,920 | |
| | | st dev = | 0.0000 | 0.0034 | 0.0032 | 0.0035 | 0.0040 | 0.0051 | 0.0060 | 0.0063 | 0.0067 | 0.0067 | | | | | | | | | TM-21 L ₇₀ (6k) > 36,000 |
| | | min = | 1.0000 | 0.9925 | 0.9841 | 0.9830 | 0.9753 | 0.9689 | 0.9872 | 0.9724 | 0.9674 | 0.9608 | | | | | | | | | |
| | | max = | 1.0000 | 1.0069 | 0.9959 | 0.9955 | 0.9903 | 0.9874 | 1.0070 | 0.9934 | 0.9920 | 0.9886 | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| DATA SET 6 | T _S = T _{AIR} = 55C | median = | 1.0000 | 0.9966 | 0.9877 | 0.9853 | 0.9735 | 0.9700 | 0.9918 | 0.9836 | 0.9751 | 0.9786 | | | | | | | | | |
| | | average = | 1.0000 | 0.9969 | 0.9882 | 0.9855 | 0.9740 | 0.9699 | 0.9930 | 0.9840 | 0.9759 | 0.9783 | | | | | -8.8983E-07 | 0.9761 | 0.039 | -373,671 | |
| | | st dev = | 0.0000 | 0.0022 | 0.0024 | 0.0027 | 0.0022 | 0.0037 | 0.0083 | 0.0082 | 0.0094 | 0.0087 | | | | | | | | | TM-21 L ₇₀ (6k) > 36,000 |
| | | min = | 1.0000 | 0.9923 | 0.9844 | 0.9816 | 0.9704 | 0.9621 | 0.9734 | 0.9637 | 0.9506 | 0.9589 | | | | | | | | | |
| | | max = | 1.0000 | 1.0017 | 0.9932 | 0.9911 | 0.9797 | 0.9771 | 1.0078 | 0.9986 | 0.9906 | 0.9937 | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |

Delta u' v'

| | | 0 | 24 | 168 | 500 | 1000 | 2000 | 3000 | 4000 | 5000 | 6000 | 7000 | 8000 | 9000 | 10000 | |
|------------|------------------------------------------|-----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|------|------|-------|--|
| DATA SET 4 | T _S = T _{AIR} = 105C | median = | 0.0000 | 0.0016 | 0.0023 | 0.0030 | 0.0035 | 0.0037 | 0.0039 | 0.0035 | 0.0030 | 0.0026 | | | | |
| | | average = | 0.0000 | 0.0016 | 0.0023 | 0.0031 | 0.0034 | 0.0037 | 0.0038 | 0.0035 | 0.0030 | 0.0025 | | | | |
| | | st dev = | 0.0000 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0002 | 0.0003 | 0.0004 | | | | |
| | | min = | 0.0000 | 0.0014 | 0.0020 | 0.0028 | 0.0032 | 0.0032 | 0.0033 | 0.0027 | 0.0023 | 0.0018 | | | | |
| | | max = | 0.0000 | 0.0017 | 0.0025 | 0.0033 | 0.0037 | 0.0039 | 0.0041 | 0.0039 | 0.0036 | 0.0032 | | | | |
| | | | | | | | | | | | | | | | | |
| DATA SET 5 | T _S = T _{AIR} = 85C | median = | 0.0000 | 0.0016 | 0.0024 | 0.0031 | 0.0038 | 0.0044 | 0.0048 | 0.0049 | 0.0047 | 0.0046 | | | | |
| | | average = | 0.0000 | 0.0017 | 0.0024 | 0.0031 | 0.0038 | 0.0044 | 0.0048 | 0.0049 | 0.0048 | 0.0047 | | | | |
| | | st dev = | 0.0000 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | | | | |
| | | min = | 0.0000 | 0.0016 | 0.0021 | 0.0028 | 0.0035 | 0.0041 | 0.0045 | 0.0045 | 0.0046 | 0.0044 | | | | |
| | | max = | 0.0000 | 0.0018 | 0.0026 | 0.0033 | 0.0041 | 0.0047 | 0.0053 | 0.0053 | 0.0051 | 0.0050 | | | | |
| | | | | | | | | | | | | | | | | |
| DATA SET 6 | T _S = T _{AIR} = 55C | median = | 0.0000 | 0.0016 | 0.0024 | 0.0030 | 0.0036 | 0.0044 | 0.0049 | 0.0050 | 0.0050 | 0.0051 | | | | |
| | | average = | 0.0000 | 0.0017 | 0.0024 | 0.0030 | 0.0036 | 0.0044 | 0.0049 | 0.0051 | 0.0050 | 0.0051 | | | | |
| | | st dev = | 0.0000 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0002 | 0.0002 | 0.0001 | 0.0001 | | | | |
| | | min = | 0.0000 | 0.0015 | 0.0022 | 0.0028 | 0.0034 | 0.0041 | 0.0047 | 0.0048 | 0.0048 | 0.0048 | | | | |
| | | max = | 0.0000 | 0.0018 | 0.0025 | 0.0033 | 0.0039 | 0.0047 | 0.0052 | 0.0054 | 0.0053 | 0.0054 | | | | |
| | | | | | | | | | | | | | | | | |



SUMMARY, Continued

LUXEON Rebel CCT = 2650K, I_F = 1A

Normalized Flux

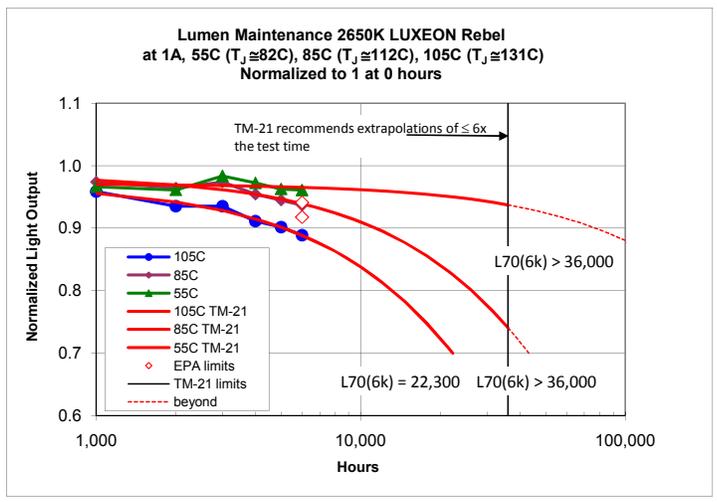
| | 0 | 24 | 168 | 500 | 1000 | 2000 | 3000 | 4000 | 5000 | 6000 | 7000 | 8000 | 9000 | 10000 | alpha | B | r2 | :L70 |
|--|---|----|-----|-----|------|------|------|------|------|------|------|------|------|-------|-------|---|----|------|
|--|---|----|-----|-----|------|------|------|------|------|------|------|------|------|-------|-------|---|----|------|

| DATA SET 7 T _S = T _{AIR} = 105C | median = | 1.0000 | 0.9944 | 0.9957 | 0.9823 | 0.9595 | 0.9365 | 0.9360 | 0.9133 | 0.9045 | 0.8929 | | | | | | | | |
|--------------------------------------------------------|-----------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------------------------------------|--------|-------|---------|--|--|--|--|--|
| | average = | 1.0000 | 0.9949 | 0.9951 | 0.9825 | 0.9589 | 0.9351 | 0.9353 | 0.9115 | 0.9018 | 0.8891 | | | | | | | | |
| | st dev = | 0.0000 | 0.0038 | 0.0050 | 0.0054 | 0.0060 | 0.0090 | 0.0087 | 0.0126 | 0.0132 | 0.0181 | | | | | | | | |
| | min = | 1.0000 | 0.9873 | 0.9819 | 0.9727 | 0.9418 | 0.9086 | 0.9153 | 0.8789 | 0.8677 | 0.8395 | | | | | | | | |
| | max = | 1.0000 | 1.0039 | 1.0013 | 0.9948 | 0.9684 | 0.9493 | 0.9492 | 0.9262 | 0.9158 | 0.9084 | | | | | | | | |
| | | | | | | | | | | | 1.4640E-05 | 0.9701 | 0.966 | 22,290 | | | | | |
| | | | | | | | | | | | TM-21 L₇₀(6k) = 22,290 | | | | | | | | |
| DATA SET 8 T _S = T _{AIR} = 85C | median = | 1.0000 | 0.9964 | 0.9858 | 0.9895 | 0.9745 | 0.9640 | 0.9741 | 0.9555 | 0.9493 | 0.9420 | | | | | | | | |
| | average = | 1.0000 | 0.9974 | 0.9860 | 0.9892 | 0.9741 | 0.9644 | 0.9741 | 0.9544 | 0.9450 | 0.9367 | | | | | | | | |
| | st dev = | 0.0000 | 0.0042 | 0.0038 | 0.0054 | 0.0074 | 0.0080 | 0.0086 | 0.0099 | 0.0112 | 0.0141 | | | | | | | | |
| | min = | 1.0000 | 0.9894 | 0.9786 | 0.9763 | 0.9610 | 0.9506 | 0.9531 | 0.9288 | 0.9138 | 0.8963 | | | | | | | | |
| | max = | 1.0000 | 1.0064 | 0.9951 | 0.9983 | 0.9867 | 0.9812 | 0.9904 | 0.9721 | 0.9618 | 0.9579 | | | | | | | | |
| | | | | | | | | | | | 7.9086E-06 | 0.9849 | 0.839 | 43,175 | | | | | |
| | | | | | | | | | | | TM-21 L₇₀(6k) > 36,000 | | | | | | | | |
| DATA SET 9 T _S = T _{AIR} = 55C | median = | 1.0000 | 0.9976 | 0.9817 | 0.9842 | 0.9688 | 0.9634 | 0.9851 | 0.9726 | 0.9640 | 0.9617 | | | | | | | | |
| | average = | 1.0000 | 0.9973 | 0.9778 | 0.9808 | 0.9663 | 0.9612 | 0.9836 | 0.9726 | 0.9627 | 0.9609 | | | | | | | | |
| | st dev = | 0.0000 | 0.0022 | 0.0107 | 0.0082 | 0.0073 | 0.0076 | 0.0078 | 0.0067 | 0.0087 | 0.0073 | | | | | | | | |
| | min = | 1.0000 | 0.9903 | 0.9487 | 0.9557 | 0.9434 | 0.9452 | 0.9656 | 0.9558 | 0.9410 | 0.9423 | | | | | | | | |
| | max = | 1.0000 | 1.0006 | 0.9859 | 0.9884 | 0.9744 | 0.9704 | 0.9955 | 0.9833 | 0.9742 | 0.9746 | | | | | | | | |
| | | | | | | | | | | | 9.8246E-07 | 0.9712 | 0.041 | 333,293 | | | | | |
| | | | | | | | | | | | TM-21 L₇₀(6k) > 36,000 | | | | | | | | |

Delta u' v'

| | 0 | 24 | 168 | 500 | 1000 | 2000 | 3000 | 4000 | 5000 | 6000 | 7000 | 8000 | 9000 | 10000 |
|--|---|----|-----|-----|------|------|------|------|------|------|------|------|------|-------|
|--|---|----|-----|-----|------|------|------|------|------|------|------|------|------|-------|

| DATA SET 7 T _S = T _{AIR} = 105C | median = | 0.0000 | 0.0017 | 0.0026 | 0.0030 | 0.0030 | 0.0022 | 0.0019 | 0.0012 | 0.0010 | 0.0009 | | | | |
|--------------------------------------------------------|-----------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|--|--|--|--|
| | average = | 0.0000 | 0.0018 | 0.0027 | 0.0031 | 0.0029 | 0.0020 | 0.0018 | 0.0013 | 0.0012 | 0.0014 | | | | |
| | st dev = | 0.0000 | 0.0001 | 0.0001 | 0.0002 | 0.0004 | 0.0007 | 0.0007 | 0.0007 | 0.0007 | 0.0008 | | | | |
| | min = | 0.0000 | 0.0015 | 0.0025 | 0.0026 | 0.0016 | 0.0002 | 0.0003 | 0.0001 | 0.0001 | 0.0003 | | | | |
| | max = | 0.0000 | 0.0019 | 0.0029 | 0.0034 | 0.0035 | 0.0029 | 0.0026 | 0.0029 | 0.0037 | 0.0061 | | | | |
| DATA SET 8 T _S = T _{AIR} = 85C | median = | 0.0000 | 0.0018 | 0.0028 | 0.0036 | 0.0042 | 0.0044 | 0.0044 | 0.0042 | 0.0035 | 0.0029 | | | | |
| | average = | 0.0000 | 0.0019 | 0.0028 | 0.0036 | 0.0042 | 0.0044 | 0.0044 | 0.0040 | 0.0035 | 0.0027 | | | | |
| | st dev = | 0.0000 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0002 | 0.0004 | 0.0006 | 0.0006 | 0.0008 | | | | |
| | min = | 0.0000 | 0.0017 | 0.0026 | 0.0033 | 0.0040 | 0.0040 | 0.0033 | 0.0025 | 0.0017 | 0.0008 | | | | |
| | max = | 0.0000 | 0.0021 | 0.0031 | 0.0039 | 0.0045 | 0.0048 | 0.0049 | 0.0049 | 0.0045 | 0.0040 | | | | |
| DATA SET 9 T _S = T _{AIR} = 55C | median = | 0.0000 | 0.0018 | 0.0027 | 0.0035 | 0.0043 | 0.0048 | 0.0052 | 0.0051 | 0.0047 | 0.0044 | | | | |
| | average = | 0.0000 | 0.0018 | 0.0027 | 0.0035 | 0.0043 | 0.0048 | 0.0052 | 0.0051 | 0.0047 | 0.0043 | | | | |
| | st dev = | 0.0000 | 0.0001 | 0.0002 | 0.0002 | 0.0001 | 0.0002 | 0.0002 | 0.0002 | 0.0003 | 0.0005 | | | | |
| | min = | 0.0000 | 0.0017 | 0.0024 | 0.0032 | 0.0040 | 0.0046 | 0.0049 | 0.0046 | 0.0037 | 0.0031 | | | | |
| | max = | 0.0000 | 0.0020 | 0.0029 | 0.0038 | 0.0046 | 0.0051 | 0.0055 | 0.0055 | 0.0052 | 0.0050 | | | | |



SUMMARY, Continued

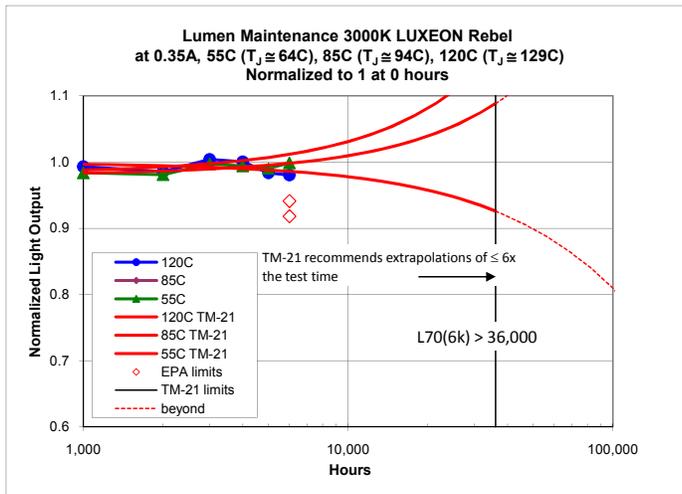
LUXEON Rebel CCT = 3000K, I_F = 0.35A

Normalized Flux

| | 0 | 24 | 168 | 500 | 1000 | 2000 | 3000 | 4000 | 5000 | 6000 | 7000 | 8000 | 9000 | 10000 | alpha | B | r2 | :L70 |
|----------------------------------------------------------------|-----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|------|------|-------|--------------------|---------------|--------------|---------------------------------------------|
| DATA SET 10 T _S = T _{AIR} = 120C | median = 1.0000 | 0.9902 | 0.9856 | 0.9977 | 0.9921 | 0.9827 | 1.0049 | 1.0022 | 0.9847 | 0.9825 | | | | | | | | |
| | average = | 1.0000 | 0.9905 | 0.9858 | 0.9986 | 0.9933 | 0.9854 | 1.0041 | 1.0006 | 0.9837 | 0.9805 | | | | 2.0990E-06 | 0.9985 | 0.165 | 169,230 |
| | st dev = | 0.0000 | 0.0031 | 0.0046 | 0.0091 | 0.0117 | 0.0108 | 0.0089 | 0.0091 | 0.0107 | | | | | | | | |
| | min = | 1.0000 | 0.9806 | 0.9734 | 0.9746 | 0.9556 | 0.9544 | 0.9847 | 0.9791 | 0.9614 | 0.9526 | | | | | | | |
| | max = | 1.0000 | 0.9979 | 0.9990 | 1.0219 | 1.0150 | 1.0091 | 1.0230 | 1.0191 | 1.0023 | 1.0004 | | | | | | | TM-21 L₇₀(6k) > 36,000 |
| DATA SET 11 T _S = T _{AIR} = 85C | median = 1.0000 | 0.9914 | 0.9883 | 0.9853 | 0.9831 | 0.9874 | 1.0094 | 1.0072 | 1.0069 | 1.0102 | | | | | | | | |
| | average = | 1.0000 | 0.9918 | 0.9887 | 0.9859 | 0.9843 | 0.9875 | 1.0091 | 1.0061 | 1.0047 | 1.0075 | | | | -4.7365E-06 | 0.9834 | 0.647 | -71,761 |
| | st dev = | 0.0000 | 0.0031 | 0.0035 | 0.0037 | 0.0038 | 0.0046 | 0.0063 | 0.0071 | 0.0074 | 0.0081 | | | | | | | |
| | min = | 1.0000 | 0.9884 | 0.9847 | 0.9793 | 0.9778 | 0.9765 | 0.9949 | 0.9909 | 0.9879 | 0.9912 | | | | | | | |
| | max = | 1.0000 | 1.0015 | 0.9991 | 0.9969 | 0.9943 | 0.9962 | 1.0210 | 1.0207 | 1.0157 | 1.0199 | | | | | | | TM-21 L₇₀(6k) > 36,000 |
| DATA SET 12 T _S = T _{AIR} = 55C | median = 1.0000 | 0.9920 | 0.9891 | 0.9864 | 0.9840 | 0.9825 | 0.9979 | 0.9939 | 0.9907 | 0.9987 | | | | | | | | |
| | average = | 1.0000 | 0.9929 | 0.9889 | 0.9862 | 0.9836 | 0.9809 | 0.9973 | 0.9941 | 0.9903 | 0.9987 | | | | -2.8896E-06 | 0.9808 | 0.542 | -116,734 |
| | st dev = | 0.0000 | 0.0024 | 0.0025 | 0.0028 | 0.0028 | 0.0109 | 0.0034 | 0.0035 | 0.0041 | 0.0041 | | | | | | | |
| | min = | 1.0000 | 0.9878 | 0.9827 | 0.9818 | 0.9793 | 0.9311 | 0.9898 | 0.9865 | 0.9822 | 0.9906 | | | | | | | |
| | max = | 1.0000 | 0.9972 | 0.9938 | 0.9926 | 0.9910 | 0.9926 | 1.0068 | 1.0047 | 1.0021 | 1.0116 | | | | | | | TM-21 L₇₀(6k) > 36,000 |

Delta u' v'

| | 0 | 24 | 168 | 500 | 1000 | 2000 | 3000 | 4000 | 5000 | 6000 | 7000 | 8000 | 9000 | 10000 |
|----------------------------------------------------------------|-----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|--------|------|-------|
| DATA SET 10 T _S = T _{AIR} = 120C | median = 0.0000 | 0.0008 | 0.0010 | 0.0015 | 0.0021 | 0.0023 | 0.0022 | 0.0021 | 0.0016 | 0.0012 | | | | |
| | average = | 0.0000 | 0.0008 | 0.0010 | 0.0015 | 0.0021 | 0.0023 | 0.0023 | 0.0022 | 0.0016 | 0.0011 | | | |
| | st dev = | 0.0000 | 0.0001 | 0.0001 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0003 | 0.0004 | | |
| | min = | 0.0000 | 0.0006 | 0.0009 | 0.0013 | 0.0017 | 0.0020 | 0.0019 | 0.0011 | 0.0001 | | | | |
| | max = | 0.0000 | 0.0013 | 0.0016 | 0.0021 | 0.0026 | 0.0027 | 0.0027 | 0.0021 | 0.0016 | | | | |
| DATA SET 11 T _S = T _{AIR} = 85C | median = 0.0000 | 0.0010 | 0.0014 | 0.0016 | 0.0017 | 0.0023 | 0.0028 | 0.0028 | 0.0028 | 0.0029 | | | | |
| | average = | 0.0000 | 0.0010 | 0.0014 | 0.0016 | 0.0017 | 0.0023 | 0.0028 | 0.0028 | 0.0028 | 0.0029 | | | |
| | st dev = | 0.0000 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | | | |
| | min = | 0.0000 | 0.0009 | 0.0013 | 0.0014 | 0.0016 | 0.0020 | 0.0025 | 0.0026 | 0.0025 | 0.0026 | | | |
| | max = | 0.0000 | 0.0011 | 0.0015 | 0.0017 | 0.0019 | 0.0026 | 0.0032 | 0.0032 | 0.0032 | 0.0032 | | | |
| DATA SET 12 T _S = T _{AIR} = 55C | median = 0.0000 | 0.0011 | 0.0014 | 0.0016 | 0.0018 | 0.0020 | 0.0025 | 0.0029 | 0.0030 | 0.0031 | | | | |
| | average = | 0.0000 | 0.0011 | 0.0015 | 0.0016 | 0.0018 | 0.0020 | 0.0025 | 0.0029 | 0.0030 | 0.0032 | | | |
| | st dev = | 0.0000 | 0.0000 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0002 | | | |
| | min = | 0.0000 | 0.0010 | 0.0014 | 0.0015 | 0.0016 | 0.0018 | 0.0023 | 0.0026 | 0.0028 | 0.0030 | | | |
| | max = | 0.0000 | 0.0011 | 0.0015 | 0.0018 | 0.0021 | 0.0022 | 0.0028 | 0.0032 | 0.0034 | 0.0036 | | | |



SUMMARY, Continued

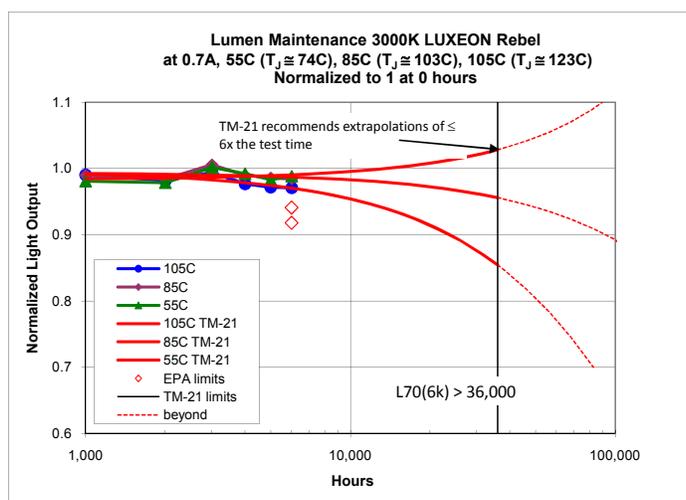
LUXEON Rebel CCT = 3000K, I_F = 0.7A

Normalized Flux

| | | 0 | 24 | 168 | 500 | 1000 | 2000 | 3000 | 4000 | 5000 | 6000 | 7000 | 8000 | 9000 | 10000 | alpha | B | r2 | :L70 | |
|---------------------------------------------------------|-----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|------|------|------|-------|-------------|--------|-------|----------|-------------------------------------|
| DATA SET 13 T _S = T _{AIR} = 105C | median = | 1.0000 | 0.9943 | 0.9930 | 1.0070 | 0.9894 | 0.9810 | 0.9936 | 0.9756 | 0.9721 | 0.9710 | | | | | | | | | |
| | average = | 1.0000 | 0.9950 | 0.9938 | 1.0053 | 0.9903 | 0.9819 | 0.9940 | 0.9767 | 0.9716 | 0.9707 | | | | | 4.2534E-06 | 0.9955 | 0.652 | 82,807 | |
| | st dev = | 0.0000 | 0.0027 | 0.0052 | 0.0080 | 0.0069 | 0.0065 | 0.0068 | 0.0064 | 0.0072 | 0.0076 | | | | | | | | | TM-21 L ₇₀ (6k) > 36,000 |
| | min = | 1.0000 | 0.9901 | 0.9860 | 0.9902 | 0.9814 | 0.9734 | 0.9840 | 0.9664 | 0.9606 | 0.9589 | | | | | | | | | |
| | max = | 1.0000 | 1.0036 | 1.0097 | 1.0180 | 1.0041 | 0.9958 | 1.0089 | 0.9920 | 0.9863 | 0.9880 | | | | | | | | | |
| DATA SET 14 T _S = T _{AIR} = 85C | median = | 1.0000 | 0.9998 | 0.9938 | 0.9940 | 0.9886 | 0.9833 | 1.0041 | 0.9886 | 0.9838 | 0.9834 | | | | | | | | | |
| | average = | 1.0000 | 0.9999 | 0.9931 | 0.9946 | 0.9896 | 0.9838 | 1.0058 | 0.9897 | 0.9858 | 0.9842 | | | | | 1.0718E-06 | 0.9935 | 0.059 | 326,739 | |
| | st dev = | 0.0000 | 0.0045 | 0.0057 | 0.0050 | 0.0065 | 0.0080 | 0.0084 | 0.0087 | 0.0083 | 0.0082 | | | | | | | | | TM-21 L ₇₀ (6k) > 36,000 |
| | min = | 1.0000 | 0.9913 | 0.9763 | 0.9872 | 0.9791 | 0.9722 | 0.9931 | 0.9758 | 0.9742 | 0.9718 | | | | | | | | | |
| | max = | 1.0000 | 1.0092 | 1.0040 | 1.0069 | 1.0057 | 1.0065 | 1.0269 | 1.0111 | 1.0058 | 1.0032 | | | | | | | | | |
| DATA SET 15 T _S = T _{AIR} = 55C | median = | 1.0000 | 0.9990 | 0.9932 | 0.9920 | 0.9816 | 0.9798 | 1.0034 | 0.9938 | 0.9845 | 0.9893 | | | | | | | | | |
| | average = | 1.0000 | 0.9992 | 0.9928 | 0.9918 | 0.9808 | 0.9785 | 1.0020 | 0.9922 | 0.9833 | 0.9884 | | | | | -1.2497E-06 | 0.9832 | 0.071 | -271,817 | |
| | st dev = | 0.0000 | 0.0030 | 0.0039 | 0.0047 | 0.0052 | 0.0052 | 0.0060 | 0.0059 | 0.0065 | 0.0068 | | | | | | | | | TM-21 L ₇₀ (6k) > 36,000 |
| | min = | 1.0000 | 0.9903 | 0.9776 | 0.9746 | 0.9626 | 0.9593 | 0.9811 | 0.9714 | 0.9627 | 0.9697 | | | | | | | | | |
| | max = | 1.0000 | 1.0035 | 0.9973 | 0.9984 | 0.9877 | 0.9841 | 1.0102 | 1.0000 | 0.9909 | 0.9995 | | | | | | | | | |

Delta u' v'

| | | 0 | 24 | 168 | 500 | 1000 | 2000 | 3000 | 4000 | 5000 | 6000 | 7000 | 8000 | 9000 | 10000 | |
|---------------------------------------------------------|-----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|------|------|------|-------|--|
| DATA SET 13 T _S = T _{AIR} = 105C | median = | 0.0000 | 0.0010 | 0.0015 | 0.0023 | 0.0027 | 0.0029 | 0.0031 | 0.0030 | 0.0026 | 0.0024 | | | | | |
| | average = | 0.0000 | 0.0010 | 0.0015 | 0.0023 | 0.0027 | 0.0029 | 0.0031 | 0.0029 | 0.0026 | 0.0023 | | | | | |
| | st dev = | 0.0000 | 0.0001 | 0.0001 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0003 | 0.0003 | | | | | |
| | min = | 0.0000 | 0.0009 | 0.0013 | 0.0020 | 0.0024 | 0.0026 | 0.0027 | 0.0023 | 0.0020 | 0.0016 | | | | | |
| | max = | 0.0000 | 0.0011 | 0.0017 | 0.0026 | 0.0030 | 0.0032 | 0.0034 | 0.0033 | 0.0030 | 0.0027 | | | | | |
| DATA SET 14 T _S = T _{AIR} = 85C | median = | 0.0000 | 0.0012 | 0.0016 | 0.0021 | 0.0028 | 0.0034 | 0.0036 | 0.0037 | 0.0037 | 0.0036 | | | | | |
| | average = | 0.0000 | 0.0012 | 0.0015 | 0.0020 | 0.0028 | 0.0033 | 0.0036 | 0.0037 | 0.0037 | 0.0036 | | | | | |
| | st dev = | 0.0000 | 0.0001 | 0.0001 | 0.0001 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | | | | | |
| | min = | 0.0000 | 0.0010 | 0.0013 | 0.0017 | 0.0023 | 0.0029 | 0.0032 | 0.0032 | 0.0032 | 0.0030 | | | | | |
| | max = | 0.0000 | 0.0013 | 0.0017 | 0.0023 | 0.0031 | 0.0036 | 0.0039 | 0.0039 | 0.0039 | 0.0039 | | | | | |
| DATA SET 15 T _S = T _{AIR} = 55C | median = | 0.0000 | 0.0013 | 0.0017 | 0.0020 | 0.0024 | 0.0032 | 0.0038 | 0.0038 | 0.0038 | 0.0039 | | | | | |
| | average = | 0.0000 | 0.0013 | 0.0017 | 0.0020 | 0.0025 | 0.0033 | 0.0038 | 0.0039 | 0.0038 | 0.0039 | | | | | |
| | st dev = | 0.0000 | 0.0001 | 0.0001 | 0.0001 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | | | | | |
| | min = | 0.0000 | 0.0011 | 0.0015 | 0.0018 | 0.0022 | 0.0029 | 0.0034 | 0.0036 | 0.0035 | 0.0036 | | | | | |
| | max = | 0.0000 | 0.0016 | 0.0021 | 0.0025 | 0.0029 | 0.0039 | 0.0044 | 0.0044 | 0.0044 | 0.0043 | | | | | |



SUMMARY, Continued

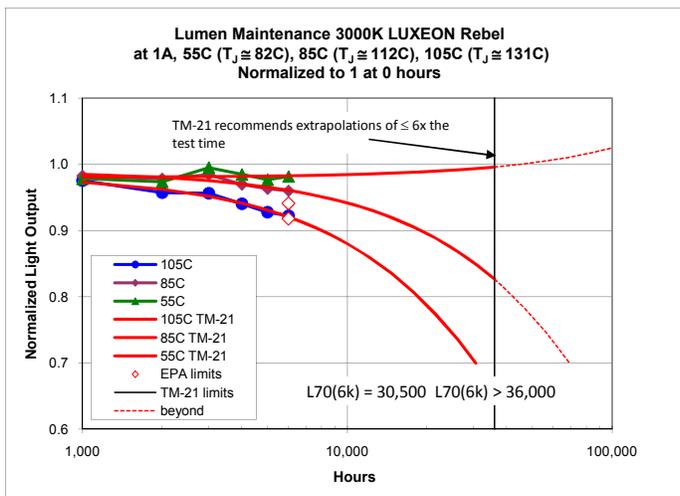
LUXEON Rebel CCT = 3000K, I_F = 1A

Normalized Flux

| | 0 | 24 | 168 | 500 | 1000 | 2000 | 3000 | 4000 | 5000 | 6000 | 7000 | 8000 | 9000 | 10000 | alpha | B | r2 | :L70 |
|----------------------------------------------------------------|-------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|------|------|------|-------|--------------------|---------------|--------------|---------------------------------------------|
| DATA SET 16 T _S = T _{AIR} = 105C | median = 1.0000 | 0.9973 | 0.9986 | 0.9965 | 0.9759 | 0.9572 | 0.9559 | 0.9388 | 0.9261 | 0.9210 | | | | | | | | |
| | average = 1.0000 | 0.9968 | 0.9971 | 0.9959 | 0.9753 | 0.9574 | 0.9563 | 0.9407 | 0.9278 | 0.9222 | | | | | 1.1158E-05 | 0.9841 | 0.969 | 30,533 |
| | st dev = 0.0000 | 0.0061 | 0.0079 | 0.0082 | 0.0076 | 0.0082 | 0.0092 | 0.0099 | 0.0102 | 0.0115 | | | | | | | | TM-21 L₇₀(6k) = 30,533 |
| | min = 1.0000 | 0.9768 | 0.9712 | 0.9736 | 0.9582 | 0.9407 | 0.9344 | 0.9216 | 0.9069 | 0.8986 | | | | | | | | |
| | max = 1.0000 | 1.0106 | 1.0088 | 1.0081 | 0.9856 | 0.9711 | 0.9751 | 0.9603 | 0.9459 | 0.9415 | | | | | | | | |
| DATA SET 17 T _S = T _{AIR} = 85C | median = 1.0000 | 0.9985 | 0.9911 | 0.9948 | 0.9825 | 0.9773 | 0.9838 | 0.9689 | 0.9623 | 0.9594 | | | | | | | | |
| | average = 1.0000 | 0.9986 | 0.9897 | 0.9947 | 0.9822 | 0.9781 | 0.9844 | 0.9697 | 0.9631 | 0.9600 | | | | | 5.0236E-06 | 0.9901 | 0.804 | 69,026 |
| | st dev = 0.0000 | 0.0042 | 0.0046 | 0.0063 | 0.0072 | 0.0083 | 0.0098 | 0.0088 | 0.0093 | 0.0089 | | | | | | | | TM-21 L₇₀(6k) > 36,000 |
| | min = 1.0000 | 0.9889 | 0.9781 | 0.9815 | 0.9678 | 0.9648 | 0.9682 | 0.9530 | 0.9446 | 0.9403 | | | | | | | | |
| | max = 1.0000 | 1.0052 | 0.9960 | 1.0047 | 0.9961 | 0.9989 | 1.0158 | 0.9964 | 0.9911 | 0.9855 | | | | | | | | |
| DATA SET 18 T _S = T _{AIR} = 55C | median = 1.0000 | 1.0002 | 0.9875 | 0.9902 | 0.9773 | 0.9734 | 0.9949 | 0.9847 | 0.9780 | 0.9813 | | | | | | | | |
| | average = 1.0000 | 1.0007 | 0.9880 | 0.9909 | 0.9785 | 0.9738 | 0.9951 | 0.9849 | 0.9768 | 0.9817 | | | | | -4.4344E-07 | 0.9802 | 0.012 | -759,338 |
| | st dev = 0.0000 | 0.0030 | 0.0029 | 0.0041 | 0.0034 | 0.0040 | 0.0055 | 0.0064 | 0.0083 | 0.0066 | | | | | | | | TM-21 L₇₀(6k) > 36,000 |
| | min = 1.0000 | 0.9943 | 0.9812 | 0.9849 | 0.9743 | 0.9656 | 0.9817 | 0.9701 | 0.9552 | 0.9663 | | | | | | | | |
| | max = 1.0000 | 1.0083 | 0.9958 | 1.0034 | 0.9889 | 0.9818 | 1.0080 | 0.9980 | 0.9906 | 0.9934 | | | | | | | | |

Delta u' v'

| | 0 | 24 | 168 | 500 | 1000 | 2000 | 3000 | 4000 | 5000 | 6000 | 7000 | 8000 | 9000 | 10000 |
|----------------------------------------------------------------|-------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|------|------|------|-------|
| DATA SET 16 T _S = T _{AIR} = 105C | median = 0.0000 | 0.0011 | 0.0019 | 0.0023 | 0.0023 | 0.0018 | 0.0016 | 0.0012 | 0.0011 | 0.0011 | | | | |
| | average = 0.0000 | 0.0012 | 0.0019 | 0.0024 | 0.0024 | 0.0019 | 0.0016 | 0.0012 | 0.0012 | 0.0011 | | | | |
| | st dev = 0.0000 | 0.0002 | 0.0002 | 0.0002 | 0.0003 | 0.0005 | 0.0006 | 0.0006 | 0.0006 | 0.0005 | | | | |
| | min = 0.0000 | 0.0010 | 0.0016 | 0.0019 | 0.0019 | 0.0012 | 0.0008 | 0.0005 | 0.0004 | 0.0003 | | | | |
| | max = 0.0000 | 0.0019 | 0.0027 | 0.0031 | 0.0034 | 0.0034 | 0.0033 | 0.0029 | 0.0027 | 0.0024 | | | | |
| DATA SET 17 T _S = T _{AIR} = 85C | median = 0.0000 | 0.0012 | 0.0018 | 0.0025 | 0.0031 | 0.0034 | 0.0036 | 0.0033 | 0.0028 | 0.0024 | | | | |
| | average = 0.0000 | 0.0013 | 0.0019 | 0.0026 | 0.0032 | 0.0033 | 0.0035 | 0.0033 | 0.0028 | 0.0024 | | | | |
| | st dev = 0.0000 | 0.0001 | 0.0001 | 0.0002 | 0.0002 | 0.0002 | 0.0003 | 0.0003 | 0.0003 | 0.0003 | | | | |
| | min = 0.0000 | 0.0011 | 0.0016 | 0.0022 | 0.0028 | 0.0030 | 0.0029 | 0.0025 | 0.0022 | 0.0017 | | | | |
| | max = 0.0000 | 0.0016 | 0.0021 | 0.0029 | 0.0035 | 0.0037 | 0.0039 | 0.0038 | 0.0034 | 0.0031 | | | | |
| DATA SET 18 T _S = T _{AIR} = 55C | median = 0.0000 | 0.0013 | 0.0017 | 0.0023 | 0.0030 | 0.0035 | 0.0038 | 0.0039 | 0.0037 | 0.0037 | | | | |
| | average = 0.0000 | 0.0013 | 0.0018 | 0.0023 | 0.0031 | 0.0036 | 0.0039 | 0.0039 | 0.0038 | 0.0038 | | | | |
| | st dev = 0.0000 | 0.0001 | 0.0001 | 0.0001 | 0.0002 | 0.0003 | 0.0003 | 0.0003 | 0.0003 | 0.0003 | | | | |
| | min = 0.0000 | 0.0012 | 0.0016 | 0.0021 | 0.0028 | 0.0032 | 0.0036 | 0.0035 | 0.0034 | 0.0034 | | | | |
| | max = 0.0000 | 0.0014 | 0.0020 | 0.0027 | 0.0035 | 0.0042 | 0.0046 | 0.0045 | 0.0044 | 0.0044 | | | | |



SUMMARY, Continued

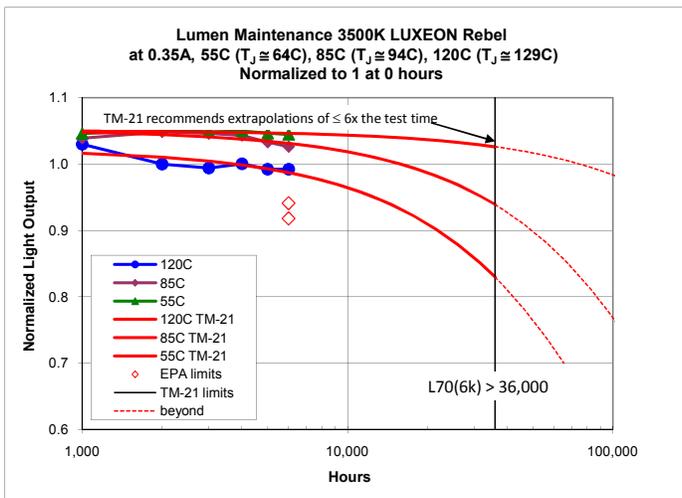
LUXEON Rebel CCT = 3500K, I_F = 0.35A

Normalized Flux

| | 0 | 24 | 168 | 500 | 1000 | 2000 | 3000 | 4000 | 5000 | 6000 | 7000 | 8000 | 9000 | 10000 | alpha | B | r2 | :L70 |
|----------------------------------------------------------------|-------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|------|------|------|-------|-------|---|----|---------------------------------------------|
| DATA SET 19 T _S = T _{AIR} = 120C | median = 1.0000 | 1.0213 | 1.0340 | 1.0390 | 1.0407 | 0.9948 | 0.9929 | 0.9984 | 0.9920 | 0.9929 | | | | | | | | |
| | average = 1.0000 | 1.0133 | 1.0253 | 1.0284 | 1.0299 | 1.0001 | 0.9941 | 1.0004 | 0.9922 | 0.9924 | | | | | | | | 65,276 |
| | st dev = 0.0000 | 0.0278 | 0.0313 | 0.0314 | 0.0254 | 0.0546 | 0.0572 | 0.0584 | 0.0579 | 0.0579 | | | | | | | | TM-21 L₇₀(6k) > 36,000 |
| | min = 1.0000 | 0.9729 | 0.9799 | 0.9672 | 0.9827 | 0.9193 | 0.8964 | 0.9025 | 0.8963 | 0.8939 | | | | | | | | |
| | max = 1.0000 | 1.0519 | 1.0758 | 1.0738 | 1.0603 | 1.1115 | 1.1109 | 1.1209 | 1.1094 | 1.1091 | | | | | | | | |
| DATA SET 20 T _S = T _{AIR} = 85C | median = 1.0000 | 1.0107 | 1.0253 | 1.0383 | 1.0436 | 1.0370 | 1.0349 | 1.0341 | 1.0244 | 1.0129 | | | | | | | | |
| | average = 1.0000 | 1.0109 | 1.0243 | 1.0339 | 1.0392 | 1.0485 | 1.0461 | 1.0432 | 1.0332 | 1.0263 | | | | | | | | 129,924 |
| | st dev = 0.0000 | 0.0077 | 0.0107 | 0.0125 | 0.0130 | 0.0471 | 0.0481 | 0.0494 | 0.0530 | 0.0531 | | | | | | | | TM-21 L₇₀(6k) > 36,000 |
| | min = 1.0000 | 0.9901 | 0.9935 | 0.9973 | 1.0025 | 0.9859 | 0.9854 | 0.9877 | 0.9741 | 0.9562 | | | | | | | | |
| | max = 1.0000 | 1.0233 | 1.0404 | 1.0480 | 1.0551 | 1.2144 | 1.2164 | 1.2289 | 1.2372 | 1.2221 | | | | | | | | |
| DATA SET 21 T _S = T _{AIR} = 55C | median = 1.0000 | 1.0347 | 1.0283 | 1.0458 | 1.0436 | 1.0426 | 1.0392 | 1.0426 | 1.0402 | 1.0387 | | | | | | | | |
| | average = 1.0000 | 1.0349 | 1.0283 | 1.0462 | 1.0458 | 1.0531 | 1.0487 | 1.0500 | 1.0466 | 1.0447 | | | | | | | | 618,395 |
| | st dev = 0.0000 | 0.0076 | 0.0100 | 0.0079 | 0.0080 | 0.0548 | 0.0546 | 0.0553 | 0.0556 | 0.0559 | | | | | | | | TM-21 L₇₀(6k) > 36,000 |
| | min = 1.0000 | 1.0179 | 0.9961 | 1.0340 | 1.0327 | 0.9647 | 0.9558 | 0.9541 | 0.9498 | 0.9474 | | | | | | | | |
| | max = 1.0000 | 1.0590 | 1.0502 | 1.0725 | 1.0725 | 1.2052 | 1.1986 | 1.2001 | 1.1978 | 1.1966 | | | | | | | | |

Delta u' v'

| | 0 | 24 | 168 | 500 | 1000 | 2000 | 3000 | 4000 | 5000 | 6000 | 7000 | 8000 | 9000 | 10000 |
|----------------------------------------------------------------|-------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|------|------|------|-------|
| DATA SET 19 T _S = T _{AIR} = 120C | median = 0.0000 | 0.0007 | 0.0010 | 0.0017 | 0.0020 | 0.0024 | 0.0024 | 0.0025 | 0.0027 | 0.0028 | | | | |
| | average = 0.0000 | 0.0013 | 0.0016 | 0.0022 | 0.0024 | 0.0027 | 0.0026 | 0.0027 | 0.0028 | 0.0030 | | | | |
| | st dev = 0.0000 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0008 | 0.0008 | 0.0007 | 0.0008 | | | | |
| | min = 0.0000 | 0.0004 | 0.0007 | 0.0013 | 0.0014 | 0.0016 | 0.0017 | 0.0017 | 0.0018 | 0.0017 | | | | |
| | max = 0.0000 | 0.0029 | 0.0033 | 0.0038 | 0.0041 | 0.0053 | 0.0052 | 0.0051 | 0.0052 | 0.0052 | | | | |
| DATA SET 20 T _S = T _{AIR} = 85C | median = 0.0000 | 0.0008 | 0.0010 | 0.0012 | 0.0014 | 0.0019 | 0.0019 | 0.0019 | 0.0019 | 0.0021 | | | | |
| | average = 0.0000 | 0.0009 | 0.0011 | 0.0013 | 0.0015 | 0.0019 | 0.0020 | 0.0020 | 0.0021 | 0.0022 | | | | |
| | st dev = 0.0000 | 0.0003 | 0.0003 | 0.0003 | 0.0004 | 0.0005 | 0.0005 | 0.0005 | 0.0005 | 0.0005 | | | | |
| | min = 0.0000 | 0.0006 | 0.0009 | 0.0010 | 0.0012 | 0.0014 | 0.0014 | 0.0015 | 0.0014 | 0.0014 | | | | |
| | max = 0.0000 | 0.0019 | 0.0022 | 0.0024 | 0.0026 | 0.0034 | 0.0034 | 0.0031 | 0.0031 | 0.0032 | | | | |
| DATA SET 21 T _S = T _{AIR} = 55C | median = 0.0000 | 0.0008 | 0.0009 | 0.0012 | 0.0013 | 0.0014 | 0.0014 | 0.0015 | 0.0017 | 0.0017 | | | | |
| | average = 0.0000 | 0.0008 | 0.0009 | 0.0012 | 0.0013 | 0.0016 | 0.0015 | 0.0017 | 0.0018 | 0.0018 | | | | |
| | st dev = 0.0000 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0003 | 0.0003 | 0.0003 | 0.0003 | 0.0002 | | | | |
| | min = 0.0000 | 0.0007 | 0.0008 | 0.0009 | 0.0012 | 0.0013 | 0.0013 | 0.0014 | 0.0015 | 0.0014 | | | | |
| | max = 0.0000 | 0.0010 | 0.0012 | 0.0015 | 0.0016 | 0.0022 | 0.0023 | 0.0025 | 0.0025 | 0.0025 | | | | |



SUMMARY, Continued

LUXEON Rebel CCT = 3500K, I_f = 0.7A

Normalized Flux

DATA SET 22
T_s = T_{AIR} = 105C

| | 0 | 24 | 168 | 500 | 1000 | 2000 | 3000 | 4000 | 5000 | 6000 | 7000 | 8000 | 9000 | 10000 | alpha | B | r2 | :L70 |
|-----------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|------|------|-------|------------|--------|-------|--------|
| median = | 1.0000 | 0.9964 | 0.9975 | 1.0004 | 1.0026 | 1.0056 | 0.9755 | 0.9651 | 0.9606 | 0.9598 | 0.9610 | | | | | | | |
| average = | 1.0000 | 0.9933 | 0.9904 | 0.9919 | 0.9965 | 0.9994 | 0.9747 | 0.9566 | 0.9441 | 0.9350 | 0.9345 | | | | 1.3532E-05 | 1.0172 | 0.914 | 27,619 |
| st dev = | 0.0000 | 0.0124 | 0.0187 | 0.0206 | 0.0265 | 0.0286 | 0.0298 | 0.0535 | 0.0685 | 0.0806 | 0.0894 | | | | | | | |
| min = | 1.0000 | 0.9429 | 0.9422 | 0.9369 | 0.9323 | 0.9371 | 0.9201 | 0.8002 | 0.7325 | 0.6847 | 0.6586 | | | | | | | |
| max = | 1.0000 | 1.0022 | 1.0063 | 1.0112 | 1.0614 | 1.0845 | 1.0732 | 1.0886 | 1.0822 | 1.0769 | 1.0789 | | | | | | | |

TM-21 L₇₀(7k) > 27,619

DATA SET 23
T_s = T_{AIR} = 85C

| | | | | | | | | | | | | | | | | | | |
|-----------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|--|--|--|------------|--------|-------|--------|
| median = | 1.0000 | 0.9932 | 1.0043 | 1.0043 | 1.0029 | 0.9969 | 0.9939 | 0.9882 | 0.9928 | 0.9701 | 0.9603 | | | | | | | |
| average = | 1.0000 | 0.9912 | 1.0015 | 1.0006 | 0.9996 | 0.9943 | 0.9909 | 0.9865 | 0.9911 | 0.9713 | 0.9580 | | | | 6.8963E-06 | 1.0129 | 0.774 | 53,576 |
| st dev = | 0.0000 | 0.0066 | 0.0084 | 0.0101 | 0.0112 | 0.0116 | 0.0135 | 0.0150 | 0.0152 | 0.0167 | 0.0183 | | | | | | | |
| min = | 1.0000 | 0.9683 | 0.9722 | 0.9677 | 0.9630 | 0.9550 | 0.9481 | 0.9414 | 0.9445 | 0.9309 | 0.9269 | | | | | | | |
| max = | 1.0000 | 0.9965 | 1.0076 | 1.0065 | 1.0170 | 1.0138 | 1.0136 | 1.0159 | 1.0191 | 1.0137 | 1.0084 | | | | | | | |

TM-21 L₇₀(7k) > 42,000

DATA SET 24
T_s = T_{AIR} = 55C

| | | | | | | | | | | | | | | | | | | |
|-----------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|--|--|--|--|------------|--------|-------|---------|
| median = | 1.0000 | 0.9946 | 1.0028 | 0.9993 | 1.0016 | 0.9912 | 0.9924 | 0.9996 | 0.9895 | 0.9900 | | | | | | | | |
| average = | 1.0000 | 0.9954 | 1.0029 | 0.9961 | 1.0012 | 0.9944 | 0.9957 | 1.0030 | 0.9944 | 0.9917 | | | | | 1.1605E-06 | 1.0008 | 0.242 | 308,016 |
| st dev = | 0.0000 | 0.0040 | 0.0039 | 0.0122 | 0.0143 | 0.0213 | 0.0219 | 0.0241 | 0.0247 | 0.0242 | | | | | | | | |
| min = | 1.0000 | 0.9905 | 0.9960 | 0.9598 | 0.9712 | 0.9607 | 0.9600 | 0.9726 | 0.9596 | 0.9567 | | | | | | | | |
| max = | 1.0000 | 1.0119 | 1.0182 | 1.0173 | 1.0479 | 1.0629 | 1.0656 | 1.0926 | 1.0845 | 1.0789 | | | | | | | | |

TM-21 L₇₀(6k) > 36,000

Delta u' v'

DATA SET 22
T_s = T_{AIR} = 105C

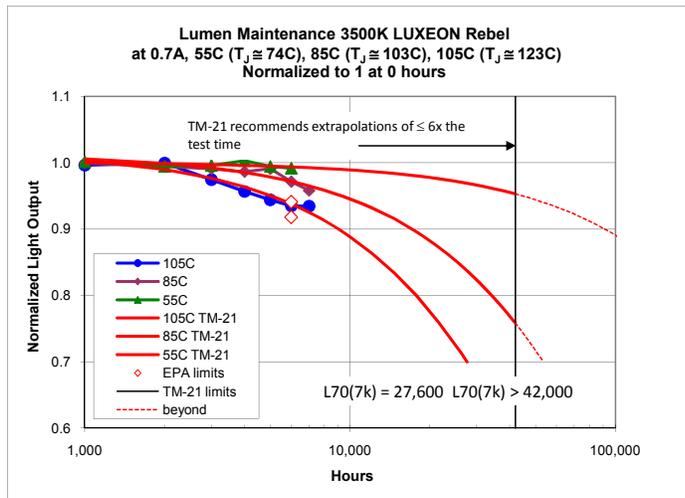
| | 0 | 24 | 168 | 500 | 1000 | 2000 | 3000 | 4000 | 5000 | 6000 | 7000 | 8000 | 9000 | 10000 |
|-----------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|------|------|-------|
| median = | 0.0000 | 0.0015 | 0.0022 | 0.0026 | 0.0028 | 0.0034 | 0.0037 | 0.0038 | 0.0038 | 0.0040 | 0.0040 | | | |
| average = | 0.0000 | 0.0016 | 0.0023 | 0.0027 | 0.0030 | 0.0034 | 0.0036 | 0.0037 | 0.0037 | 0.0038 | 0.0039 | | | |
| st dev = | 0.0000 | 0.0005 | 0.0005 | 0.0005 | 0.0005 | 0.0005 | 0.0004 | 0.0004 | 0.0004 | 0.0005 | 0.0007 | | | |
| min = | 0.0000 | 0.0012 | 0.0018 | 0.0022 | 0.0024 | 0.0027 | 0.0029 | 0.0027 | 0.0015 | 0.0007 | 0.0007 | | | |
| max = | 0.0000 | 0.0036 | 0.0043 | 0.0046 | 0.0048 | 0.0047 | 0.0044 | 0.0042 | 0.0043 | 0.0044 | 0.0045 | | | |

DATA SET 23
T_s = T_{AIR} = 85C

| | | | | | | | | | | | | | | |
|-----------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|--|--|--|
| median = | 0.0000 | 0.0016 | 0.0022 | 0.0028 | 0.0031 | 0.0035 | 0.0038 | 0.0040 | 0.0041 | 0.0042 | 0.0042 | | | |
| average = | 0.0000 | 0.0016 | 0.0023 | 0.0028 | 0.0031 | 0.0035 | 0.0038 | 0.0040 | 0.0041 | 0.0042 | 0.0043 | | | |
| st dev = | 0.0000 | 0.0002 | 0.0003 | 0.0003 | 0.0003 | 0.0003 | 0.0003 | 0.0003 | 0.0003 | 0.0003 | 0.0003 | | | |
| min = | 0.0000 | 0.0013 | 0.0020 | 0.0024 | 0.0026 | 0.0030 | 0.0034 | 0.0036 | 0.0036 | 0.0037 | 0.0037 | | | |
| max = | 0.0000 | 0.0023 | 0.0032 | 0.0037 | 0.0039 | 0.0042 | 0.0045 | 0.0048 | 0.0047 | 0.0047 | 0.0046 | | | |

DATA SET 24
T_s = T_{AIR} = 55C

| | | | | | | | | | | | | | | |
|-----------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|--|--|--|--|
| median = | 0.0000 | 0.0014 | 0.0022 | 0.0027 | 0.0031 | 0.0036 | 0.0040 | 0.0041 | 0.0044 | 0.0045 | | | | |
| average = | 0.0000 | 0.0014 | 0.0021 | 0.0027 | 0.0032 | 0.0037 | 0.0041 | 0.0043 | 0.0044 | 0.0045 | | | | |
| st dev = | 0.0000 | 0.0001 | 0.0001 | 0.0002 | 0.0003 | 0.0004 | 0.0004 | 0.0004 | 0.0005 | 0.0005 | | | | |
| min = | 0.0000 | 0.0011 | 0.0019 | 0.0024 | 0.0025 | 0.0032 | 0.0036 | 0.0038 | 0.0040 | 0.0041 | | | | |
| max = | 0.0000 | 0.0016 | 0.0024 | 0.0030 | 0.0043 | 0.0049 | 0.0052 | 0.0057 | 0.0060 | 0.0060 | | | | |



SUMMARY, Continued

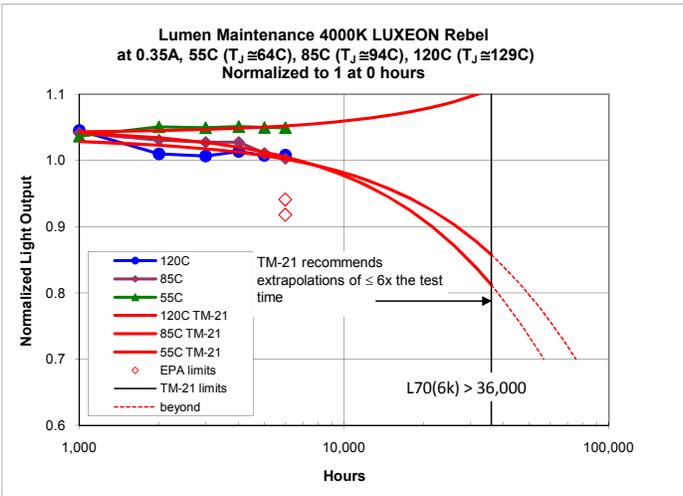
LUXEON Rebel CCT = 4000K, I_f = 0.35A

Normalized Flux

| | 0 | 24 | 168 | 500 | 1000 | 2000 | 3000 | 4000 | 5000 | 6000 | 7000 | 8000 | 9000 | 10000 | alpha | B | r2 | :L70 |
|----------------------------------------------------------------|-------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|------|------|------|-------|-------------|--------|-------|-------------------------------------|
| DATA SET 25 T _s = T _{AIR} = 120C | median = 1.0000 | 1.0211 | 1.0373 | 1.0544 | 1.0433 | 0.9969 | 0.9926 | 1.0005 | 0.9949 | 1.0019 | | | | | | | | |
| | average = 1.0000 | 1.0214 | 1.0367 | 1.0523 | 1.0454 | 1.0101 | 1.0067 | 1.0136 | 1.0075 | 1.0083 | | | | | 5.1911E-06 | 1.0338 | 0.444 | 75,108 |
| | st dev = 0.0000 | 0.0036 | 0.0048 | 0.0116 | 0.0095 | 0.0399 | 0.0416 | 0.0394 | 0.0390 | 0.0406 | | | | | | | | TM-21 L ₇₀ (6k) > 36,000 |
| | min = 1.0000 | 1.0140 | 1.0282 | 1.0216 | 1.0280 | 0.9625 | 0.9600 | 0.9679 | 0.9650 | 0.9624 | | | | | | | | |
| | max = 1.0000 | 1.0295 | 1.0459 | 1.0753 | 1.0687 | 1.1228 | 1.1251 | 1.1300 | 1.1247 | 1.1217 | | | | | | | | |
| DATA SET 26 T _s = T _{AIR} = 85C | median = 1.0000 | 1.0120 | 1.0268 | 1.0360 | 1.0414 | 1.0384 | 1.0402 | 1.0350 | 1.0193 | 1.0134 | | | | | | | | |
| | average = 1.0000 | 1.0132 | 1.0273 | 0.9946 | 1.0415 | 1.0310 | 1.0276 | 1.0277 | 1.0108 | 1.0027 | | | | | 7.1265E-06 | 1.0493 | 0.916 | 56,803 |
| | st dev = 0.0000 | 0.0073 | 0.0111 | 0.2076 | 0.0130 | 0.0378 | 0.0389 | 0.0410 | 0.0384 | 0.0356 | | | | | | | | TM-21 L ₇₀ (6k) > 36,000 |
| | min = 1.0000 | 1.0013 | 1.0089 | 0.0000 | 1.0218 | 0.9185 | 0.9215 | 0.9099 | 0.8967 | 0.8947 | | | | | | | | |
| | max = 1.0000 | 1.0301 | 1.0545 | 1.0669 | 1.0761 | 1.0856 | 1.0826 | 1.0851 | 1.0581 | 1.0435 | | | | | | | | |
| DATA SET 27 T _s = T _{AIR} = 55C | median = 1.0000 | 1.0036 | 1.0209 | 1.0303 | 1.0384 | 1.0472 | 1.0475 | 1.0494 | 1.0479 | 1.0467 | | | | | | | | |
| | average = 1.0000 | 1.0038 | 1.0221 | 1.0304 | 1.0367 | 1.0506 | 1.0494 | 1.0512 | 1.0498 | 1.0493 | | | | | -1.7052E-06 | 1.0416 | 0.364 | -233,062 |
| | st dev = 0.0000 | 0.0056 | 0.0058 | 0.0086 | 0.0090 | 0.0175 | 0.0175 | 0.0172 | 0.0169 | 0.0168 | | | | | | | | TM-21 L ₇₀ (6k) > 36,000 |
| | min = 1.0000 | 0.9911 | 1.0119 | 1.0093 | 1.0154 | 1.0198 | 1.0202 | 1.0233 | 1.0249 | 1.0249 | | | | | | | | |
| | max = 1.0000 | 1.0154 | 1.0357 | 1.0441 | 1.0526 | 1.0973 | 1.0992 | 1.0992 | 1.0937 | 1.0909 | | | | | | | | |

Delta u' v'

| | 0 | 24 | 168 | 500 | 1000 | 2000 | 3000 | 4000 | 5000 | 6000 | 7000 | 8000 | 9000 | 10000 |
|----------------------------------------------------------------|-------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|------|------|------|-------|
| DATA SET 25 T _s = T _{AIR} = 120C | median = 0.0000 | 0.0007 | 0.0009 | 0.0014 | 0.0015 | 0.0028 | 0.0026 | 0.0025 | 0.0026 | 0.0027 | | | | |
| | average = 0.0000 | 0.0007 | 0.0009 | 0.0014 | 0.0015 | 0.0030 | 0.0027 | 0.0027 | 0.0028 | 0.0029 | | | | |
| | st dev = 0.0000 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0007 | 0.0006 | 0.0006 | 0.0006 | 0.0006 | | | | |
| | min = 0.0000 | 0.0006 | 0.0008 | 0.0011 | 0.0013 | 0.0020 | 0.0019 | 0.0020 | 0.0021 | 0.0019 | | | | |
| | max = 0.0000 | 0.0008 | 0.0011 | 0.0016 | 0.0018 | 0.0047 | 0.0045 | 0.0047 | 0.0046 | 0.0049 | | | | |
| DATA SET 26 T _s = T _{AIR} = 85C | median = 0.0000 | 0.0007 | 0.0011 | 0.0013 | 0.0016 | 0.0024 | 0.0024 | 0.0023 | 0.0023 | 0.0023 | | | | |
| | average = 0.0000 | 0.0007 | 0.0011 | 0.0014 | 0.0016 | 0.0026 | 0.0025 | 0.0024 | 0.0024 | 0.0024 | | | | |
| | st dev = 0.0000 | 0.0001 | 0.0001 | 0.0002 | 0.0002 | 0.0008 | 0.0008 | 0.0006 | 0.0005 | 0.0004 | | | | |
| | min = 0.0000 | 0.0005 | 0.0009 | 0.0011 | 0.0014 | 0.0017 | 0.0017 | 0.0018 | 0.0018 | 0.0018 | | | | |
| | max = 0.0000 | 0.0010 | 0.0014 | 0.0017 | 0.0019 | 0.0054 | 0.0052 | 0.0047 | 0.0044 | 0.0036 | | | | |
| DATA SET 27 T _s = T _{AIR} = 55C | median = 0.0000 | 0.0005 | 0.0007 | 0.0009 | 0.0009 | 0.0013 | 0.0012 | 0.0013 | 0.0014 | 0.0014 | | | | |
| | average = 0.0000 | 0.0005 | 0.0007 | 0.0009 | 0.0009 | 0.0016 | 0.0015 | 0.0016 | 0.0016 | 0.0017 | | | | |
| | st dev = 0.0000 | 0.0001 | 0.0001 | 0.0001 | 0.0002 | 0.0007 | 0.0007 | 0.0007 | 0.0006 | 0.0006 | | | | |
| | min = 0.0000 | 0.0004 | 0.0005 | 0.0007 | 0.0006 | 0.0011 | 0.0010 | 0.0010 | 0.0011 | 0.0011 | | | | |
| | max = 0.0000 | 0.0007 | 0.0009 | 0.0010 | 0.0013 | 0.0037 | 0.0034 | 0.0036 | 0.0036 | 0.0035 | | | | |



SUMMARY, Continued

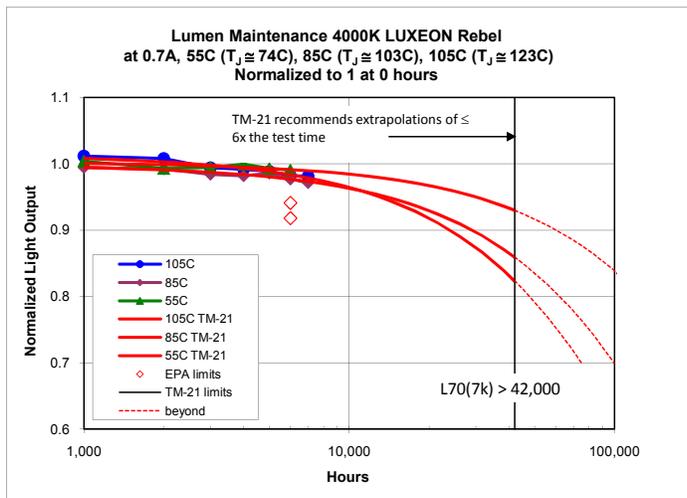
LUXEON Rebel CCT = 4000K, $I_f = 0.7A$

Normalized Flux

| | 0 | 24 | 168 | 500 | 1000 | 2000 | 3000 | 4000 | 5000 | 6000 | 7000 | 8000 | 9000 | 10000 | alpha | B | r2 | :L70 | |
|----------------------------------------------|--------------------------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|------|------|-------|------------|--------|-------|---------|--|
| DATA SET 28 $T_s = T_{AIR} = 105C$ | median = 1.0000 | 1.0006 | 1.0048 | 1.0075 | 1.0129 | 1.0072 | 0.9948 | 0.9920 | 0.9905 | 0.9831 | 0.9832 | | | | | | | | |
| | average = 1.0000 | 1.0010 | 1.0047 | 1.0082 | 1.0120 | 1.0080 | 0.9941 | 0.9919 | 0.9884 | 0.9821 | 0.9815 | | | | 4.9350E-06 | 1.0132 | 0.890 | 74,930 | |
| | st dev = 0.0000 | 0.0020 | 0.0028 | 0.0046 | 0.0055 | 0.0080 | 0.0090 | 0.0086 | 0.0096 | 0.0113 | 0.0126 | | | | | | | | |
| | min = 1.0000 | 0.9977 | 1.0004 | 0.9995 | 1.0008 | 0.9894 | 0.9715 | 0.9698 | 0.9630 | 0.9519 | 0.9464 | | | | | | | | |
| | max = 1.0000 | 1.0069 | 1.0124 | 1.0182 | 1.0244 | 1.0205 | 1.0128 | 1.0087 | 1.0036 | 1.0023 | 1.0066 | | | | | | | | |
| | TM-21 $L_{70}(7k) > 42,000$ | | | | | | | | | | | | | | | | | | |
| DATA SET 29 $T_s = T_{AIR} = 85C$ | median = 1.0000 | 0.9952 | 1.0030 | 1.0003 | 1.0017 | 1.0002 | 0.9857 | 0.9854 | 0.9893 | 0.9838 | 0.9738 | | | | | | | | |
| | average = 1.0000 | 0.9899 | 0.9974 | 0.9939 | 0.9945 | 0.9924 | 0.9841 | 0.9818 | 0.9859 | 0.9771 | 0.9714 | | | | 3.5583E-06 | 0.9979 | 0.806 | 99,658 | |
| | st dev = 0.0000 | 0.0113 | 0.0136 | 0.0153 | 0.0204 | 0.0226 | 0.0256 | 0.0267 | 0.0267 | 0.0261 | 0.0250 | | | | | | | | |
| | min = 1.0000 | 0.9559 | 0.9587 | 0.9505 | 0.9431 | 0.9343 | 0.9292 | 0.9233 | 0.9299 | 0.9225 | 0.9179 | | | | | | | | |
| | max = 1.0000 | 1.0009 | 1.0108 | 1.0092 | 1.0415 | 1.0397 | 1.0480 | 1.0482 | 1.0558 | 1.0443 | 1.0361 | | | | | | | | |
| | TM-21 $L_{70}(7k) > 42,000$ | | | | | | | | | | | | | | | | | | |
| DATA SET 30 $T_s = T_{AIR} = 55C$ | median = 1.0000 | 0.9972 | 1.0053 | 1.0045 | 1.0045 | 0.9930 | 0.9948 | 1.0004 | 0.9941 | 0.9920 | | | | | | | | | |
| | average = 1.0000 | 0.9964 | 1.0040 | 1.0020 | 1.0041 | 0.9930 | 0.9947 | 0.9997 | 0.9933 | 0.9905 | | | | | 1.7783E-06 | 1.0021 | 0.433 | 201,745 | |
| | st dev = 0.0000 | 0.0043 | 0.0058 | 0.0069 | 0.0101 | 0.0107 | 0.0113 | 0.0110 | 0.0108 | 0.0112 | | | | | | | | | |
| | min = 1.0000 | 0.9799 | 0.9803 | 0.9757 | 0.9766 | 0.9655 | 0.9646 | 0.9707 | 0.9607 | 0.9577 | | | | | | | | | |
| | max = 1.0000 | 1.0018 | 1.0114 | 1.0110 | 1.0238 | 1.0111 | 1.0146 | 1.0206 | 1.0118 | 1.0102 | | | | | | | | | |
| | TM-21 $L_{70}(6k) > 36,000$ | | | | | | | | | | | | | | | | | | |

Delta u' v'

| | 0 | 24 | 168 | 500 | 1000 | 2000 | 3000 | 4000 | 5000 | 6000 | 7000 | 8000 | 9000 | 10000 |
|----------------------------------------------|-------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|------|------|-------|
| DATA SET 28 $T_s = T_{AIR} = 105C$ | median = 0.0000 | 0.0013 | 0.0020 | 0.0024 | 0.0026 | 0.0030 | 0.0033 | 0.0035 | 0.0037 | 0.0041 | 0.0040 | | | |
| | average = 0.0000 | 0.0013 | 0.0020 | 0.0024 | 0.0026 | 0.0031 | 0.0033 | 0.0036 | 0.0038 | 0.0041 | 0.0041 | | | |
| | st dev = 0.0000 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0002 | 0.0003 | 0.0003 | 0.0004 | | | |
| | min = 0.0000 | 0.0011 | 0.0017 | 0.0021 | 0.0025 | 0.0028 | 0.0030 | 0.0032 | 0.0034 | 0.0035 | 0.0036 | | | |
| | max = 0.0000 | 0.0014 | 0.0021 | 0.0025 | 0.0029 | 0.0034 | 0.0037 | 0.0044 | 0.0045 | 0.0052 | 0.0052 | | | |
| DATA SET 29 $T_s = T_{AIR} = 85C$ | median = 0.0000 | 0.0014 | 0.0022 | 0.0026 | 0.0028 | 0.0030 | 0.0033 | 0.0035 | 0.0036 | 0.0037 | 0.0037 | | | |
| | average = 0.0000 | 0.0016 | 0.0024 | 0.0028 | 0.0030 | 0.0033 | 0.0036 | 0.0038 | 0.0038 | 0.0039 | 0.0039 | | | |
| | st dev = 0.0000 | 0.0004 | 0.0005 | 0.0005 | 0.0005 | 0.0006 | 0.0006 | 0.0006 | 0.0006 | 0.0005 | 0.0005 | | | |
| | min = 0.0000 | 0.0013 | 0.0020 | 0.0023 | 0.0025 | 0.0027 | 0.0028 | 0.0030 | 0.0031 | 0.0032 | 0.0033 | | | |
| | max = 0.0000 | 0.0027 | 0.0036 | 0.0043 | 0.0045 | 0.0048 | 0.0051 | 0.0052 | 0.0051 | 0.0051 | 0.0050 | | | |
| DATA SET 30 $T_s = T_{AIR} = 55C$ | median = 0.0000 | 0.0013 | 0.0021 | 0.0026 | 0.0031 | 0.0035 | 0.0039 | 0.0040 | 0.0041 | 0.0042 | | | | |
| | average = 0.0000 | 0.0013 | 0.0021 | 0.0026 | 0.0031 | 0.0035 | 0.0039 | 0.0040 | 0.0042 | 0.0043 | | | | |
| | st dev = 0.0000 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0003 | 0.0003 | 0.0003 | 0.0003 | 0.0003 | | | | |
| | min = 0.0000 | 0.0010 | 0.0018 | 0.0024 | 0.0028 | 0.0031 | 0.0036 | 0.0037 | 0.0039 | 0.0040 | | | | |
| | max = 0.0000 | 0.0017 | 0.0027 | 0.0033 | 0.0038 | 0.0044 | 0.0049 | 0.0049 | 0.0053 | 0.0053 | | | | |



SUMMARY, Continued

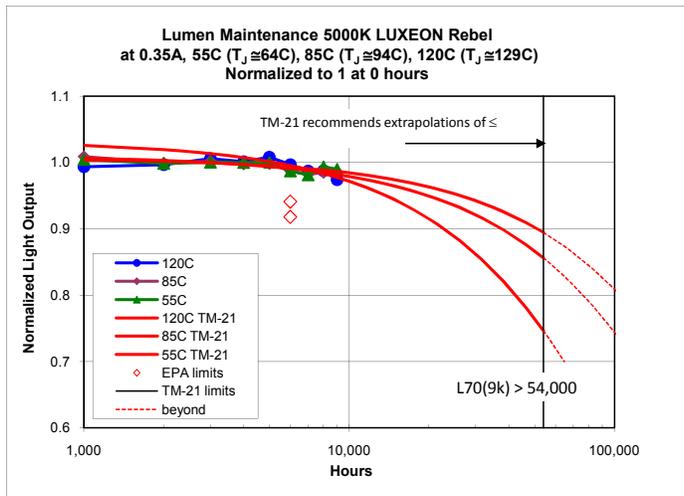
LUXEON Rebel CCT > 5000K, I_f = 0.35A

Normalized Flux

| | 0 | 24 | 168 | 500 | 1000 | 2000 | 3000 | 4000 | 5000 | 6000 | 7000 | 8000 | 9000 | 10000 | alpha | B | r2 | :L70 |
|----------------------------------------------------------------|-------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|-------|------------|--------|-------|-------------------------------------|
| DATA SET 31 T _S = T _{AIR} = 120C | median = 1.0000 | 0.9870 | 0.9942 | 0.9916 | 0.9934 | 0.9965 | 1.0041 | 1.0024 | 1.0084 | 0.9965 | 0.9878 | 0.9863 | 0.9741 | | 6.0016E-06 | 1.0319 | 0.839 | 64,667 |
| | average = 1.0000 | 0.9887 | 0.9960 | 0.9920 | 0.9935 | 0.9966 | 1.0057 | 1.0014 | 1.0081 | 0.9969 | 0.9870 | 0.9877 | 0.9740 | | | | | TM-21 L ₇₀ (9k) > 54,000 |
| | st dev = 0.0000 | 0.0056 | 0.0042 | 0.0047 | 0.0051 | 0.0070 | 0.0088 | 0.0126 | 0.0121 | 0.0104 | 0.0118 | 0.0100 | 0.0144 | | | | | |
| | min = 1.0000 | 0.9748 | 0.9895 | 0.9839 | 0.9821 | 0.9829 | 0.9875 | 0.9712 | 0.9756 | 0.9742 | 0.9542 | 0.9671 | 0.9359 | | | | | |
| | max = 1.0000 | 0.9968 | 1.0035 | 1.0014 | 1.0028 | 1.0093 | 1.0214 | 1.0253 | 1.0341 | 1.0212 | 1.0129 | 1.0077 | 1.0005 | | | | | |
| DATA SET 32 T _S = T _{AIR} = 85C | median = 1.0000 | 0.9990 | 1.0086 | 1.0118 | 1.0080 | 0.9991 | 1.0001 | 0.9963 | 0.9948 | 0.9861 | 0.9805 | 0.9788 | 0.9789 | | 3.0491E-06 | 1.0093 | 0.663 | 120,023 |
| | average = 1.0000 | 0.9992 | 1.0076 | 1.0121 | 1.0089 | 0.9992 | 1.0018 | 0.9979 | 0.9986 | 0.9874 | 0.9824 | 0.9851 | 0.9859 | | | | | TM-21 L ₇₀ (9k) > 54,000 |
| | st dev = 0.0000 | 0.0062 | 0.0078 | 0.0092 | 0.0108 | 0.0144 | 0.0159 | 0.0170 | 0.0171 | 0.0208 | 0.0176 | 0.0180 | 0.0187 | | | | | |
| | min = 1.0000 | 0.9858 | 0.9895 | 0.9985 | 0.9936 | 0.9769 | 0.9723 | 0.9687 | 0.9703 | 0.9429 | 0.9450 | 0.9555 | 0.9562 | | | | | |
| | max = 1.0000 | 1.0093 | 1.0223 | 1.0302 | 1.0298 | 1.0236 | 1.0293 | 1.0283 | 1.0297 | 1.0268 | 1.0202 | 1.0190 | 1.0206 | | | | | |
| DATA SET 33 T _S = T _{AIR} = 55C | median = 1.0000 | 0.9957 | 1.0049 | 1.0058 | 1.0024 | 0.9948 | 0.9953 | 0.9943 | 0.9949 | 0.9819 | 0.9906 | 0.9855 | 0.9829 | | 2.1812E-06 | 1.0062 | 0.293 | 166,349 |
| | average = 1.0000 | 0.9970 | 1.0060 | 1.0083 | 1.0045 | 0.9987 | 1.0005 | 0.9999 | 1.0005 | 0.9871 | 0.9812 | 0.9934 | 0.9901 | | | | | TM-21 L ₇₀ (9k) > 54,000 |
| | st dev = 0.0000 | 0.0052 | 0.0064 | 0.0069 | 0.0079 | 0.0110 | 0.0127 | 0.0139 | 0.0156 | 0.0191 | 0.0354 | 0.0207 | 0.0210 | | | | | |
| | min = 1.0000 | 0.9894 | 0.9957 | 0.9980 | 0.9918 | 0.9795 | 0.9783 | 0.9781 | 0.9782 | 0.9597 | 0.9280 | 0.9644 | 0.9649 | | | | | |
| | max = 1.0000 | 1.0071 | 1.0169 | 1.0203 | 1.0190 | 1.0192 | 1.0232 | 1.0275 | 1.0321 | 1.0338 | 1.0371 | 1.0343 | 1.0338 | | | | | |

Delta u' v'

| | 0 | 24 | 168 | 500 | 1000 | 2000 | 3000 | 4000 | 5000 | 6000 | 7000 | 8000 | 9000 | 10000 |
|----------------------------------------------------------------|-------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| DATA SET 31 T _S = T _{AIR} = 120C | median = 0.0000 | 0.0003 | 0.0012 | 0.0016 | 0.0019 | 0.0008 | 0.0015 | 0.0007 | 0.0009 | 0.0008 | 0.0010 | 0.0009 | 0.0007 | 0.0007 |
| | average = 0.0000 | 0.0004 | 0.0017 | 0.0023 | 0.0025 | 0.0014 | 0.0020 | 0.0015 | 0.0016 | 0.0015 | 0.0015 | 0.0015 | 0.0015 | 0.0017 |
| | st dev = 0.0000 | 0.0002 | 0.0012 | 0.0016 | 0.0015 | 0.0011 | 0.0016 | 0.0013 | 0.0015 | 0.0013 | 0.0012 | 0.0012 | 0.0015 | 0.0015 |
| | min = 0.0000 | 0.0001 | 0.0001 | 0.0001 | 0.0004 | 0.0001 | 0.0001 | 0.0001 | 0.0000 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 |
| | max = 0.0000 | 0.0009 | 0.0036 | 0.0047 | 0.0048 | 0.0031 | 0.0042 | 0.0035 | 0.0037 | 0.0035 | 0.0034 | 0.0034 | 0.0040 | 0.0040 |
| DATA SET 32 T _S = T _{AIR} = 85C | median = 0.0000 | 0.0001 | 0.0004 | 0.0009 | 0.0016 | 0.0005 | 0.0007 | 0.0007 | 0.0007 | 0.0007 | 0.0007 | 0.0011 | 0.0009 | 0.0009 |
| | average = 0.0000 | 0.0002 | 0.0004 | 0.0009 | 0.0016 | 0.0006 | 0.0007 | 0.0008 | 0.0008 | 0.0008 | 0.0008 | 0.0010 | 0.0009 | 0.0009 |
| | st dev = 0.0000 | 0.0001 | 0.0002 | 0.0005 | 0.0007 | 0.0004 | 0.0004 | 0.0004 | 0.0003 | 0.0003 | 0.0004 | 0.0005 | 0.0004 | 0.0004 |
| | min = 0.0000 | 0.0000 | 0.0001 | 0.0002 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0002 |
| | max = 0.0000 | 0.0003 | 0.0007 | 0.0017 | 0.0025 | 0.0019 | 0.0016 | 0.0016 | 0.0015 | 0.0015 | 0.0014 | 0.0018 | 0.0016 | 0.0016 |
| DATA SET 33 T _S = T _{AIR} = 55C | median = 0.0000 | 0.0001 | 0.0003 | 0.0003 | 0.0004 | 0.0016 | 0.0014 | 0.0014 | 0.0013 | 0.0013 | 0.0014 | 0.0012 | 0.0011 | 0.0011 |
| | average = 0.0000 | 0.0002 | 0.0004 | 0.0004 | 0.0004 | 0.0016 | 0.0014 | 0.0014 | 0.0013 | 0.0015 | 0.0014 | 0.0011 | 0.0011 | |
| | st dev = 0.0000 | 0.0001 | 0.0003 | 0.0003 | 0.0003 | 0.0007 | 0.0008 | 0.0008 | 0.0007 | 0.0007 | 0.0009 | 0.0006 | 0.0006 | |
| | min = 0.0000 | 0.0001 | 0.0000 | 0.0000 | 0.0000 | 0.0003 | 0.0001 | 0.0001 | 0.0001 | 0.0004 | 0.0003 | 0.0001 | 0.0001 | |
| | max = 0.0000 | 0.0004 | 0.0008 | 0.0009 | 0.0013 | 0.0028 | 0.0030 | 0.0030 | 0.0029 | 0.0029 | 0.0028 | 0.0026 | 0.0024 | |



SUMMARY, Continued

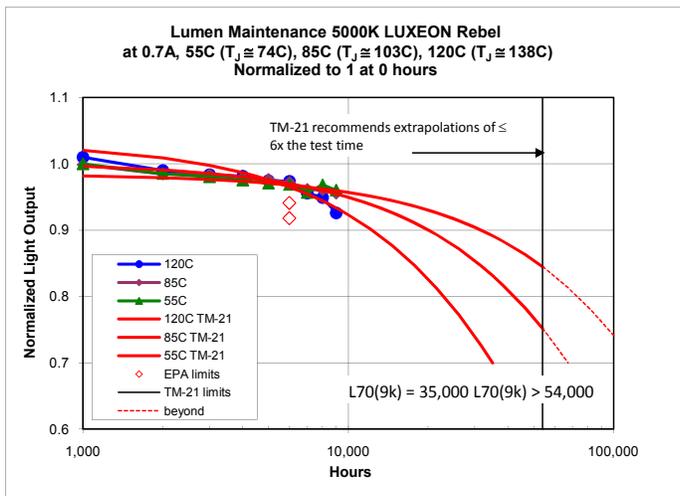
LUXEON Rebel CCT > 5000K, I_F = 0.7A

Normalized Flux

| | 0 | 24 | 168 | 500 | 1000 | 2000 | 3000 | 4000 | 5000 | 6000 | 7000 | 8000 | 9000 | 10000 | alpha | B | r2 | :L70 |
|----------------------------------------------------------------|-----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|-------------------|---------------|--------------|---------------------------------------------|
| DATA SET 34 T _S = T _{AIR} = 120C | median = 1.0000 | 0.9868 | 1.0091 | 1.0095 | 1.0128 | 0.9927 | 0.9820 | 0.9791 | 0.9753 | 0.9683 | 0.9558 | 0.9498 | 0.9336 | | | | | |
| | average = | 1.0000 | 0.9890 | 1.0091 | 1.0076 | 1.0099 | 0.9902 | 0.9836 | 0.9811 | 0.9748 | 0.9735 | 0.9559 | 0.9492 | 0.9258 | 1.1088E-05 | 1.0316 | 0.911 | 34,975 |
| | st dev = 0.0000 | 0.0148 | 0.0194 | 0.0208 | 0.0221 | 0.0210 | 0.0210 | 0.0222 | 0.0256 | 0.0259 | 0.0337 | 0.0360 | 0.0432 | | | | | TM-21 L₇₀(9k) > 34,975 |
| | min = 1.0000 | 0.9622 | 0.9716 | 0.9634 | 0.9645 | 0.9506 | 0.9500 | 0.9478 | 0.9250 | 0.9295 | 0.8939 | 0.8807 | 0.8470 | | | | | |
| | max = 1.0000 | 1.0128 | 1.0546 | 1.0525 | 1.0506 | 1.0324 | 1.0237 | 1.0216 | 1.0225 | 1.0208 | 1.0129 | 1.0137 | 1.0038 | | | | | |
| DATA SET 35 T _S = T _{AIR} = 85C | median = 1.0000 | 1.0023 | 1.0038 | 1.0027 | 0.9984 | 0.9815 | 0.9812 | 0.9777 | 0.9752 | 0.9715 | 0.9608 | 0.9620 | 0.9574 | | | | | |
| | average = | 1.0000 | 1.0039 | 1.0059 | 1.0055 | 0.9986 | 0.9844 | 0.9839 | 0.9794 | 0.9765 | 0.9719 | 0.9615 | 0.9602 | 0.9553 | 5.3141E-06 | 1.0014 | 0.962 | 67,386 |
| | st dev = 0.0000 | 0.0057 | 0.0089 | 0.0115 | 0.0117 | 0.0126 | 0.0131 | 0.0132 | 0.0133 | 0.0137 | 0.0137 | 0.0160 | 0.0167 | | | | | TM-21 L₇₀(9k) > 54,000 |
| | min = 1.0000 | 0.9941 | 0.9879 | 0.9846 | 0.9761 | 0.9631 | 0.9606 | 0.9563 | 0.9538 | 0.9441 | 0.9345 | 0.9243 | 0.9144 | | | | | |
| | max = 1.0000 | 1.0133 | 1.0203 | 1.0243 | 1.0178 | 1.0082 | 1.0088 | 1.0045 | 1.0044 | 1.0009 | 0.9914 | 0.9925 | 0.9885 | | | | | |
| DATA SET 36 T _S = T _{AIR} = 55C | median = 1.0000 | 1.0025 | 1.0048 | 1.0056 | 1.0005 | 0.9835 | 0.9782 | 0.9722 | 0.9672 | 0.9648 | 0.9571 | 0.9677 | 0.9584 | | | | | |
| | average = | 1.0000 | 1.0049 | 1.0053 | 1.0066 | 0.9998 | 0.9851 | 0.9804 | 0.9753 | 0.9708 | 0.9687 | 0.9566 | 0.9679 | 0.9602 | 2.8372E-06 | 0.9846 | 0.548 | 120,226 |
| | st dev = 0.0000 | 0.0070 | 0.0084 | 0.0091 | 0.0111 | 0.0122 | 0.0145 | 0.0156 | 0.0156 | 0.0158 | 0.0188 | 0.0144 | 0.0153 | | | | | TM-21 L₇₀(9k) > 54,000 |
| | min = 1.0000 | 0.9952 | 0.9931 | 0.9926 | 0.9744 | 0.9652 | 0.9543 | 0.9467 | 0.9425 | 0.9409 | 0.9186 | 0.9416 | 0.9324 | | | | | |
| | max = 1.0000 | 1.0248 | 1.0285 | 1.0315 | 1.0267 | 1.0182 | 1.0131 | 1.0059 | 0.9985 | 0.9961 | 0.9881 | 0.9920 | 0.9833 | | | | | |

Delta u' v'

| | 0 | 24 | 168 | 500 | 1000 | 2000 | 3000 | 4000 | 5000 | 6000 | 7000 | 8000 | 9000 | 10000 |
|----------------------------------------------------------------|-----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| DATA SET 34 T _S = T _{AIR} = 120C | median = 0.0000 | 0.0014 | 0.0005 | 0.0006 | 0.0006 | 0.0006 | 0.0010 | 0.0010 | 0.0006 | 0.0009 | 0.0022 | 0.0022 | 0.0046 | |
| | average = | 0.0000 | 0.0014 | 0.0008 | 0.0007 | 0.0007 | 0.0011 | 0.0011 | 0.0008 | 0.0009 | 0.0021 | 0.0024 | 0.0047 | |
| | st dev = 0.0000 | 0.0005 | 0.0006 | 0.0005 | 0.0004 | 0.0006 | 0.0006 | 0.0006 | 0.0005 | 0.0005 | 0.0012 | 0.0013 | 0.0015 | |
| | min = 0.0000 | 0.0003 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0004 | 0.0000 | 0.0001 | 0.0003 | 0.0005 | 0.0013 | |
| | max = 0.0000 | 0.0021 | 0.0018 | 0.0016 | 0.0015 | 0.0021 | 0.0027 | 0.0026 | 0.0020 | 0.0025 | 0.0053 | 0.0060 | 0.0082 | |
| DATA SET 35 T _S = T _{AIR} = 85C | median = 0.0000 | 0.0003 | 0.0015 | 0.0020 | 0.0023 | 0.0006 | 0.0014 | 0.0018 | 0.0019 | 0.0021 | 0.0023 | 0.0025 | 0.0024 | |
| | average = | 0.0000 | 0.0004 | 0.0012 | 0.0016 | 0.0019 | 0.0007 | 0.0014 | 0.0017 | 0.0019 | 0.0021 | 0.0024 | 0.0026 | 0.0025 |
| | st dev = 0.0000 | 0.0003 | 0.0009 | 0.0011 | 0.0011 | 0.0006 | 0.0008 | 0.0009 | 0.0009 | 0.0010 | 0.0011 | 0.0010 | 0.0010 | |
| | min = 0.0000 | 0.0001 | 0.0000 | 0.0001 | 0.0003 | 0.0001 | 0.0004 | 0.0003 | 0.0005 | 0.0006 | 0.0009 | 0.0012 | 0.0011 | |
| | max = 0.0000 | 0.0010 | 0.0022 | 0.0028 | 0.0033 | 0.0031 | 0.0041 | 0.0046 | 0.0051 | 0.0057 | 0.0063 | 0.0064 | 0.0064 | |
| DATA SET 36 T _S = T _{AIR} = 55C | median = 0.0000 | 0.0003 | 0.0004 | 0.0005 | 0.0006 | 0.0015 | 0.0012 | 0.0013 | 0.0013 | 0.0013 | 0.0011 | 0.0011 | 0.0009 | |
| | average = | 0.0000 | 0.0004 | 0.0004 | 0.0005 | 0.0006 | 0.0017 | 0.0014 | 0.0013 | 0.0013 | 0.0013 | 0.0012 | 0.0012 | 0.0011 |
| | st dev = 0.0000 | 0.0003 | 0.0003 | 0.0003 | 0.0004 | 0.0012 | 0.0010 | 0.0008 | 0.0007 | 0.0007 | 0.0007 | 0.0007 | 0.0006 | |
| | min = 0.0000 | 0.0000 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0002 | 0.0002 | 0.0001 | 0.0002 | 0.0004 | |
| | max = 0.0000 | 0.0014 | 0.0013 | 0.0011 | 0.0016 | 0.0043 | 0.0038 | 0.0027 | 0.0025 | 0.0025 | 0.0024 | 0.0024 | 0.0022 | |



$$T_S = T_{AIR} = 55^{\circ}\text{C}, I_F = 0.35\text{A}$$

$$T_S \geq 53^{\circ}\text{C}, T_{AIR} \geq 50^{\circ}\text{C in compliance with LM-80-08}$$

TM-21 extrapolation

| | | CCT (T=0) | alpha | B | r ² | L70 |
|-----------------------------------------------|------------|--------------|--------------------|---------------|----------------|-----------------|
| DATA SET 3: CCT = 2650K, T _J = 64C | A11 | 2606 | -3.3290E-06 | 0.9763 | 0.548 | -99,932 |
| | A12 | 2606 | -2.7486E-06 | 0.9728 | 0.484 | -119,716 |
| | A13 | 2556 | -3.2515E-06 | 0.9785 | 0.543 | -103,015 |
| | A14 | 2553 | -2.4211E-06 | 0.9734 | 0.488 | -136,189 |
| | A15 | 2549 | -1.9941E-06 | 0.9732 | 0.389 | -165,234 |
| | A16 | 2582 | -3.4283E-06 | 0.9745 | 0.603 | -96,509 |
| | A17 | 2626 | -3.1805E-06 | 0.9765 | 0.572 | -104,672 |
| | A18 | 2525 | -2.5974E-06 | 0.9706 | 0.459 | -125,851 |
| | A19 | 2629 | -4.2772E-06 | 0.9644 | 0.605 | -74,908 |
| | A20 | 2571 | -2.6101E-06 | 0.9699 | 0.382 | -124,946 |
| | A31 | 2528 | -3.1946E-06 | 0.9727 | 0.679 | -102,984 |
| | A32 | 2602 | -2.9851E-06 | 0.9743 | 0.598 | -110,760 |
| | A33 | 2549 | -1.7258E-06 | 0.9799 | 0.310 | -194,904 |
| | A34 | 2577 | -2.7492E-06 | 0.9771 | 0.448 | -121,319 |
| | A35 | 2598 | -1.4392E-06 | 0.9772 | 0.244 | -231,798 |
| | A36 | 2615 | -2.6868E-06 | 0.9704 | 0.402 | -121,562 |
| | A37 | 2582 | -3.0259E-06 | 0.9697 | 0.518 | -107,720 |
| | A38 | 2563 | -3.7545E-06 | 0.9687 | 0.632 | -86,521 |
| | A39 | 2566 | -1.4689E-06 | 0.9771 | 0.230 | -227,018 |
| | A40 | 2578 | -8.2791E-07 | 0.9822 | 0.096 | -409,080 |
| | A51 | 2603 | -3.8495E-06 | 0.9826 | 0.656 | -88,092 |
| | A52 | 2614 | -1.3497E-06 | 0.9971 | 0.475 | -262,065 |
| | A53 | 2631 | -1.7572E-06 | 0.9867 | 0.388 | -195,374 |
| | A54 | 2608 | -3.0955E-06 | 0.9913 | 0.568 | -112,411 |
| | A55 | 2609 | -2.3189E-06 | 0.9784 | 0.435 | -144,416 |
| | ave | 2585 | -2.6419E-06 | 0.9766 | 0.501 | -126,051 |

| | | | | | | |
|------------------------------------------------|------------|-------------|--------------------|---------------|--------------|-----------------|
| DATA SET 12: CCT = 3000K, T _J = 64C | A1 | 2894 | -3.0821E-06 | 0.9823 | 0.614 | -109,929 |
| | A2 | 2901 | -2.3968E-06 | 0.9840 | 0.522 | -142,102 |
| | A3 | 2964 | -2.4286E-06 | 0.9833 | 0.480 | -139,925 |
| | A4 | 2946 | -2.4072E-06 | 0.9839 | 0.444 | -141,439 |
| | A5 | 2960 | -3.0894E-06 | 0.9778 | 0.585 | -108,189 |
| | A6 | 2957 | -2.8052E-06 | 0.9835 | 0.551 | -121,216 |
| | A7 | 2855 | -2.1798E-06 | 0.9855 | 0.502 | -156,913 |
| | A8 | 2888 | -3.2414E-06 | 0.9796 | 0.620 | -103,678 |
| | A9 | 2949 | -3.1106E-06 | 0.9804 | 0.611 | -108,309 |
| | A10 | 2940 | -6.6440E-06 | 0.9580 | 0.236 | -47,222 |
| | A21 | 2966 | -2.9753E-06 | 0.9789 | 0.653 | -112,719 |
| | A22 | 2913 | -3.2359E-06 | 0.9855 | 0.720 | -105,723 |
| | A23 | 2875 | -4.1624E-06 | 0.9767 | 0.726 | -80,031 |
| | A24 | 2982 | -2.9385E-06 | 0.9813 | 0.676 | -114,963 |
| | A25 | 3003 | -2.8685E-06 | 0.9761 | 0.674 | -115,914 |
| | A26 | 2981 | -3.6926E-06 | 0.9886 | 0.724 | -93,486 |
| | A27 | 2985 | -2.5166E-06 | 0.9835 | 0.536 | -135,133 |
| | A28 | 2966 | -2.1611E-06 | 0.9827 | 0.440 | -156,949 |
| | A29 | 2876 | -2.3215E-06 | 0.9838 | 0.482 | -146,593 |
| | A30 | 2999 | -2.4834E-06 | 0.9797 | 0.452 | -135,383 |
| | A41 | 3003 | -1.3704E-06 | 0.9832 | 0.168 | -247,928 |
| | A42 | 2972 | -2.8247E-06 | 0.9803 | 0.418 | -119,222 |
| | A43 | 2997 | -2.9631E-06 | 0.9800 | 0.503 | -113,551 |
| | A44 | 3028 | -2.9065E-06 | 0.9817 | 0.496 | -116,379 |
| | A45 | 3003 | -1.5314E-06 | 0.9797 | 0.339 | -219,525 |
| | ave | 2952 | -2.8896E-06 | 0.9808 | 0.542 | -116,734 |

| | | | | | | |
|------------------------------------------------|------------|-------------|-------------------|---------------|--------------|----------------|
| DATA SET 21: CCT = 3500K, T _J = 69C | A1 | 3310 | -1.7439E-05 | 1.1048 | 0.389 | -26,168 |
| | A2 | 3301 | -6.0755E-06 | 1.0690 | 0.284 | -69,694 |
| | A3 | 3277 | 6.2126E-06 | 1.0371 | 0.681 | 63,270 |
| | A4 | 3384 | 1.5164E-05 | 1.0214 | 0.590 | 24,919 |
| | A5 | 3361 | 8.0041E-06 | 1.0369 | 0.748 | 49,093 |
| | A6 | 3723 | 4.8126E-06 | 1.0286 | 0.662 | 79,981 |
| | A7 | 3473 | 1.1934E-05 | 1.0302 | 0.657 | 32,383 |
| | A8 | 3475 | 1.0657E-05 | 1.0359 | 0.761 | 36,782 |
| | A9 | 3488 | 9.1667E-06 | 1.0372 | 0.753 | 42,890 |
| | A10 | 3518 | -1.2158E-05 | 1.0962 | 0.273 | -36,890 |
| | A11 | 3504 | -2.8064E-06 | 1.0552 | 0.340 | -146,249 |
| | A12 | 3484 | 1.0992E-06 | 1.0452 | 0.457 | 364,679 |
| | A13 | 3496 | 1.2850E-06 | 1.0379 | 0.354 | 306,541 |
| | A14 | 3488 | 1.7671E-06 | 1.0390 | 0.758 | 223,486 |
| | A15 | 3528 | -6.4996E-06 | 1.0654 | 0.266 | -64,623 |
| | A16 | 3233 | 2.6971E-06 | 1.0709 | 0.758 | 157,655 |
| | A17 | 3271 | 2.0418E-06 | 1.0492 | 0.696 | 198,217 |
| | A18 | 3384 | 2.2444E-06 | 1.0377 | 0.522 | 175,410 |
| | A19 | 3354 | 9.7163E-07 | 1.0478 | 0.480 | 415,156 |
| | A20 | 3374 | -6.3290E-06 | 1.0705 | 0.371 | -67,125 |
| | A21 | 3291 | -7.2692E-07 | 1.0610 | 0.072 | -572,063 |
| | A22 | 3288 | 1.5004E-06 | 1.0536 | 0.763 | 272,518 |
| | A23 | 3249 | 2.0000E-06 | 1.0456 | 0.654 | 200,629 |
| | A24 | 3450 | -1.5662E-06 | 1.0393 | 0.551 | -252,332 |
| | A25 | 3375 | -6.6824E-06 | 1.0425 | 0.641 | -59,604 |
| | ave | 3403 | 6.5656E-07 | 1.0506 | 0.171 | 618,395 |

$T_S = T_{AIR} = 55^{\circ}C, I_F = 0.35A$

$T_S \geq 53C, T_{AIR} \geq 50C$ in compliance with LM-80-08

TM-21 extrapolation

| | CCT (t=0) | alpha | B | r2 | L70 | | |
|-----------------------------------------------|------------------------------------------------|-------------|-------------------|--------------------|---------------|----------------|-----------------|
| DATA SET 27: CCT = 4000K, T _J = 69 | B1 | 4020 | 1.3321E-06 | 1.0562 | 0.245 | 308,823 | |
| | B2 | 4017 | -2.0191E-06 | 1.0504 | 0.201 | -201,020 | |
| | B3 | 4143 | 1.4791E-06 | 1.0363 | 0.827 | 265,245 | |
| | B4 | 4219 | 6.9722E-07 | 1.0390 | 0.954 | 566,371 | |
| | B5 | 4200 | -1.5166E-06 | 1.0608 | 0.171 | -274,089 | |
| | B6 | 4131 | 1.4716E-06 | 1.0393 | 0.680 | 268,564 | |
| | B7 | 4276 | 1.1575E-07 | 1.0342 | 0.037 | 3,372,435 | |
| | B8 | 4090 | 1.6050E-06 | 1.0313 | 0.170 | 241,430 | |
| | B9 | 4128 | -3.0474E-06 | 1.0320 | 0.528 | -127,366 | |
| | B10 | 4160 | -8.5897E-06 | 1.0372 | 0.461 | -45,779 | |
| | B11 | 3988 | 1.2668E-06 | 1.0402 | 0.814 | 312,703 | |
| | B12 | 3918 | -2.8316E-06 | 1.0337 | 0.633 | -137,674 | |
| | B14 | 3946 | -1.8105E-06 | 1.0316 | 0.489 | -214,184 | |
| | B16 | 4315 | -3.3361E-06 | 1.0440 | 0.494 | -119,812 | |
| | B17 | 4215 | 4.2670E-07 | 1.0507 | 0.242 | 951,697 | |
| | B18 | 4143 | -5.3209E-07 | 1.0430 | 0.264 | -749,382 | |
| | B19 | 4116 | -3.6123E-06 | 1.0455 | 0.569 | -111,045 | |
| | B20 | 4256 | -2.6944E-06 | 1.0411 | 0.335 | -147,329 | |
| | B21 | 4193 | -5.8397E-07 | 1.0477 | 0.393 | -690,583 | |
| | B22 | 4146 | -4.3450E-06 | 1.0522 | 0.415 | -93,794 | |
| | B23 | 4183 | -1.2804E-07 | 1.0331 | 0.017 | -3,040,019 | |
| | B24 | 4242 | -6.4482E-07 | 1.0435 | 0.186 | -619,128 | |
| | B25 | 4144 | -6.3425E-06 | 1.0629 | 0.317 | -65,853 | |
| | B26 | 3930 | -2.5202E-06 | 1.0284 | 0.569 | -152,632 | |
| | B27 | 3851 | -6.1871E-06 | 1.0244 | 0.580 | -61,548 | |
| | | ave | 4119 | -1.7052E-06 | 1.0416 | 0.364 | -233,062 |
| | DATA SET 33: CCT > 5000K, T _J = 68C | A6 | 6398 | 2.6591E-06 | 1.0122 | 0.761 | 138,681 |
| | | A8 | 6023 | 3.5611E-06 | 1.0295 | 0.907 | 108,331 |
| A11 | | 6106 | 2.5264E-06 | 0.9807 | 0.057 | 133,445 | |
| A13 | | 5797 | 3.1069E-06 | 0.9877 | 0.080 | 110,803 | |
| A14 | | 5921 | 1.0711E-06 | 0.9857 | 0.051 | 319,522 | |
| A15 | | 5876 | 1.7676E-06 | 0.9916 | 0.165 | 197,003 | |
| A17 | | 6278 | -8.9882E-07 | 1.0024 | 0.036 | -399,500 | |
| A19 | | 5986 | 6.8133E-10 | 1.0058 | 0.000 | 531,964,394 | |
| A20 | | 6066 | 1.0381E-08 | 1.0141 | 0.000 | 35,711,152 | |
| A21 | | 5870 | 4.9553E-06 | 1.0129 | 0.746 | 74,569 | |
| A22 | | 5829 | 6.4465E-06 | 1.0159 | 0.233 | 57,770 | |
| A23 | | 6065 | 5.2960E-06 | 1.0114 | 0.889 | 69,490 | |
| A26 | | 5717 | 5.7053E-06 | 1.0078 | 0.205 | 63,872 | |
| A27 | | 5655 | 5.3319E-06 | 1.0117 | 0.179 | 69,086 | |
| A28 | | 5572 | 4.6148E-06 | 1.0064 | 0.156 | 78,664 | |
| A29 | | 5508 | 2.5621E-06 | 1.0036 | 0.260 | 140,621 | |
| A31 | | 6173 | 1.9657E-06 | 1.0008 | 0.290 | 181,843 | |
| A32 | | 6064 | 1.5541E-06 | 0.9957 | 0.143 | 226,708 | |
| A33 | | 6306 | 2.0012E-06 | 1.0012 | 0.413 | 178,823 | |
| A34 | | 6302 | 1.5057E-06 | 0.9964 | 0.100 | 234,479 | |
| A35 | | 6073 | 3.4891E-06 | 1.0045 | 0.069 | 103,511 | |
| A36 | 5554 | 6.7528E-07 | 1.0272 | 0.381 | 567,993 | | |
| A37 | 5517 | -1.7991E-06 | 1.0203 | 0.501 | -209,410 | | |
| A39 | 5787 | -2.0966E-06 | 1.0071 | 0.263 | -173,484 | | |
| A40 | 6101 | -5.3177E-07 | 1.0243 | 0.025 | -715,854 | | |
| | ave | 5942 | 2.1812E-06 | 1.0062 | 0.293 | 166,349 | |

$T_s = T_{AIR} = 85^{\circ}\text{C}$, $I_F = 0.35\text{A}$

$T_s \geq 83^{\circ}\text{C}$, $T_{AIR} \geq 80^{\circ}\text{C}$ in compliance with LM-80-08

TM-21 extrapolation

| | CCT ($t=0$) | TM-21 extrapolation | | | | |
|---------------------------------------------|------------------|---------------------|---------------|--------------|----------------|----------|
| | | alpha | B | r2 | L70 | |
| DATA SET 2: CCT = 2650K, $T_j = 94\text{C}$ | A11 | 2597 | -2.9916E-06 | 0.9785 | 0.461 | -111,970 |
| | A12 | 2561 | -3.3182E-06 | 0.9777 | 0.588 | -100,691 |
| | A13 | 2606 | -4.5079E-06 | 0.9778 | 0.654 | -74,145 |
| | A14 | 2633 | -2.9293E-06 | 0.9764 | 0.531 | -113,604 |
| | A15 | 2525 | -2.3196E-06 | 0.9736 | 0.400 | -142,236 |
| | A16 | 2554 | -3.6538E-06 | 0.9750 | 0.571 | -90,677 |
| | A17 | 2595 | -3.4680E-06 | 0.9808 | 0.624 | -97,263 |
| | A18 | 2595 | -3.3118E-06 | 0.9798 | 0.561 | -101,551 |
| | A19 | 2622 | -1.7449E-06 | 0.9788 | 0.521 | -192,124 |
| | A20 | 2599 | -5.4230E-06 | 0.9798 | 0.596 | -62,013 |
| | A31 | 2552 | -5.2225E-06 | 0.9769 | 0.611 | -63,817 |
| | A32 | 2610 | -4.1699E-06 | 0.9777 | 0.500 | -80,115 |
| | A33 | 2596 | -4.2890E-06 | 0.9743 | 0.578 | -77,097 |
| | A34 | 2603 | -5.4427E-06 | 0.9728 | 0.635 | -60,470 |
| | A35 | 2577 | -3.2800E-06 | 0.9731 | 0.526 | -100,434 |
| | A36 | 2572 | -5.7787E-06 | 0.9788 | 0.697 | -58,021 |
| | A37 | 2573 | -4.1483E-06 | 0.9776 | 0.543 | -80,509 |
| | A38 | 2589 | -3.1538E-06 | 0.9741 | 0.524 | -104,777 |
| | A39 | 2543 | -3.0300E-06 | 0.9755 | 0.450 | -109,521 |
| | A40 | 2592 | -2.6223E-06 | 0.9772 | 0.483 | -127,224 |
| A51 | 2597 | -2.6906E-06 | 0.9758 | 0.590 | -123,446 | |
| A52 | 2640 | -2.6883E-06 | 0.9755 | 0.462 | -123,464 | |
| A53 | 2614 | -1.6449E-06 | 0.9875 | 0.201 | -209,193 | |
| A54 | 2578 | -2.9736E-06 | 0.9836 | 0.437 | -114,379 | |
| A55 | 2617 | -3.6666E-06 | 0.9828 | 0.544 | -92,538 | |
| ave | 2590 | -3.5416E-06 | 0.9777 | 0.553 | -94,328 | |

| | | | | | | |
|----------------------------------------------|-------------|--------------------|---------------|--------------|----------------|----------|
| DATA SET 11: CCT = 3000K, $T_j = 94\text{C}$ | A2 | 2899 | -5.6233E-06 | 0.9856 | 0.694 | -60,847 |
| | A3 | 2939 | -6.0679E-06 | 0.9874 | 0.572 | -56,686 |
| | A4 | 2967 | -3.7274E-06 | 0.9802 | 0.532 | -90,327 |
| | A5 | 2947 | -5.8727E-06 | 0.9802 | 0.788 | -57,326 |
| | A6 | 2974 | -5.7299E-06 | 0.9794 | 0.791 | -58,608 |
| | A7 | 2967 | -2.8454E-06 | 0.9811 | 0.481 | -118,649 |
| | A8 | 2969 | -4.5898E-06 | 0.9875 | 0.627 | -74,974 |
| | A9 | 2858 | -5.8067E-06 | 0.9817 | 0.786 | -58,246 |
| | A10 | 2868 | -3.6578E-06 | 0.9816 | 0.625 | -92,434 |
| | A21 | 2956 | -5.4963E-06 | 0.9856 | 0.640 | -62,250 |
| | A22 | 3013 | -6.2273E-06 | 0.9797 | 0.736 | -53,983 |
| | A23 | 2961 | -6.6567E-06 | 0.9806 | 0.793 | -50,640 |
| | A24 | 3038 | -6.0474E-06 | 0.9802 | 0.811 | -55,669 |
| | A25 | 2954 | -6.1143E-06 | 0.9813 | 0.783 | -55,239 |
| | A26 | 2907 | -4.0500E-06 | 0.9828 | 0.516 | -83,796 |
| | A27 | 2938 | -6.2628E-06 | 0.9854 | 0.608 | -54,603 |
| | A28 | 2942 | -4.7185E-06 | 0.9851 | 0.509 | -72,405 |
| | A29 | 3025 | -6.4538E-06 | 0.9829 | 0.853 | -52,589 |
| | A30 | 2962 | -5.5242E-06 | 0.9796 | 0.753 | -60,843 |
| | A41 | 2942 | -6.8484E-07 | 0.9995 | 0.026 | -520,129 |
| A42 | 2973 | -6.0619E-06 | 0.9776 | 0.760 | -55,103 | |
| A43 | 2949 | -2.8205E-06 | 0.9768 | 0.467 | -118,145 | |
| A44 | 2937 | -2.7790E-06 | 0.9813 | 0.512 | -121,547 | |
| A45 | 2965 | -4.4132E-07 | 0.9990 | 0.011 | -806,012 | |
| A46 | 2962 | -4.0270E-06 | 0.9822 | 0.574 | -84,100 | |
| ave | 2952 | -4.7365E-06 | 0.9834 | 0.647 | -71,761 | |

| | | | | | | |
|----------------------------------------------|-------------|-------------------|---------------|--------------|----------------|------------|
| DATA SET 20: CCT = 3500K, $T_j = 98\text{C}$ | A4 | 3410 | 5.2635E-06 | 1.0366 | 0.904 | 74,589 |
| | A5 | 3340 | -5.7893E-06 | 1.0874 | 0.112 | -76,078 |
| | A6 | 3352 | -1.4413E-06 | 1.0537 | 0.119 | -283,767 |
| | A7 | 3425 | 7.3676E-06 | 1.0471 | 0.652 | 54,662 |
| | A8 | 3336 | -2.8461E-07 | 1.0464 | 0.014 | -1,412,524 |
| | A9 | 3618 | 1.3988E-05 | 1.0419 | 0.800 | 28,436 |
| | A10 | 3414 | -2.5447E-05 | 1.0889 | 0.487 | -17,362 |
| | A11 | 3459 | 1.1224E-05 | 1.0521 | 0.944 | 36,302 |
| | A12 | 3502 | 6.9549E-06 | 1.0476 | 0.971 | 57,972 |
| | A13 | 3580 | 8.7303E-06 | 1.0572 | 0.876 | 47,223 |
| | A18 | 3496 | 1.3610E-06 | 1.0535 | 0.167 | 300,381 |
| | A19 | 3539 | 4.0783E-06 | 1.0553 | 0.677 | 100,659 |
| | A20 | 3479 | 6.2835E-07 | 1.0577 | 0.012 | 656,989 |
| | A21 | 3593 | 4.1402E-06 | 1.0542 | 0.629 | 98,896 |
| | A22 | 3584 | 3.6454E-06 | 1.0434 | 0.545 | 109,493 |
| | A23 | 3772 | 4.5311E-06 | 1.0378 | 0.559 | 86,912 |
| | A24 | 3480 | 7.3558E-06 | 1.0477 | 0.912 | 54,829 |
| | A25 | 3490 | -2.6130E-06 | 1.0806 | 0.047 | -166,184 |
| | A41 | 3446 | 3.3241E-06 | 1.0567 | 0.583 | 123,895 |
| | A42 | 3419 | 7.1937E-06 | 1.0450 | 0.899 | 55,700 |
| A56 | 3476 | 6.5920E-06 | 1.0066 | 0.813 | 55,108 | |
| A57 | 3445 | 2.9964E-06 | 1.0143 | 0.421 | 123,767 | |
| A59 | 3740 | 1.0871E-05 | 1.0513 | 0.971 | 37,407 | |
| A70 | 3703 | 5.4483E-06 | 1.0573 | 0.629 | 75,701 | |
| B11 | 3703 | 2.6624E-06 | 1.0466 | 0.677 | 151,086 | |
| ave | 3512 | 3.1266E-06 | 1.0508 | 0.522 | 129,924 | |

$T_S = T_{AIR} = 85^{\circ}C, I_F = 0.35A$

$T_S \geq 83C, T_{AIR} \geq 80C$ in compliance with LM-80-08

TM-21 extrapolation

| CCT (t=0) | alpha | B | r2 | L70 |
|--------------|-------|---|----|-----|
|--------------|-------|---|----|-----|

| DATA SET 26: CCT = 4000K, T _J = 98C | A26 | 3881 | 4.3560E-06 | 1.0476 | 0.460 | 92,548 |
|------------------------------------------------|-------------|-------------------|---------------|--------------|---------------|---------|
| | A27 | 3917 | 4.4796E-06 | 1.0444 | 0.572 | 89,322 |
| | A35 | 3973 | 6.4248E-06 | 1.0569 | 0.818 | 64,122 |
| | A36 | 4199 | 1.1807E-05 | 1.0422 | 0.806 | 33,708 |
| | A37 | 4253 | 2.4836E-05 | 1.0144 | 0.616 | 14,936 |
| | A38 | 4223 | 1.4339E-05 | 1.0224 | 0.552 | 26,418 |
| | A39 | 4145 | 2.7919E-06 | 1.0516 | 0.590 | 145,782 |
| | A43 | 3953 | 7.9225E-06 | 1.0803 | 0.802 | 54,769 |
| | A44 | 3851 | 1.0498E-05 | 1.0694 | 0.929 | 40,364 |
| | A50 | 4061 | 3.4638E-06 | 1.0480 | 0.294 | 116,511 |
| | A63 | 3968 | 2.4533E-06 | 1.0677 | 0.272 | 172,091 |
| | A64 | 3930 | 5.2607E-06 | 1.0834 | 0.437 | 83,024 |
| | B30 | 4256 | 2.1331E-06 | 1.0482 | 0.143 | 189,287 |
| | B31 | 4072 | 1.1426E-05 | 1.0359 | 0.743 | 34,307 |
| | B32 | 4111 | 1.2010E-05 | 1.0463 | 0.854 | 33,471 |
| | B33 | 4027 | 1.2095E-05 | 1.0309 | 0.863 | 32,009 |
| | B34 | 4173 | 4.9808E-06 | 1.0565 | 0.585 | 82,636 |
| | B40 | 4281 | 2.5012E-06 | 1.0609 | 0.110 | 166,258 |
| | B50 | 4287 | 1.8609E-06 | 1.0649 | 0.045 | 225,459 |
| | B52 | 3917 | 9.4297E-06 | 1.0435 | 0.839 | 42,339 |
| B53 | 3865 | 8.6551E-06 | 1.0302 | 0.962 | 44,642 | |
| B54 | 3877 | 9.4196E-06 | 1.0273 | 0.875 | 40,728 | |
| B55 | 3919 | 1.6122E-07 | 1.0459 | 0.000 | 2,490,932 | |
| B60 | 4192 | 2.7844E-06 | 1.0773 | 0.080 | 154,857 | |
| B69 | 3900 | 4.1939E-06 | 1.0325 | 0.629 | 92,683 | |
| ave | 4049 | 7.1265E-06 | 1.0493 | 0.916 | 56,803 | |

| DATA SET 32: CCT > 5000K, T _J = 98C | A8 | 6331 | 2.0710E-06 | 0.9954 | 0.153 | 169,994 |
|------------------------------------------------|-------------|-------------------|---------------|--------------|----------------|---------|
| | A9 | 6217 | 3.2036E-06 | 1.0151 | 0.475 | 116,002 |
| | A10 | 5932 | 3.5228E-06 | 1.0181 | 0.401 | 106,354 |
| | A11 | 5669 | 3.1216E-06 | 0.9760 | 0.238 | 106,466 |
| | A12 | 5623 | 3.0984E-06 | 0.9857 | 0.696 | 110,456 |
| | A13 | 5694 | 3.1218E-06 | 0.9901 | 0.602 | 111,067 |
| | A14 | 5629 | 1.2650E-06 | 0.9829 | 0.229 | 268,290 |
| | A15 | 5630 | 2.9143E-06 | 0.9913 | 0.489 | 119,379 |
| | A18 | 6481 | 1.8975E-06 | 1.0246 | 0.534 | 200,764 |
| | A19 | 6412 | 2.8974E-06 | 1.0307 | 0.546 | 133,537 |
| | A20 | 6391 | 2.4814E-06 | 1.0400 | 0.845 | 159,541 |
| | A21 | 6379 | 5.2776E-06 | 1.0196 | 0.818 | 71,255 |
| | A22 | 6488 | 4.5650E-06 | 1.0151 | 0.946 | 81,423 |
| | A23 | 6306 | 3.8025E-06 | 1.0092 | 0.932 | 96,217 |
| | A24 | 6088 | 5.8659E-06 | 1.0214 | 0.961 | 64,413 |
| | A25 | 5641 | 3.7408E-06 | 1.0138 | 0.721 | 98,999 |
| | A29 | 5504 | 3.9178E-06 | 1.0117 | 0.541 | 94,020 |
| | A30 | 5606 | 4.0104E-06 | 1.0356 | 0.703 | 97,658 |
| | A31 | 6115 | 2.8456E-06 | 0.9966 | 0.621 | 124,132 |
| | A32 | 5821 | 2.7904E-06 | 0.9968 | 0.424 | 126,678 |
| A33 | 5853 | 3.0021E-06 | 0.9982 | 0.283 | 118,223 | |
| A34 | 5884 | 3.1683E-06 | 1.0046 | 0.864 | 114,040 | |
| A35 | 5688 | -5.0941E-07 | 0.9925 | 0.032 | -685,338 | |
| A36 | 6164 | 2.1871E-06 | 1.0370 | 0.385 | 179,698 | |
| A37 | 6136 | 2.0803E-06 | 1.0319 | 0.153 | 186,525 | |
| ave | 5987 | 3.0491E-06 | 1.0093 | 0.663 | 120,023 | |

$T_S = T_{AIR} = 120^{\circ}C$, $I_F = 0.35A$ (CCT = 5000°K set: $T_S = T_{AIR} = 98C$)

$T_S \geq 118C$, $T_{AIR} \geq 115C$ in compliance with LM-80-08

CCT = 5000K Data Set: $T_S \geq 98C$, $T_{AIR} \geq 93C$ in compliance with LM-80-08

TM-21 extrapolation

| | | CCT (t=0) | alpha | B | r2 | L70 | |
|----------------------------------------|----------------------------------------|--------------|-------------|-------------------|---------------|--------------|---------------|
| DATA SET 25: CCT = 4000K, $T_J = 133C$ | A11 | 3988 | 2.8789E-06 | 1.0151 | 0.098 | 129,115 | |
| | A12 | 3889 | -4.2966E-06 | 1.0370 | 0.610 | -91,476 | |
| | A14 | 3884 | 9.7354E-06 | 1.0132 | 0.341 | 37,986 | |
| | A15 | 3851 | 6.2511E-06 | 1.0429 | 0.512 | 63,777 | |
| | A16 | 4002 | 1.1341E-05 | 1.0168 | 0.475 | 32,921 | |
| | A17 | 3904 | 8.8587E-06 | 1.0302 | 0.343 | 43,624 | |
| | A18 | 3931 | 7.3006E-06 | 1.0249 | 0.447 | 52,230 | |
| | A19 | 3850 | 4.7138E-07 | 1.0298 | 0.074 | 818,895 | |
| | A20 | 3893 | 5.6490E-07 | 1.0361 | 0.066 | 694,213 | |
| | A21 | 3951 | 8.0974E-06 | 1.0461 | 0.787 | 49,618 | |
| | A22 | 3986 | -2.4773E-06 | 1.0704 | 0.208 | -171,443 | |
| | A25 | 3967 | 1.3368E-05 | 1.0367 | 0.618 | 29,376 | |
| | A26 | 3944 | 1.5136E-05 | 1.0488 | 0.714 | 26,710 | |
| | A33 | 3916 | 6.3787E-06 | 1.0230 | 0.340 | 59,481 | |
| | A34 | 3916 | 3.1497E-06 | 1.0300 | 0.409 | 122,622 | |
| | A35 | 3851 | -8.9223E-06 | 1.0788 | 0.412 | -48,477 | |
| | A41 | 3941 | 3.8832E-06 | 1.0504 | 0.643 | 104,512 | |
| | A42 | 3877 | 1.7915E-06 | 1.0552 | 0.475 | 229,096 | |
| | A43 | 3885 | 8.1690E-06 | 1.0165 | 0.337 | 45,670 | |
| | A48 | 3877 | 8.4885E-06 | 1.0185 | 0.334 | 44,177 | |
| | A49 | 3884 | 3.4947E-06 | 1.0300 | 0.243 | 110,508 | |
| | A50 | 3901 | -4.5323E-07 | 1.0372 | 0.019 | -867,447 | |
| | A51 | 3921 | 1.2010E-05 | 1.0237 | 0.448 | 31,651 | |
| | A52 | 3996 | 8.2057E-06 | 1.0165 | 0.320 | 45,457 | |
| | A53 | 3892 | 8.7862E-06 | 1.0127 | 0.300 | 42,027 | |
| | | ave | 3916 | 5.1911E-06 | 1.0338 | 0.444 | 75,108 |
| | DATA SET 31: CCT > 5000K, $T_J = 123C$ | 1 | 6742 | 6.4215E-06 | 1.0205 | 0.591 | 58,706 |
| | | 2 | 6638 | 6.5909E-06 | 1.0236 | 0.633 | 57,656 |
| | | 3 | 6769 | 8.2976E-06 | 1.0382 | 0.891 | 47,506 |
| | | 18 | 6437 | 6.4415E-06 | 1.0341 | 0.856 | 60,572 |
| | | 19 | 6415 | 5.7519E-06 | 1.0333 | 0.749 | 67,709 |
| | | 20 | 6207 | 6.1866E-06 | 1.0357 | 0.761 | 63,321 |
| | | 23 | 6626 | 6.6549E-06 | 1.0610 | 0.851 | 62,492 |
| | | 24 | 6375 | 2.6370E-07 | 1.0045 | 0.004 | 1,369,460 |
| 25 | | 6324 | 4.5019E-06 | 1.0400 | 0.937 | 87,943 | |
| 33 | | 6687 | 7.4320E-06 | 1.0464 | 0.826 | 54,095 | |
| 34 | | 6633 | 5.5913E-06 | 1.0258 | 0.755 | 68,338 | |
| 35 | | 6619 | 5.4413E-06 | 1.0305 | 0.862 | 71,070 | |
| 39 | | 5284 | 4.7201E-06 | 0.9986 | 0.656 | 75,270 | |
| 40 | | 5283 | 9.9952E-06 | 1.0395 | 0.762 | 39,557 | |
| 41 | | 6330 | 6.5835E-06 | 1.0314 | 0.706 | 58,867 | |
| 42 | | 6172 | 6.1820E-06 | 1.0323 | 0.889 | 62,830 | |
| 43 | | 6376 | 6.9748E-06 | 1.0392 | 0.872 | 56,648 | |
| 44 | | 6562 | 7.5592E-06 | 1.0432 | 0.891 | 52,775 | |
| 45 | | 6518 | 5.2696E-06 | 1.0185 | 0.828 | 71,167 | |
| 52 | | 6772 | 5.7813E-06 | 1.0414 | 0.847 | 68,716 | |
| 61 | | 6611 | 8.0824E-06 | 1.0525 | 0.920 | 50,463 | |
| 62 | | 6687 | 1.0875E-06 | 0.9997 | 0.015 | 327,675 | |
| 63 | | 6640 | 5.8403E-06 | 1.0304 | 0.910 | 66,203 | |
| 64 | | 6724 | 7.3999E-06 | 1.0452 | 0.691 | 54,172 | |
| 65 | | 6756 | 5.0639E-06 | 1.0344 | 0.824 | 77,114 | |
| | | ave | 6447 | 6.0016E-06 | 1.0319 | 0.839 | 64,667 |

$T_s = T_{AIR} = 55^\circ\text{C}, I_F = 0.7A$

$T_s \geq 53^\circ\text{C}, T_{AIR} \geq 50^\circ\text{C}$ in compliance with LM-80-08

TM-21 extrapolation

| | | CCT (I=0) | alpha | B | r2 | L70 |
|-----------------------------------------------|-------------|--------------------|---------------|--------------|-----------------|------------|
| DATA SET 6: CCT = 2650K, T _J = 74C | A11 | 2662 | -1.5617E-06 | 0.9777 | 0.081 | -213,917 |
| | A12 | 2589 | 4.6926E-07 | 0.9743 | 0.015 | 704,576 |
| | A13 | 2627 | -2.7390E-07 | 0.9763 | 0.004 | -1,214,485 |
| | A14 | 2607 | 3.0238E-07 | 0.9746 | 0.004 | 1,094,402 |
| | A15 | 2533 | 1.4253E-06 | 0.9758 | 0.156 | 233,050 |
| | A16 | 2609 | -2.7931E-06 | 0.9781 | 0.212 | -119,772 |
| | A17 | 2687 | -2.2595E-06 | 0.9770 | 0.188 | -147,563 |
| | A18 | 2643 | -2.4785E-06 | 0.9718 | 0.172 | -132,353 |
| | A19 | 2659 | -2.7045E-06 | 0.9762 | 0.244 | -122,968 |
| | A20 | 2592 | -1.0671E-06 | 0.9755 | 0.050 | -310,956 |
| | A31 | 2564 | -7.6437E-07 | 0.9735 | 0.029 | -431,493 |
| | A32 | 2647 | -2.7893E-07 | 0.9773 | 0.004 | -1,196,475 |
| | A33 | 2656 | -7.9631E-07 | 0.9737 | 0.031 | -414,503 |
| | A34 | 2627 | -5.4830E-07 | 0.9824 | 0.018 | -618,188 |
| | A35 | 2620 | 1.5889E-06 | 0.9770 | 0.199 | 209,827 |
| | A36 | 2688 | -3.2113E-06 | 0.9798 | 0.248 | -104,721 |
| | A37 | 2608 | -3.1430E-06 | 0.9778 | 0.229 | -106,333 |
| | A38 | 2640 | -1.8662E-06 | 0.9756 | 0.132 | -177,862 |
| | A39 | 2586 | -2.3053E-06 | 0.9750 | 0.177 | -143,729 |
| | A40 | 2631 | -3.0116E-06 | 0.9752 | 0.239 | -110,111 |
| | A51 | 2671 | -7.3902E-07 | 0.9758 | 0.033 | -449,428 |
| A52 | 2621 | 8.6633E-07 | 0.9754 | 0.045 | 382,950 | |
| A53 | 2678 | 6.3261E-07 | 0.9772 | 0.028 | 527,293 | |
| A54 | 2658 | -7.6515E-07 | 0.9759 | 0.049 | -434,256 | |
| A55 | 2652 | 3.2460E-06 | 0.9744 | 0.476 | 101,894 | |
| ave | 2630 | -8.8983E-07 | 0.9761 | 0.039 | -373,671 | |

| | | | | | | |
|------------------------------------------------|-------------|--------------------|---------------|--------------|-----------------|------------|
| DATA SET 15: CCT = 3000K, T _J = 74C | A1 | 2992 | -1.5003E-06 | 0.9828 | 0.078 | -226,145 |
| | A2 | 3008 | -1.0068E-06 | 0.9875 | 0.050 | -341,760 |
| | A3 | 2921 | -1.3579E-06 | 0.9781 | 0.077 | -246,367 |
| | A4 | 2975 | -1.7141E-06 | 0.9798 | 0.106 | -196,166 |
| | A5 | 2986 | -1.0050E-06 | 0.9815 | 0.054 | -336,314 |
| | A6 | 2992 | -2.1410E-06 | 0.9857 | 0.172 | -159,886 |
| | A7 | 2965 | -1.0855E-06 | 0.9886 | 0.074 | -318,040 |
| | A8 | 3026 | -1.6492E-06 | 0.9838 | 0.159 | -206,386 |
| | A9 | 3083 | -2.0130E-06 | 0.9843 | 0.164 | -169,328 |
| | A10 | 3048 | -1.8109E-06 | 0.9858 | 0.132 | -189,078 |
| | A21 | 3055 | -1.0233E-06 | 0.9822 | 0.038 | -331,015 |
| | A22 | 3026 | -1.2724E-06 | 0.9818 | 0.058 | -265,862 |
| | A23 | 3032 | -3.2079E-07 | 0.9770 | 0.004 | -1,039,469 |
| | A24 | 3043 | -1.7721E-06 | 0.9816 | 0.124 | -190,778 |
| | A25 | 3043 | -2.5659E-06 | 0.9819 | 0.192 | -131,903 |
| | A26 | 3104 | -1.5099E-06 | 0.9843 | 0.100 | -225,721 |
| | A27 | 3032 | -2.3977E-06 | 0.9835 | 0.171 | -141,820 |
| | A28 | 3056 | -2.9099E-06 | 0.9840 | 0.238 | -117,045 |
| | A29 | 3020 | -2.3676E-06 | 0.9834 | 0.212 | -143,575 |
| | A30 | 3002 | -1.0692E-06 | 0.9642 | 0.059 | -299,467 |
| | A41 | 3081 | 2.0990E-07 | 0.9873 | 0.004 | 1,638,566 |
| A42 | 3049 | 1.0159E-06 | 0.9873 | 0.081 | 338,548 | |
| A43 | 3082 | -1.8575E-08 | 0.9868 | 0.000 | -18,489,606 | |
| A44 | 3009 | 3.3841E-07 | 0.9861 | 0.005 | 1,012,653 | |
| A45 | 3116 | -2.4650E-07 | 0.9898 | 0.003 | -1,405,205 | |
| ave | 3030 | -1.2497E-06 | 0.9832 | 0.071 | -271,817 | |

| | | | | | | |
|------------------------------------------------|-------------|-------------------|---------------|--------------|----------------|----------|
| DATA SET 24: CCT = 3500K, T _J = 81C | A1 | 3588 | -1.2605E-05 | 1.0185 | 0.612 | -29,753 |
| | A7 | 3621 | 2.2807E-06 | 0.9992 | 0.629 | 156,024 |
| | A8 | 3613 | -1.0300E-06 | 1.0215 | 0.072 | -366,918 |
| | A9 | 3562 | -4.9021E-07 | 1.0031 | 0.016 | -733,823 |
| | A36 | 3558 | 2.2609E-06 | 0.9920 | 0.653 | 154,188 |
| | A38 | 3665 | 1.4401E-06 | 1.0010 | 0.453 | 248,397 |
| | A39 | 3655 | 1.7775E-06 | 0.9875 | 0.561 | 193,597 |
| | A56 | 3687 | 1.8874E-06 | 1.0115 | 0.521 | 195,062 |
| | A80 | 3661 | 1.4940E-06 | 1.0084 | 0.347 | 244,336 |
| | B3 | 3450 | 3.3370E-06 | 0.9992 | 0.626 | 106,660 |
| | B4 | 3360 | 2.1857E-06 | 0.9946 | 0.345 | 160,714 |
| | B5 | 3310 | 2.5243E-06 | 1.0443 | 0.461 | 158,466 |
| | B6 | 3372 | 3.3030E-06 | 1.0085 | 0.697 | 110,551 |
| | B7 | 3345 | 3.6405E-07 | 0.9956 | 0.013 | 967,554 |
| | B8 | 3376 | 6.4630E-07 | 0.9971 | 0.033 | 547,313 |
| | B9 | 3305 | 3.4634E-06 | 0.9788 | 0.619 | 96,806 |
| | B13 | 3340 | 3.3675E-06 | 1.0039 | 0.703 | 107,063 |
| | B14 | 3368 | 6.4230E-07 | 0.9865 | 0.036 | 534,098 |
| | B15 | 3443 | 1.5772E-06 | 1.0034 | 0.285 | 228,279 |
| | B17 | 3352 | 2.1918E-06 | 0.9966 | 0.410 | 161,162 |
| | B18 | 3341 | 1.8606E-06 | 0.9826 | 0.280 | 182,285 |
| B19 | 3358 | 1.8385E-06 | 0.9698 | 0.240 | 177,305 | |
| B21 | 3667 | 9.5336E-07 | 1.0040 | 0.151 | 378,264 | |
| B22 | 3672 | 1.4880E-06 | 1.0094 | 0.329 | 246,008 | |
| B23 | 3409 | 3.0815E-06 | 1.0027 | 0.751 | 116,612 | |
| ave | 3483 | 1.1605E-06 | 1.0008 | 0.242 | 308,016 | |

$T_S = T_{AIR} = 55^{\circ}\text{C}$, $I_F = 0.7\text{A}$

$T_S \geq 53^{\circ}\text{C}$, $T_{AIR} \geq 50^{\circ}\text{C}$ in compliance with LM-80-08

TM-21 extrapolation

| | CCT ($t=0$) | alpha | B | r2 | L70 | | |
|------------------------------------------------------|------------------------------------------------------|-------------------|-------------------|---------------|----------------|----------------|---------|
| DATA SET 30: CCT = 4000K, $T_J = 81^{\circ}\text{C}$ | A10 | 3942 | 2.5158E-07 | 1.0104 | 0.015 | 1,458,841 | |
| | A11 | 4035 | 1.5410E-06 | 1.0089 | 0.381 | 237,199 | |
| | A16 | 4008 | 2.1286E-06 | 0.9943 | 0.452 | 164,873 | |
| | A19 | 3856 | 1.7827E-06 | 0.9927 | 0.335 | 195,974 | |
| | A26 | 3909 | 2.4420E-06 | 0.9969 | 0.617 | 144,795 | |
| | A27 | 3858 | 2.2416E-06 | 0.9851 | 0.397 | 152,422 | |
| | A30 | 4069 | 6.8470E-07 | 0.9972 | 0.124 | 516,873 | |
| | A31 | 3969 | 1.7040E-06 | 1.0031 | 0.519 | 211,122 | |
| | A40 | 3939 | 1.7942E-06 | 1.0076 | 0.509 | 202,998 | |
| | A41 | 4101 | 9.5818E-07 | 0.9979 | 0.105 | 370,095 | |
| | A47 | 3859 | 1.6845E-06 | 0.9920 | 0.396 | 206,978 | |
| | A59 | 3885 | 3.0373E-06 | 0.9763 | 0.646 | 109,528 | |
| | A60 | 4029 | 8.5684E-07 | 0.9977 | 0.133 | 413,538 | |
| | A61 | 4015 | 2.8951E-06 | 1.0220 | 0.669 | 130,726 | |
| | A71 | 3988 | 2.1631E-06 | 1.0086 | 0.548 | 168,847 | |
| | A78 | 3866 | 1.5305E-06 | 1.0003 | 0.278 | 233,248 | |
| | A79 | 3890 | 2.1225E-06 | 1.0008 | 0.427 | 168,429 | |
| | B1 | 3912 | 2.0080E-06 | 1.0053 | 0.530 | 180,254 | |
| | B2 | 3875 | 2.0988E-06 | 1.0055 | 0.615 | 172,549 | |
| | B11 | 3979 | 2.1488E-06 | 1.0012 | 0.541 | 166,555 | |
| | B12 | 4026 | 1.7238E-06 | 1.0022 | 0.398 | 208,164 | |
| | B31 | 3879 | 1.7906E-06 | 1.0039 | 0.357 | 201,370 | |
| | B32 | 3904 | 1.4938E-06 | 1.0035 | 0.267 | 241,125 | |
| | B61 | 3956 | 1.6788E-06 | 1.0213 | 0.324 | 225,019 | |
| | B62 | 4003 | 1.7437E-06 | 1.0177 | 0.379 | 214,580 | |
| | ave | 3950 | 1.7783E-06 | 1.0021 | 0.433 | 201,745 | |
| | DATA SET 36: CCT > 5000K, $T_J = 82^{\circ}\text{C}$ | B1 | 6069 | 2.4202E-06 | 1.0025 | 0.271 | 148,392 |
| | | B2 | 6484 | 2.8556E-06 | 0.9801 | 0.543 | 117,872 |
| | | B3 | 6432 | 3.4713E-06 | 0.9784 | 0.370 | 96,472 |
| | | B5 | 6067 | 1.2803E-06 | 0.9722 | 0.368 | 256,554 |
| B6 | | 5875 | 2.2683E-06 | 1.0047 | 0.711 | 159,326 | |
| B8 | | 6023 | 3.9526E-06 | 1.0003 | 0.810 | 90,319 | |
| B9 | | 6108 | 1.4991E-06 | 0.9947 | 0.460 | 234,421 | |
| B10 | | 6034 | 2.0432E-06 | 0.9986 | 0.811 | 173,868 | |
| B11 | | 6336 | 4.3327E-06 | 1.0218 | 0.938 | 87,307 | |
| B12 | | 6196 | 4.0949E-06 | 1.0051 | 0.536 | 88,355 | |
| B13 | | 6264 | 2.8592E-06 | 1.0006 | 0.908 | 124,950 | |
| B14 | | 6490 | 2.3206E-06 | 0.9861 | 0.290 | 147,651 | |
| B15 | | 6330 | 2.7103E-06 | 0.9787 | 0.280 | 123,638 | |
| B16 | | 5914 | 2.9285E-06 | 0.9717 | 0.502 | 111,994 | |
| B17 | | 6084 | 3.7654E-06 | 0.9809 | 0.508 | 89,613 | |
| B18 | | 5902 | 3.4413E-06 | 0.9776 | 0.398 | 97,062 | |
| B20 | | 5660 | 3.8876E-06 | 0.9934 | 0.882 | 90,054 | |
| B23 | | 6195 | 3.1663E-06 | 0.9754 | 0.588 | 104,782 | |
| B25 | | 6166 | 2.3386E-08 | 0.9628 | 0.000 | 13,628,620 | |
| B37 | | 6490 | 2.5744E-06 | 0.9549 | 0.510 | 120,627 | |
| B38 | | 6149 | 1.4063E-06 | 0.9568 | 0.571 | 222,226 | |
| B39 | | 5918 | 3.2715E-06 | 0.9639 | 0.569 | 97,771 | |
| B40 | | 5999 | 2.3521E-06 | 0.9627 | 0.641 | 135,498 | |
| A41 | | 5892 | 4.8447E-06 | 0.9917 | 0.145 | 71,910 | |
| A42 | 5695 | 3.1567E-06 | 0.9985 | 0.898 | 112,503 | | |
| ave | 6111 | 2.8372E-06 | 0.9846 | 0.548 | 120,226 | | |

T_S = T_{AIR} = 85°C, I_F = 0.7A

T_S ≥ 83C, T_{AIR} ≥ 80C in compliance with LM-80-08

TM-21 extrapolation

| | CCT (I=0) | TM-21 extrapolation | | | | |
|------------------------------------------------|--------------|---------------------|-------------------|---------------|--------------|----------------|
| | | alpha | B | r2 | L70 | |
| DATA SET 5: CCT = 2650K, T _j = 103C | B1 | 2727 | -7.8947E-07 | 0.9845 | 0.020 | -432,063 |
| | B2 | 2633 | -6.2455E-07 | 0.9848 | 0.014 | -546,576 |
| | B3 | 2650 | 2.0216E-06 | 0.9824 | 0.192 | 167,627 |
| | B4 | 2615 | 1.6238E-06 | 0.9915 | 0.108 | 214,406 |
| | B5 | 2660 | 2.4854E-06 | 0.9822 | 0.329 | 136,286 |
| | B6 | 2699 | 1.3911E-06 | 0.9816 | 0.114 | 243,052 |
| | B7 | 2643 | 2.7248E-06 | 0.9892 | 0.337 | 126,906 |
| | B8 | 2674 | 9.2476E-07 | 0.9885 | 0.036 | 373,182 |
| | B9 | 2633 | 6.2839E-07 | 0.9874 | 0.016 | 547,394 |
| | B10 | 2593 | 3.2643E-06 | 0.9976 | 0.436 | 108,528 |
| | B21 | 2658 | 3.0688E-07 | 0.9881 | 0.004 | 1,123,269 |
| | B22 | 2704 | 2.4683E-06 | 0.9919 | 0.323 | 141,225 |
| | B23 | 2668 | 2.8398E-06 | 0.9845 | 0.368 | 120,083 |
| | B24 | 2677 | 1.6177E-06 | 0.9855 | 0.134 | 211,439 |
| | B25 | 2670 | 3.9880E-06 | 0.9942 | 0.756 | 87,991 |
| | B26 | 2651 | 5.9577E-06 | 0.9987 | 0.745 | 59,653 |
| | B27 | 2645 | 8.6913E-07 | 0.9897 | 0.032 | 398,448 |
| | B28 | 2740 | 1.7337E-06 | 0.9891 | 0.150 | 199,423 |
| | B29 | 2706 | 7.2042E-07 | 0.9811 | 0.017 | 468,609 |
| | B30 | 2656 | 1.5435E-06 | 0.9904 | 0.124 | 224,838 |
| | B41 | 2653 | -1.0880E-06 | 0.9792 | 0.052 | -308,485 |
| | B42 | 2680 | -2.1673E-06 | 0.9806 | 0.136 | -155,545 |
| | B43 | 2671 | 2.4093E-07 | 0.9799 | 0.002 | 1,396,319 |
| | B44 | 2719 | -2.1704E-06 | 0.9821 | 0.138 | -155,992 |
| | B45 | 2677 | 1.2322E-08 | 0.9845 | 0.000 | 27,679,382 |
| | ave | 2668 | 1.2179E-06 | 0.9868 | 0.070 | 281,920 |

| | | | | | | |
|-------------------------------------------------|------------|-------------|-------------------|---------------|--------------|----------------|
| DATA SET 14: CCT = 3000K, T _j = 103C | B11 | 3082 | 1.4284E-06 | 0.9949 | 0.096 | 246,090 |
| | B12 | 3036 | 7.3059E-07 | 0.9876 | 0.024 | 471,109 |
| | B13 | 2987 | 1.7226E-07 | 0.9916 | 0.001 | 2,021,356 |
| | B14 | 2963 | 2.0123E-06 | 0.9921 | 0.183 | 173,295 |
| | B15 | 3033 | 1.1460E-06 | 0.9929 | 0.065 | 304,987 |
| | B16 | 3030 | 1.7136E-06 | 0.9865 | 0.165 | 200,215 |
| | B17 | 2934 | 1.2915E-06 | 0.9890 | 0.081 | 267,582 |
| | B18 | 3017 | 8.9996E-08 | 0.9975 | 0.000 | 3,935,802 |
| | B19 | 3033 | 2.1016E-06 | 0.9909 | 0.232 | 165,368 |
| | B20 | 2957 | 1.7662E-06 | 0.9844 | 0.181 | 193,034 |
| | B31 | 3020 | 3.3337E-06 | 0.9933 | 0.390 | 104,987 |
| | B32 | 3130 | 2.1192E-07 | 0.9817 | 0.002 | 1,595,693 |
| | B33 | 3078 | 1.3681E-06 | 0.9945 | 0.093 | 256,709 |
| | B34 | 3067 | 8.4503E-07 | 1.0128 | 0.034 | 437,163 |
| | B35 | 3086 | 1.0270E-06 | 0.9901 | 0.043 | 337,609 |
| | B36 | 3091 | 2.1844E-06 | 1.0037 | 0.169 | 164,969 |
| | B37 | 3058 | 1.9741E-06 | 0.9947 | 0.209 | 177,975 |
| | B38 | 3144 | 2.5983E-06 | 0.9994 | 0.288 | 137,052 |
| | B39 | 3037 | 2.1129E-06 | 0.9971 | 0.268 | 167,452 |
| | B40 | 3074 | 1.6857E-06 | 0.9993 | 0.136 | 211,162 |
| | B51 | 3018 | -1.7351E-07 | 0.9816 | 0.002 | -1,948,714 |
| | B52 | 3072 | -3.3164E-07 | 1.0015 | 0.006 | -1,080,064 |
| | B53 | 3116 | -1.6398E-06 | 0.9926 | 0.101 | -212,984 |
| | B54 | 2993 | -1.0524E-06 | 0.9950 | 0.039 | -334,121 |
| | B55 | 3066 | 2.5072E-07 | 0.9935 | 0.003 | 1,396,765 |
| | ave | 3045 | 1.0718E-06 | 0.9935 | 0.059 | 326,739 |

| | | | | | | |
|-------------------------------------------------|------------|-------------|-------------------|---------------|--------------|---------------|
| DATA SET 23: CCT = 3500K, T _j = 110C | A17 | 3683 | 5.1368E-06 | 1.0109 | 0.896 | 71,539 |
| | A28 | 3663 | 5.1645E-06 | 0.9712 | 0.907 | 63,407 |
| | A29 | 3539 | 4.3551E-06 | 1.0019 | 0.898 | 82,328 |
| | A51 | 3634 | 6.6301E-07 | 1.0171 | 0.128 | 563,521 |
| | A56 | 3695 | 7.3883E-06 | 1.0169 | 0.917 | 50,541 |
| | A58 | 3699 | 3.0180E-06 | 1.0056 | 0.756 | 120,038 |
| | A66 | 3661 | 3.3858E-06 | 1.0015 | 0.866 | 105,790 |
| | A67 | 3657 | 5.7402E-06 | 0.9657 | 0.912 | 56,057 |
| | B3 | 3464 | 9.2994E-06 | 1.0281 | 0.648 | 41,340 |
| | B4 | 3389 | 1.2060E-05 | 1.0371 | 0.735 | 32,591 |
| | B5 | 3394 | 5.5434E-06 | 1.0085 | 0.686 | 65,862 |
| | B6 | 3393 | 5.1380E-06 | 1.0104 | 0.750 | 71,423 |
| | B7 | 3372 | 1.1749E-05 | 1.0387 | 0.679 | 33,588 |
| | B8 | 3437 | 3.8569E-06 | 1.0108 | 0.427 | 95,265 |
| | B9 | 3366 | 5.4885E-06 | 1.0153 | 0.629 | 67,746 |
| | B10 | 3394 | 6.3478E-06 | 1.0107 | 0.889 | 57,859 |
| | B13 | 3377 | 9.6930E-06 | 1.0168 | 0.812 | 38,518 |
| | B14 | 3487 | 7.7210E-06 | 1.0139 | 0.725 | 47,985 |
| | B15 | 3480 | 9.4802E-06 | 1.0202 | 0.719 | 39,734 |
| | B16 | 3440 | 1.0689E-05 | 1.0278 | 0.652 | 35,933 |
| | B17 | 3385 | 5.4594E-06 | 1.0096 | 0.562 | 67,081 |
| | B18 | 3431 | 9.7629E-06 | 1.0285 | 0.662 | 39,415 |
| | B19 | 3389 | 1.1579E-05 | 1.0323 | 0.652 | 33,548 |
| | B20 | 3394 | 4.7342E-06 | 1.0040 | 0.743 | 76,191 |
| | B23 | 3464 | 9.4545E-06 | 1.0214 | 0.859 | 39,965 |
| | ave | 3491 | 6.8963E-06 | 1.0129 | 0.774 | 53,576 |

$$T_S = T_{AIR} = 85^\circ\text{C}, I_F = 0.7A$$

$$T_S \geq 83^\circ\text{C}, T_{AIR} \geq 80^\circ\text{C} \text{ in compliance with LM-80-08}$$

TM-21 extrapolation

| | CCT ($t=0$) | alpha | B | r2 | L70 | |
|-----------------------------------------------------|------------------|-------------------|---------------|--------------|---------------|------------|
| DATA SET 29: CCT = 4000K, $T_J = 110^\circ\text{C}$ | A1 | 4049 | 3.6122E-06 | 1.0024 | 0.670 | 99,395 |
| | A8 | 3864 | 5.5796E-06 | 0.9713 | 0.416 | 58,707 |
| | A11 | 4053 | 1.5528E-06 | 1.0125 | 0.284 | 237,684 |
| | A16 | 3870 | 3.5239E-06 | 0.9678 | 0.831 | 91,916 |
| | A18 | 3895 | 2.3876E-06 | 0.9890 | 0.613 | 144,744 |
| | A19 | 3884 | 2.9612E-06 | 0.9386 | 0.729 | 99,047 |
| | A26 | 3919 | 4.1204E-06 | 0.9942 | 0.869 | 85,158 |
| | A27 | 3933 | 6.4611E-06 | 1.0117 | 0.956 | 57,010 |
| | A31 | 4117 | -3.1721E-07 | 1.0032 | 0.010 | -1,134,595 |
| | A38 | 3876 | 4.1997E-06 | 0.9685 | 0.858 | 77,320 |
| | A39 | 3952 | 3.8491E-06 | 0.9636 | 0.757 | 83,039 |
| | A41 | 3908 | 6.0663E-07 | 1.0482 | 0.029 | 665,551 |
| | A47 | 3856 | 2.8879E-06 | 1.0022 | 0.711 | 124,264 |
| | A49 | 3944 | 3.8487E-06 | 0.9736 | 0.789 | 85,718 |
| | A50 | 4077 | 5.8819E-06 | 1.0256 | 0.895 | 64,945 |
| | A61 | 4018 | 2.4647E-06 | 1.0117 | 0.760 | 149,445 |
| | A68 | 4002 | 4.6407E-06 | 0.9996 | 0.844 | 76,771 |
| | A70 | 4204 | 6.8940E-06 | 1.0174 | 0.828 | 54,245 |
| | A76 | 3980 | 2.0638E-06 | 0.9921 | 0.156 | 168,973 |
| | A79 | 3889 | 2.6805E-06 | 0.9858 | 0.765 | 127,716 |
| | A80 | 3992 | 4.1575E-06 | 1.0079 | 0.604 | 87,684 |
| | B1 | 4143 | 2.7892E-06 | 1.0147 | 0.747 | 133,118 |
| B2 | 4151 | 4.6370E-06 | 1.0176 | 0.918 | 80,685 | |
| B11 | 4251 | 1.8323E-06 | 1.0031 | 0.512 | 196,341 | |
| B21 | 4319 | 5.9106E-06 | 1.0263 | 0.949 | 64,741 | |
| ave | 4006 | 3.5583E-06 | 0.9979 | 0.806 | 99,658 | |
| DATA SET 35: CCT > 5000K, $T_J = 112^\circ\text{C}$ | B11 | 6308 | 9.9627E-06 | 1.0231 | 0.991 | 38,089 |
| | B12 | 6442 | 9.3394E-06 | 1.0159 | 0.994 | 39,879 |
| | B13 | 6415 | 1.0155E-05 | 1.0210 | 0.978 | 37,171 |
| | B14 | 6472 | 8.5757E-06 | 1.0198 | 0.989 | 43,882 |
| | B15 | 6378 | 6.5364E-06 | 1.0158 | 0.982 | 56,966 |
| | B16 | 6013 | 5.1696E-06 | 1.0063 | 0.977 | 70,214 |
| | B17 | 5986 | 5.0503E-06 | 0.9983 | 0.880 | 70,286 |
| | B18 | 5881 | 4.4143E-06 | 0.9944 | 0.952 | 79,532 |
| | B19 | 5871 | 1.6313E-06 | 0.9869 | 0.594 | 210,539 |
| | B20 | 5776 | 2.8105E-06 | 0.9879 | 0.939 | 122,578 |
| | B22 | 6119 | 4.1409E-06 | 0.9824 | 0.872 | 81,850 |
| | B23 | 6065 | 9.5551E-06 | 0.9980 | 0.985 | 37,123 |
| | B24 | 5910 | 4.9733E-06 | 0.9771 | 0.974 | 67,060 |
| | B25 | 5932 | 3.4189E-06 | 0.9705 | 0.980 | 95,573 |
| | A45 | 6451 | 3.9144E-06 | 1.0135 | 0.890 | 94,534 |
| | A46 | 6392 | 5.2702E-06 | 1.0161 | 0.948 | 70,711 |
| | A47 | 6369 | 6.0911E-06 | 1.0232 | 0.884 | 62,325 |
| | A48 | 6370 | 6.0454E-06 | 1.0279 | 0.936 | 63,546 |
| | A50 | 6418 | 3.5930E-06 | 1.0206 | 0.896 | 104,933 |
| | A51 | 5745 | 2.6579E-06 | 0.9799 | 0.701 | 126,541 |
| | A52 | 5595 | 2.8498E-06 | 0.9874 | 0.683 | 120,698 |
| | A53 | 5548 | 4.4287E-06 | 0.9925 | 0.839 | 78,836 |
| | A54 | 5546 | 4.6952E-06 | 0.9946 | 0.426 | 74,817 |
| A55 | 5508 | 4.0941E-06 | 0.9966 | 0.771 | 86,297 | |
| A63 | 6467 | 3.7861E-06 | 0.9886 | 0.747 | 91,184 | |
| ave | 6079 | 5.3141E-06 | 1.0014 | 0.962 | 67,386 | |

$T_S = T_{AIR} = 105^\circ\text{C}$, $I_F = 0.7\text{A}$

$T_S \geq 103^\circ\text{C}$, $T_{AIR} \geq 100^\circ\text{C}$ in compliance with LM-80-08

TM-21 extrapolation

| | | CCT (t=0) | alpha | B | r2 | L70 |
|----------------------------------------------|------|--------------|------------|--------|--------|--------|
| DATA SET 4: CCT = 2650K, $T_J = 123\text{C}$ | A11 | 2649 | 3.7031E-06 | 0.9979 | 0.485 | 95,736 |
| | A12 | 2593 | 5.5614E-06 | 0.9928 | 0.747 | 62,833 |
| | A13 | 2644 | 6.6643E-06 | 0.9913 | 0.808 | 52,204 |
| | A14 | 2594 | 6.3728E-06 | 0.9772 | 0.833 | 52,348 |
| | A15 | 2645 | 7.0606E-06 | 1.0012 | 0.831 | 50,691 |
| | A16 | 2665 | 7.0909E-06 | 1.0060 | 0.831 | 51,138 |
| | A17 | 2639 | 6.2117E-06 | 0.9867 | 0.811 | 55,263 |
| | A18 | 2550 | 9.2356E-06 | 0.9969 | 0.918 | 38,283 |
| | A19 | 2688 | 7.8170E-06 | 0.9999 | 0.815 | 45,612 |
| | A20 | 2652 | 7.8213E-06 | 0.9999 | 0.842 | 45,586 |
| | A31 | 2673 | 5.8193E-06 | 0.9927 | 0.824 | 60,034 |
| | A32 | 2650 | 6.8062E-06 | 0.9937 | 0.820 | 51,469 |
| | A33 | 2598 | 8.3934E-06 | 0.9919 | 0.874 | 41,527 |
| | A34 | 2665 | 7.3262E-06 | 0.9921 | 0.839 | 47,609 |
| | A35 | 2612 | 7.2076E-06 | 0.9855 | 0.821 | 47,465 |
| | A36 | 2654 | 7.7859E-06 | 1.0012 | 0.855 | 45,958 |
| | A37 | 2639 | 6.9380E-06 | 1.0022 | 0.784 | 51,719 |
| | A38 | 2645 | 5.4110E-06 | 1.0043 | 0.602 | 66,711 |
| | A39 | 2684 | 7.3875E-06 | 0.9976 | 0.806 | 47,960 |
| | A40 | 2670 | 7.0615E-06 | 0.9986 | 0.775 | 50,311 |
| | A51 | 2651 | 6.2546E-06 | 0.9854 | 0.851 | 54,668 |
| A52 | 2653 | 5.8157E-06 | 0.9893 | 0.815 | 59,472 | |
| A53 | 2669 | 6.6976E-06 | 0.9956 | 0.864 | 52,591 | |
| A54 | 2642 | 5.6271E-06 | 0.9844 | 0.775 | 60,596 | |
| A55 | 2658 | 5.9901E-06 | 0.9860 | 0.843 | 57,187 | |
| | ave | 2643 | 6.7205E-06 | 0.9940 | 0.821 | 52,177 |

| | | | | | | |
|-----------------------------------------------|-----|------|------------|------------|--------|---------|
| DATA SET 13: CCT = 3000K, $T_J = 123\text{C}$ | A1 | 3033 | 3.2170E-06 | 0.9952 | 0.540 | 109,382 |
| | A2 | 2976 | 3.0219E-06 | 0.9920 | 0.441 | 115,388 |
| | A3 | 3001 | 3.9807E-06 | 1.0080 | 0.624 | 91,605 |
| | A4 | 3023 | 4.9377E-06 | 0.9946 | 0.653 | 71,133 |
| | A5 | 3070 | 4.8050E-06 | 1.0023 | 0.713 | 74,712 |
| | A6 | 2957 | 2.1581E-06 | 0.9984 | 0.264 | 164,518 |
| | A7 | 2964 | 4.4536E-06 | 0.9877 | 0.676 | 77,304 |
| | A8 | 2888 | 3.2269E-06 | 0.9883 | 0.565 | 106,881 |
| | A9 | 2954 | 3.5151E-06 | 0.9967 | 0.585 | 100,527 |
| | A10 | 2962 | 1.7089E-06 | 0.9856 | 0.180 | 200,216 |
| | A21 | 3072 | 3.9927E-06 | 1.0094 | 0.611 | 91,670 |
| | A22 | 2986 | 4.2610E-06 | 0.9968 | 0.653 | 82,949 |
| | A23 | 2971 | 3.9858E-06 | 0.9881 | 0.583 | 86,489 |
| | A24 | 2977 | 4.4491E-06 | 0.9949 | 0.674 | 79,010 |
| | A25 | 3041 | 4.9267E-06 | 1.0016 | 0.739 | 72,713 |
| | A26 | 2986 | 4.1350E-06 | 0.9873 | 0.625 | 83,165 |
| | A27 | 3100 | 4.0787E-06 | 0.9947 | 0.668 | 86,152 |
| | A28 | 2992 | 4.4972E-06 | 0.9967 | 0.701 | 78,574 |
| | A29 | 3056 | 4.2819E-06 | 0.9895 | 0.618 | 80,842 |
| | A30 | 2997 | 4.9132E-06 | 1.0026 | 0.680 | 73,123 |
| | A41 | 3069 | 4.7051E-06 | 0.9947 | 0.734 | 74,677 |
| | A42 | 3048 | 6.1743E-06 | 0.9945 | 0.806 | 56,879 |
| | A43 | 3006 | 7.3789E-06 | 1.0120 | 0.838 | 49,958 |
| | A44 | 3032 | 4.8070E-06 | 0.9879 | 0.732 | 71,671 |
| | A45 | 3073 | 4.7567E-06 | 0.9894 | 0.750 | 72,733 |
| | | ave | 3009 | 4.2534E-06 | 0.9955 | 0.652 |

$T_S = T_{AIR} = 120^{\circ}C, I_F = 0.7A$

$T_S \geq 118C, T_{AIR} \geq 115C$ in compliance with LM-80-08

Lumen Data

| | CCT ($t=0$) | Lumen Maintenance | | | | | | | | | | | | | | |
|----------------------------------------|------------------|-------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------------|--------------|
| | | 0 | 24 | 168 | 500 | 1000 | 2000 | 3000 | 4000 | 5000 | 6000 | 7000 | 8000 | 9000 | 10000 | % at 6khours |
| DATA SET 34: CCT > 5000K, $T_J = 147C$ | B3 | 5742 | 69.004 | 68.095 | 70.442 | 71.289 | 72.020 | 71.237 | 70.638 | 70.028 | 70.029 | 69.561 | 68.148 | 66.210 | 64.494 | 100.8 |
| | B4 | 5709 | 68.686 | 67.571 | 69.989 | 70.352 | 70.793 | 69.828 | 69.150 | 68.615 | 68.606 | 67.679 | 66.234 | 63.269 | 61.248 | 98.5 |
| | B5 | 6084 | 67.328 | 66.735 | 68.030 | 68.018 | 68.743 | 67.979 | 67.490 | 67.122 | 66.999 | 66.519 | 65.239 | 64.962 | 63.397 | 98.8 |
| | B7 | 6398 | 62.723 | 62.684 | 63.726 | 63.321 | 63.389 | 61.013 | 60.133 | 60.264 | 59.858 | 58.529 | 57.677 | 56.977 | 54.608 | 93.3 |
| | B8 | 6271 | 65.366 | 65.421 | 67.002 | 66.950 | 67.358 | 64.298 | 63.618 | 63.099 | 62.702 | 63.070 | 58.428 | 62.160 | 58.033 | 96.5 |
| | B9 | 6479 | 66.939 | 67.547 | 69.168 | 68.991 | 68.627 | 66.590 | 65.563 | 63.845 | 65.910 | 65.805 | 61.354 | 61.100 | 58.752 | 98.3 |
| | B10 | 6354 | 70.351 | 70.882 | 72.049 | 71.514 | 71.671 | 69.898 | 69.154 | 68.890 | 68.862 | 69.273 | 68.339 | 67.604 | 65.164 | 98.5 |
| | B22 | 5934 | 83.746 | 82.511 | 83.978 | 83.795 | 83.957 | 83.126 | 83.056 | 82.815 | 82.754 | 82.611 | 82.001 | 82.102 | 81.269 | 98.6 |
| | B26 | 5635 | 56.752 | 54.604 | 56.329 | 56.419 | 56.645 | 55.876 | 55.233 | 54.686 | 54.407 | 53.861 | 52.489 | 52.007 | 50.312 | 94.9 |
| | B27 | 6048 | 63.268 | 62.031 | 62.975 | 62.913 | 62.995 | 61.765 | 61.056 | 60.505 | 60.245 | 59.645 | 58.389 | 57.936 | 56.094 | 94.3 |
| | B28 | 5695 | 63.763 | 62.642 | 64.132 | 64.640 | 64.877 | 63.660 | 62.962 | 62.433 | 62.190 | 61.429 | 60.090 | 59.235 | 57.180 | 96.3 |
| | B29 | 6035 | 65.103 | 64.189 | 65.282 | 65.351 | 65.306 | 63.713 | 63.151 | 62.560 | 62.203 | 61.416 | 59.654 | 58.487 | 56.138 | 94.3 |
| | B30 | 5572 | 66.275 | 65.154 | 66.460 | 66.637 | 66.953 | 65.790 | 65.082 | 64.913 | 64.609 | 64.173 | 62.936 | 61.987 | 60.776 | 96.8 |
| | B37 | 5943 | 82.658 | 83.443 | 84.930 | 85.040 | 85.587 | 84.642 | 84.409 | 84.441 | 84.518 | 84.373 | 83.723 | 83.787 | 82.972 | 102.1 |
| | B38 | 5780 | 84.505 | 84.370 | 85.695 | 85.317 | 85.806 | 84.639 | 84.230 | 84.733 | 84.718 | 84.681 | 83.881 | 83.977 | 80.435 | 100.2 |
| | B39 | 5636 | 85.640 | 85.414 | 86.418 | 86.193 | 86.739 | 85.333 | 84.973 | 85.122 | 85.141 | 85.021 | 84.183 | 83.581 | 79.956 | 99.3 |
| | A44 | 5888 | 86.118 | 83.374 | 83.672 | 82.970 | 83.061 | 81.865 | 81.815 | 82.151 | 80.447 | 81.760 | 81.414 | 81.282 | 80.615 | 94.9 |
| | A45 | 6086 | 85.266 | 82.850 | 83.389 | 82.885 | 83.235 | 81.963 | 81.929 | 82.480 | 82.317 | 82.201 | 81.906 | 81.801 | 81.163 | 96.4 |
| | A54 | 6411 | 83.124 | 83.511 | 84.629 | 83.933 | 84.362 | 83.183 | 83.119 | 83.458 | 81.390 | 82.692 | 82.661 | 82.696 | 82.221 | 99.5 |
| | A61 | 5682 | 58.911 | 56.862 | 57.681 | 58.146 | 58.958 | 58.076 | 57.658 | 57.496 | 56.455 | 56.968 | 56.305 | 55.954 | 55.067 | 96.7 |
| A63 | 6117 | 58.731 | 56.878 | 58.021 | 57.964 | 58.490 | 57.283 | 56.379 | 55.667 | 54.325 | 54.590 | 52.801 | 51.722 | 49.745 | 92.9 | |
| A68 | 6457 | 82.254 | 81.434 | 82.831 | 81.699 | 80.900 | 79.191 | 79.235 | 79.959 | 78.242 | 78.537 | 77.634 | 76.245 | 77.706 | 95.5 | |
| A70 | 6229 | 79.891 | 80.910 | 84.252 | 84.086 | 83.933 | 81.228 | 81.082 | 81.165 | 80.800 | 81.234 | 80.454 | 80.607 | 80.097 | 101.7 | |
| A76 | 5703 | 82.711 | 82.846 | 85.562 | 85.648 | 84.837 | 82.597 | 82.807 | 83.638 | 81.989 | 82.419 | 82.379 | 82.499 | 80.616 | 99.6 | |
| A77 | 5673 | 88.832 | 87.076 | 88.418 | 87.302 | 85.750 | 84.698 | 84.834 | 85.611 | 83.816 | 84.351 | 84.248 | 82.792 | 82.227 | 95.0 | |
| ave | 5982 | | | | | | | | | | | | | | 97.4 | |

$T_S = T_{AIR} = 120^{\circ}C, I_F = 0.7A$

$T_S \geq 118C, T_{AIR} \geq 115C$ in compliance with LM-80-08

Normalized flux

| | | CCT ($t=0$) | 0 | 24 | 168 | 500 | 1000 | 2000 | 3000 | 4000 | 5000 | 6000 | 7000 | 8000 | 9000 | 10000 |
|----------------------------------------|-----|------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|-------|
| DATA SET 34: CCT > 5000K, $T_J = 147C$ | B3 | 5742 | 1.0000 | 0.9868 | 1.0208 | 1.0331 | 1.0437 | 1.0324 | 1.0237 | 1.0148 | 1.0149 | 1.0081 | 0.9876 | 0.9595 | 0.9346 | |
| | B4 | 5709 | 1.0000 | 0.9838 | 1.0190 | 1.0243 | 1.0307 | 1.0166 | 1.0068 | 0.9990 | 0.9988 | 0.9853 | 0.9643 | 0.9211 | 0.8917 | |
| | B5 | 6084 | 1.0000 | 0.9912 | 1.0104 | 1.0103 | 1.0210 | 1.0097 | 1.0024 | 0.9969 | 0.9951 | 0.9880 | 0.9690 | 0.9649 | 0.9416 | |
| | B7 | 6398 | 1.0000 | 0.9994 | 1.0160 | 1.0095 | 1.0106 | 0.9727 | 0.9587 | 0.9608 | 0.9543 | 0.9331 | 0.9195 | 0.9084 | 0.8706 | |
| | B8 | 6271 | 1.0000 | 1.0008 | 1.0250 | 1.0242 | 1.0305 | 0.9837 | 0.9733 | 0.9653 | 0.9593 | 0.9649 | 0.8939 | 0.9510 | 0.8878 | |
| | B9 | 6479 | 1.0000 | 1.0091 | 1.0333 | 1.0307 | 1.0252 | 0.9948 | 0.9794 | 0.9538 | 0.9846 | 0.9831 | 0.9166 | 0.9128 | 0.8777 | |
| | B10 | 6354 | 1.0000 | 1.0075 | 1.0241 | 1.0165 | 1.0188 | 0.9936 | 0.9830 | 0.9792 | 0.9788 | 0.9847 | 0.9714 | 0.9609 | 0.9263 | |
| | B22 | 5934 | 1.0000 | 0.9853 | 1.0028 | 1.0006 | 1.0025 | 0.9926 | 0.9918 | 0.9889 | 0.9882 | 0.9864 | 0.9792 | 0.9804 | 0.9704 | |
| | B26 | 5635 | 1.0000 | 0.9622 | 0.9926 | 0.9941 | 0.9981 | 0.9846 | 0.9732 | 0.9636 | 0.9587 | 0.9491 | 0.9249 | 0.9164 | 0.8865 | |
| | B27 | 6048 | 1.0000 | 0.9804 | 0.9954 | 0.9944 | 0.9957 | 0.9762 | 0.9650 | 0.9563 | 0.9522 | 0.9427 | 0.9229 | 0.9157 | 0.8866 | |
| | B28 | 5695 | 1.0000 | 0.9824 | 1.0058 | 1.0138 | 1.0175 | 0.9984 | 0.9874 | 0.9791 | 0.9753 | 0.9634 | 0.9424 | 0.9290 | 0.8968 | |
| | B29 | 6035 | 1.0000 | 0.9860 | 1.0027 | 1.0038 | 1.0031 | 0.9786 | 0.9700 | 0.9609 | 0.9555 | 0.9434 | 0.9163 | 0.8984 | 0.8623 | |
| | B30 | 5572 | 1.0000 | 0.9831 | 1.0028 | 1.0055 | 1.0102 | 0.9927 | 0.9820 | 0.9794 | 0.9749 | 0.9683 | 0.9496 | 0.9353 | 0.9170 | |
| | B37 | 5943 | 1.0000 | 1.0095 | 1.0275 | 1.0288 | 1.0354 | 1.0240 | 1.0212 | 1.0216 | 1.0225 | 1.0208 | 1.0129 | 1.0137 | 1.0038 | |
| | B38 | 5780 | 1.0000 | 0.9984 | 1.0141 | 1.0096 | 1.0154 | 1.0016 | 0.9967 | 1.0027 | 1.0025 | 1.0021 | 0.9926 | 0.9938 | 0.9518 | |
| | B39 | 5636 | 1.0000 | 0.9974 | 1.0091 | 1.0065 | 1.0128 | 0.9964 | 0.9922 | 0.9940 | 0.9942 | 0.9928 | 0.9830 | 0.9760 | 0.9336 | |
| | A44 | 5888 | 1.0000 | 0.9681 | 0.9716 | 0.9634 | 0.9645 | 0.9506 | 0.9500 | 0.9539 | 0.9341 | 0.9494 | 0.9454 | 0.9439 | 0.9361 | |
| | A45 | 6086 | 1.0000 | 0.9717 | 0.9780 | 0.9721 | 0.9762 | 0.9613 | 0.9609 | 0.9673 | 0.9654 | 0.9640 | 0.9606 | 0.9594 | 0.9519 | |
| | A54 | 6411 | 1.0000 | 1.0047 | 1.0181 | 1.0097 | 1.0149 | 1.0007 | 0.9999 | 1.0040 | 0.9791 | 0.9948 | 0.9944 | 0.9949 | 0.9891 | |
| | A61 | 5682 | 1.0000 | 0.9652 | 0.9791 | 0.9870 | 1.0008 | 0.9858 | 0.9787 | 0.9760 | 0.9583 | 0.9670 | 0.9558 | 0.9498 | 0.9348 | |
| | A63 | 6117 | 1.0000 | 0.9685 | 0.9879 | 0.9869 | 0.9959 | 0.9753 | 0.9599 | 0.9478 | 0.9250 | 0.9295 | 0.8990 | 0.8807 | 0.8470 | |
| | A68 | 6457 | 1.0000 | 0.9900 | 1.0070 | 0.9933 | 0.9835 | 0.9628 | 0.9633 | 0.9721 | 0.9512 | 0.9548 | 0.9438 | 0.9270 | 0.9447 | |
| | A70 | 6229 | 1.0000 | 1.0128 | 1.0546 | 1.0525 | 1.0506 | 1.0167 | 1.0149 | 1.0160 | 1.0114 | 1.0168 | 1.0071 | 1.0090 | 1.0026 | |
| | A76 | 5703 | 1.0000 | 1.0016 | 1.0345 | 1.0355 | 1.0257 | 0.9986 | 1.0012 | 1.0112 | 0.9913 | 0.9965 | 0.9960 | 0.9974 | 0.9747 | |
| | A77 | 5673 | 1.0000 | 0.9802 | 0.9953 | 0.9828 | 0.9653 | 0.9535 | 0.9550 | 0.9637 | 0.9435 | 0.9496 | 0.9484 | 0.9320 | 0.9256 | |
| | ave | 5982 | 1.0000 | 0.9890 | 1.0091 | 1.0076 | 1.0099 | 0.9902 | 0.9836 | 0.9811 | 0.9748 | 0.9735 | 0.9559 | 0.9492 | 0.9258 | |

$T_S = T_{AIR} = 120^{\circ}\text{C}$, $I_F = 0.7\text{A}$

$T_S \geq 118\text{C}$, $T_{AIR} \geq 115\text{C}$ in compliance with LM-80-08

TM-21 extrapolation

| | | CCT (t=0) | alpha | B | r2 | L70 | |
|-------------------------------------------------|-----|--------------|-------------|-------------------|---------------|--------------|---------------|
| DATA SET 34: CCT > 5000K, T _J = 147C | B3 | 5742 | 1.7154E-05 | 1.1024 | 0.894 | 26,477 | |
| | B4 | 5709 | 2.3785E-05 | 1.1195 | 0.900 | 19,743 | |
| | B5 | 6084 | 1.1357E-05 | 1.0505 | 0.923 | 35,741 | |
| | B7 | 6398 | 1.8728E-05 | 1.0436 | 0.941 | 21,323 | |
| | B8 | 6271 | 1.4884E-05 | 1.0315 | 0.507 | 26,050 | |
| | B9 | 6479 | 2.0373E-05 | 1.0700 | 0.690 | 20,827 | |
| | B10 | 6354 | 9.9110E-06 | 1.0310 | 0.675 | 39,069 | |
| | B22 | 5934 | 3.5816E-06 | 1.0054 | 0.864 | 101,075 | |
| | B26 | 5635 | 1.6514E-05 | 1.0385 | 0.939 | 23,886 | |
| | B27 | 6048 | 1.4770E-05 | 1.0227 | 0.932 | 25,670 | |
| | B28 | 5695 | 1.7359E-05 | 1.0604 | 0.935 | 23,924 | |
| | B29 | 6035 | 2.1584E-05 | 1.0610 | 0.937 | 19,269 | |
| | B30 | 5572 | 1.3513E-05 | 1.0414 | 0.952 | 29,396 | |
| | B37 | 5943 | 3.4721E-06 | 1.0390 | 0.834 | 113,754 | |
| | B38 | 5780 | 8.4611E-06 | 1.0468 | 0.617 | 47,557 | |
| | B39 | 5636 | 1.0812E-05 | 1.0499 | 0.696 | 37,495 | |
| | A44 | 5888 | 1.9319E-06 | 0.9557 | 0.201 | 161,173 | |
| | A45 | 6086 | 2.9422E-06 | 0.9800 | 0.907 | 114,356 | |
| | A54 | 6411 | 7.7928E-07 | 0.9977 | 0.031 | 454,794 | |
| | A61 | 5682 | 7.2639E-06 | 1.0031 | 0.834 | 49,531 | |
| | A63 | 6117 | 2.1229E-05 | 1.0380 | 0.928 | 18,557 | |
| | A68 | 6457 | 6.6301E-06 | 0.9906 | 0.628 | 52,376 | |
| | A70 | 6229 | 2.3724E-06 | 1.0262 | 0.682 | 161,223 | |
| | A76 | 5703 | 4.7411E-06 | 1.0256 | 0.555 | 80,556 | |
| | A77 | 5673 | 6.8491E-06 | 0.9867 | 0.795 | 50,120 | |
| | | ave | 5982 | 1.1088E-05 | 1.0316 | 0.911 | 34,975 |

$T_S = T_{AIR} = 120^{\circ}C, I_F = 0.7A$

$T_S \geq 118C, T_{AIR} \geq 115C$ in compliance with LM-80-08

u'

| | | CCT (t=0) | u' | | | | | | | | | | | | | |
|-------------------------------------------------|------------|--------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | | | 0 | 24 | 168 | 500 | 1000 | 2000 | 3000 | 4000 | 5000 | 6000 | 7000 | 8000 | 9000 | 10000 |
| DATA SET 34: CCT > 5000K, T _J = 147C | B3 | 5742 | 0.2054 | 0.2054 | 0.2055 | 0.2055 | 0.2056 | 0.2056 | 0.2056 | 0.2057 | 0.2056 | 0.2056 | 0.2057 | 0.2058 | 0.2058 | 0.2058 |
| | B4 | 5709 | 0.2055 | 0.2053 | 0.2054 | 0.2054 | 0.2055 | 0.2055 | 0.2055 | 0.2055 | 0.2055 | 0.2054 | 0.2055 | 0.2057 | 0.2058 | 0.2058 |
| | B5 | 6084 | 0.2055 | 0.2052 | 0.2052 | 0.2053 | 0.2054 | 0.2054 | 0.2054 | 0.2054 | 0.2053 | 0.2053 | 0.2054 | 0.2053 | 0.2053 | 0.2053 |
| | B7 | 6398 | 0.2089 | 0.2089 | 0.2090 | 0.2090 | 0.2091 | 0.2092 | 0.2093 | 0.2093 | 0.2092 | 0.2092 | 0.2093 | 0.2093 | 0.2093 | 0.2094 |
| | B8 | 6271 | 0.2081 | 0.2081 | 0.2082 | 0.2082 | 0.2083 | 0.2083 | 0.2084 | 0.2084 | 0.2083 | 0.2083 | 0.2084 | 0.2085 | 0.2085 | 0.2085 |
| | B9 | 6479 | 0.2076 | 0.2075 | 0.2076 | 0.2076 | 0.2077 | 0.2077 | 0.2077 | 0.2077 | 0.2077 | 0.2077 | 0.2077 | 0.2077 | 0.2077 | 0.2077 |
| | B10 | 6354 | 0.2072 | 0.2071 | 0.2072 | 0.2071 | 0.2073 | 0.2073 | 0.2073 | 0.2074 | 0.2073 | 0.2073 | 0.2074 | 0.2073 | 0.2073 | 0.2073 |
| | B22 | 5934 | 0.2082 | 0.2084 | 0.2084 | 0.2084 | 0.2085 | 0.2086 | 0.2086 | 0.2086 | 0.2086 | 0.2086 | 0.2085 | 0.2086 | 0.2086 | 0.2086 |
| | B26 | 5635 | 0.2061 | 0.2055 | 0.2056 | 0.2056 | 0.2057 | 0.2058 | 0.2058 | 0.2058 | 0.2057 | 0.2057 | 0.2058 | 0.2057 | 0.2057 | 0.2057 |
| | B27 | 6048 | 0.2055 | 0.2051 | 0.2050 | 0.2050 | 0.2051 | 0.2052 | 0.2051 | 0.2052 | 0.2050 | 0.2050 | 0.2051 | 0.2050 | 0.2050 | 0.2051 |
| | B28 | 5695 | 0.2056 | 0.2052 | 0.2052 | 0.2052 | 0.2053 | 0.2053 | 0.2053 | 0.2053 | 0.2052 | 0.2052 | 0.2053 | 0.2052 | 0.2052 | 0.2052 |
| | B29 | 6035 | 0.2054 | 0.2051 | 0.2051 | 0.2051 | 0.2052 | 0.2052 | 0.2052 | 0.2052 | 0.2051 | 0.2050 | 0.2051 | 0.2050 | 0.2050 | 0.2050 |
| | B30 | 5572 | 0.2058 | 0.2054 | 0.2054 | 0.2054 | 0.2055 | 0.2055 | 0.2055 | 0.2055 | 0.2054 | 0.2053 | 0.2055 | 0.2053 | 0.2053 | 0.2054 |
| | B37 | 5943 | 0.2077 | 0.2078 | 0.2079 | 0.2079 | 0.2080 | 0.2080 | 0.2080 | 0.2081 | 0.2080 | 0.2080 | 0.2081 | 0.2080 | 0.2080 | 0.2081 |
| | B38 | 5780 | 0.2078 | 0.2079 | 0.2080 | 0.2079 | 0.2080 | 0.2080 | 0.2080 | 0.2081 | 0.2080 | 0.2080 | 0.2081 | 0.2080 | 0.2080 | 0.2081 |
| | B39 | 5636 | 0.2077 | 0.2079 | 0.2079 | 0.2079 | 0.2079 | 0.2080 | 0.2080 | 0.2081 | 0.2080 | 0.2080 | 0.2081 | 0.2080 | 0.2080 | 0.2081 |
| | A44 | 5888 | 0.2082 | 0.2084 | 0.2084 | 0.2084 | 0.2085 | 0.2085 | 0.2085 | 0.2086 | 0.2085 | 0.2085 | 0.2085 | 0.2085 | 0.2085 | 0.2085 |
| | A45 | 6086 | 0.2081 | 0.2083 | 0.2084 | 0.2084 | 0.2084 | 0.2084 | 0.2085 | 0.2085 | 0.2084 | 0.2084 | 0.2085 | 0.2084 | 0.2084 | 0.2084 |
| | A54 | 6411 | 0.2077 | 0.2079 | 0.2079 | 0.2079 | 0.2079 | 0.2080 | 0.2080 | 0.2080 | 0.2080 | 0.2080 | 0.2081 | 0.2080 | 0.2080 | 0.2080 |
| | A61 | 5682 | 0.2056 | 0.2051 | 0.2052 | 0.2051 | 0.2053 | 0.2052 | 0.2053 | 0.2053 | 0.2052 | 0.2052 | 0.2053 | 0.2052 | 0.2053 | 0.2053 |
| A63 | 6117 | 0.2055 | 0.2051 | 0.2051 | 0.2051 | 0.2052 | 0.2052 | 0.2053 | 0.2052 | 0.2051 | 0.2051 | 0.2052 | 0.2051 | 0.2051 | 0.2051 | |
| A68 | 6457 | 0.2070 | 0.2071 | 0.2072 | 0.2071 | 0.2072 | 0.2073 | 0.2073 | 0.2073 | 0.2072 | 0.2072 | 0.2074 | 0.2073 | 0.2073 | 0.2074 | |
| A70 | 6229 | 0.2074 | 0.2074 | 0.2074 | 0.2074 | 0.2075 | 0.2076 | 0.2076 | 0.2076 | 0.2075 | 0.2075 | 0.2076 | 0.2076 | 0.2076 | 0.2076 | |
| A76 | 5703 | 0.2081 | 0.2082 | 0.2082 | 0.2082 | 0.2083 | 0.2083 | 0.2084 | 0.2085 | 0.2083 | 0.2084 | 0.2084 | 0.2084 | 0.2084 | 0.2085 | |
| A77 | 5673 | 0.2084 | 0.2084 | 0.2085 | 0.2085 | 0.2086 | 0.2086 | 0.2086 | 0.2087 | 0.2086 | 0.2086 | 0.2086 | 0.2086 | 0.2087 | 0.2087 | |
| | ave | 5982 | | | | | | | | | | | | | | |

$T_S = T_{AIR} = 120^{\circ}C, I_F = 0.7A$

$T_S \geq 118C, T_{AIR} \geq 115C$ in compliance with LM-80-08

| | | v' | | | | | | | | | | | | | | |
|-------------------------------------------------|-----|--------------|-------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|
| | | CCT (t=0) | 0 | 24 | 168 | 500 | 1000 | 2000 | 3000 | 4000 | 5000 | 6000 | 7000 | 8000 | 9000 | 10000 |
| DATA SET 34: CCT > 5000K, T _J = 147C | B3 | 5742 | 0.4739 | 0.4726 | 0.4739 | 0.4746 | 0.4746 | 0.4745 | 0.4756 | 0.4757 | 0.4750 | 0.4750 | 0.4767 | 0.4774 | 0.4796 | |
| | B4 | 5709 | 0.4745 | 0.4727 | 0.4737 | 0.4744 | 0.4746 | 0.4743 | 0.4753 | 0.4751 | 0.4745 | 0.4745 | 0.4764 | 0.4773 | 0.4794 | |
| | B5 | 6084 | 0.4670 | 0.4652 | 0.4663 | 0.4674 | 0.4682 | 0.4681 | 0.4688 | 0.4687 | 0.4681 | 0.4681 | 0.4697 | 0.4696 | 0.4716 | |
| | B7 | 6398 | 0.4579 | 0.4574 | 0.4580 | 0.4581 | 0.4574 | 0.4559 | 0.4570 | 0.4572 | 0.4567 | 0.4568 | 0.4581 | 0.4593 | 0.4618 | |
| | B8 | 6271 | 0.4608 | 0.4604 | 0.4612 | 0.4618 | 0.4615 | 0.4605 | 0.4610 | 0.4612 | 0.4606 | 0.4608 | 0.4637 | 0.4630 | 0.4657 | |
| | B9 | 6479 | 0.4582 | 0.4578 | 0.4587 | 0.4593 | 0.4591 | 0.4579 | 0.4581 | 0.4587 | 0.4577 | 0.4576 | 0.4598 | 0.4599 | 0.4620 | |
| | B10 | 6354 | 0.4605 | 0.4602 | 0.4607 | 0.4612 | 0.4609 | 0.4605 | 0.4613 | 0.4600 | 0.4595 | 0.4596 | 0.4608 | 0.4612 | 0.4634 | |
| | B22 | 5934 | 0.4665 | 0.4652 | 0.4665 | 0.4666 | 0.4662 | 0.4664 | 0.4683 | 0.4683 | 0.4672 | 0.4673 | 0.4695 | 0.4697 | 0.4720 | |
| | B26 | 5635 | 0.4754 | 0.4737 | 0.4737 | 0.4743 | 0.4745 | 0.4746 | 0.4763 | 0.4763 | 0.4753 | 0.4752 | 0.4773 | 0.4773 | 0.4797 | |
| | B27 | 6048 | 0.4677 | 0.4656 | 0.4661 | 0.4664 | 0.4664 | 0.4660 | 0.4674 | 0.4675 | 0.4666 | 0.4666 | 0.4687 | 0.4690 | 0.4717 | |
| | B28 | 5695 | 0.4747 | 0.4731 | 0.4732 | 0.4735 | 0.4736 | 0.4734 | 0.4745 | 0.4743 | 0.4734 | 0.4733 | 0.4754 | 0.4755 | 0.4780 | |
| | B29 | 6035 | 0.4680 | 0.4660 | 0.4668 | 0.4665 | 0.4665 | 0.4659 | 0.4674 | 0.4676 | 0.4667 | 0.4669 | 0.4692 | 0.4697 | 0.4720 | |
| | B30 | 5572 | 0.4773 | 0.4756 | 0.4761 | 0.4763 | 0.4761 | 0.4755 | 0.4763 | 0.4761 | 0.4753 | 0.4751 | 0.4769 | 0.4771 | 0.4790 | |
| | B37 | 5943 | 0.4670 | 0.4658 | 0.4668 | 0.4674 | 0.4675 | 0.4674 | 0.4690 | 0.4690 | 0.4679 | 0.4677 | 0.4699 | 0.4705 | 0.4727 | |
| | B38 | 5780 | 0.4701 | 0.4686 | 0.4697 | 0.4699 | 0.4700 | 0.4698 | 0.4716 | 0.4717 | 0.4707 | 0.4706 | 0.4729 | 0.4736 | 0.4759 | |
| | B39 | 5636 | 0.4733 | 0.4719 | 0.4725 | 0.4727 | 0.4727 | 0.4724 | 0.4741 | 0.4743 | 0.4734 | 0.4732 | 0.4755 | 0.4761 | 0.4781 | |
| | A44 | 5888 | 0.4675 | 0.4661 | 0.4671 | 0.4678 | 0.4675 | 0.4674 | 0.4692 | 0.4689 | 0.4680 | 0.4683 | 0.4704 | 0.4705 | 0.4733 | |
| | A45 | 6086 | 0.4639 | 0.4625 | 0.4637 | 0.4640 | 0.4640 | 0.4639 | 0.4653 | 0.4649 | 0.4642 | 0.4644 | 0.4661 | 0.4659 | 0.4688 | |
| | A54 | 6411 | 0.4590 | 0.4578 | 0.4586 | 0.4588 | 0.4589 | 0.4583 | 0.4597 | 0.4596 | 0.4586 | 0.4588 | 0.4613 | 0.4614 | 0.4636 | |
| | A61 | 5682 | 0.4750 | 0.4732 | 0.4733 | 0.4735 | 0.4737 | 0.4736 | 0.4744 | 0.4740 | 0.4734 | 0.4735 | 0.4749 | 0.4747 | 0.4763 | |
| | A63 | 6117 | 0.4663 | 0.4643 | 0.4646 | 0.4651 | 0.4651 | 0.4655 | 0.4670 | 0.4670 | 0.4659 | 0.4658 | 0.4682 | 0.4682 | 0.4704 | |
| | A68 | 6457 | 0.4591 | 0.4578 | 0.4595 | 0.4595 | 0.4591 | 0.4596 | 0.4618 | 0.4617 | 0.4606 | 0.4616 | 0.4644 | 0.4651 | 0.4673 | |
| | A70 | 6229 | 0.4623 | 0.4615 | 0.4628 | 0.4633 | 0.4621 | 0.4615 | 0.4634 | 0.4635 | 0.4623 | 0.4625 | 0.4654 | 0.4659 | 0.4687 | |
| | A76 | 5703 | 0.4713 | 0.4697 | 0.4705 | 0.4710 | 0.4704 | 0.4711 | 0.4726 | 0.4718 | 0.4709 | 0.4714 | 0.4732 | 0.4732 | 0.4759 | |
| | A77 | 5673 | 0.4717 | 0.4704 | 0.4717 | 0.4721 | 0.4715 | 0.4716 | 0.4736 | 0.4733 | 0.4723 | 0.4728 | 0.4754 | 0.4763 | 0.4787 | |
| | | ave | 5982 | | | | | | | | | | | | | |

$T_S = T_{AIR} = 120^{\circ}C, I_F = 0.7A$

$T_S \geq 118C, T_{AIR} \geq 115C$ in compliance with LM-80-08

delta u' v'

| | | CCT (f=0) | 0 | 24 | 168 | 500 | 1000 | 2000 | 3000 | 4000 | 5000 | 6000 | 7000 | 8000 | 9000 | 10000 |
|-------------------------------------------------|------------|--------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|-------|
| DATA SET 34: CCT > 5000K, T _J = 147C | B3 | 5742 | 0.0000 | 0.0013 | 0.0001 | 0.0007 | 0.0007 | 0.0006 | 0.0017 | 0.0018 | 0.0011 | 0.0011 | 0.0028 | 0.0035 | 0.0057 | |
| | B4 | 5709 | 0.0000 | 0.0018 | 0.0008 | 0.0001 | 0.0001 | 0.0002 | 0.0008 | 0.0006 | 0.0000 | 0.0001 | 0.0019 | 0.0028 | 0.0049 | |
| | B5 | 6084 | 0.0000 | 0.0018 | 0.0008 | 0.0004 | 0.0012 | 0.0011 | 0.0018 | 0.0017 | 0.0011 | 0.0011 | 0.0027 | 0.0026 | 0.0046 | |
| | B7 | 6398 | 0.0000 | 0.0005 | 0.0001 | 0.0002 | 0.0005 | 0.0020 | 0.0010 | 0.0008 | 0.0012 | 0.0011 | 0.0004 | 0.0015 | 0.0039 | |
| | B8 | 6271 | 0.0000 | 0.0004 | 0.0004 | 0.0010 | 0.0007 | 0.0004 | 0.0004 | 0.0005 | 0.0003 | 0.0002 | 0.0029 | 0.0022 | 0.0049 | |
| | B9 | 6479 | 0.0000 | 0.0004 | 0.0005 | 0.0011 | 0.0009 | 0.0003 | 0.0001 | 0.0005 | 0.0005 | 0.0006 | 0.0016 | 0.0017 | 0.0038 | |
| | B10 | 6354 | 0.0000 | 0.0003 | 0.0002 | 0.0007 | 0.0004 | 0.0001 | 0.0008 | 0.0005 | 0.0010 | 0.0009 | 0.0004 | 0.0007 | 0.0029 | |
| | B22 | 5934 | 0.0000 | 0.0013 | 0.0002 | 0.0002 | 0.0004 | 0.0004 | 0.0018 | 0.0018 | 0.0008 | 0.0009 | 0.0030 | 0.0032 | 0.0055 | |
| | B26 | 5635 | 0.0000 | 0.0018 | 0.0018 | 0.0012 | 0.0010 | 0.0009 | 0.0009 | 0.0009 | 0.0004 | 0.0004 | 0.0019 | 0.0019 | 0.0043 | |
| | B27 | 6048 | 0.0000 | 0.0021 | 0.0017 | 0.0014 | 0.0014 | 0.0017 | 0.0005 | 0.0004 | 0.0012 | 0.0012 | 0.0011 | 0.0014 | 0.0040 | |
| | B28 | 5695 | 0.0000 | 0.0016 | 0.0016 | 0.0013 | 0.0011 | 0.0013 | 0.0004 | 0.0005 | 0.0014 | 0.0015 | 0.0008 | 0.0009 | 0.0033 | |
| | B29 | 6035 | 0.0000 | 0.0020 | 0.0012 | 0.0015 | 0.0015 | 0.0021 | 0.0006 | 0.0004 | 0.0013 | 0.0012 | 0.0012 | 0.0017 | 0.0040 | |
| | B30 | 5572 | 0.0000 | 0.0017 | 0.0013 | 0.0011 | 0.0012 | 0.0018 | 0.0010 | 0.0012 | 0.0020 | 0.0023 | 0.0005 | 0.0005 | 0.0017 | |
| | B37 | 5943 | 0.0000 | 0.0012 | 0.0003 | 0.0004 | 0.0006 | 0.0005 | 0.0020 | 0.0020 | 0.0009 | 0.0008 | 0.0029 | 0.0035 | 0.0057 | |
| | B38 | 5780 | 0.0000 | 0.0015 | 0.0004 | 0.0002 | 0.0002 | 0.0004 | 0.0015 | 0.0016 | 0.0006 | 0.0005 | 0.0028 | 0.0035 | 0.0058 | |
| | B39 | 5636 | 0.0000 | 0.0014 | 0.0008 | 0.0006 | 0.0006 | 0.0009 | 0.0009 | 0.0011 | 0.0003 | 0.0003 | 0.0022 | 0.0028 | 0.0048 | |
| | A44 | 5888 | 0.0000 | 0.0014 | 0.0004 | 0.0004 | 0.0003 | 0.0003 | 0.0017 | 0.0015 | 0.0006 | 0.0009 | 0.0029 | 0.0030 | 0.0058 | |
| | A45 | 6086 | 0.0000 | 0.0014 | 0.0004 | 0.0003 | 0.0003 | 0.0003 | 0.0015 | 0.0011 | 0.0004 | 0.0006 | 0.0022 | 0.0020 | 0.0049 | |
| | A54 | 6411 | 0.0000 | 0.0012 | 0.0004 | 0.0003 | 0.0002 | 0.0008 | 0.0008 | 0.0007 | 0.0005 | 0.0004 | 0.0023 | 0.0024 | 0.0046 | |
| | A61 | 5682 | 0.0000 | 0.0019 | 0.0017 | 0.0016 | 0.0013 | 0.0015 | 0.0007 | 0.0010 | 0.0016 | 0.0016 | 0.0003 | 0.0005 | 0.0013 | |
| A63 | 6117 | 0.0000 | 0.0020 | 0.0017 | 0.0013 | 0.0012 | 0.0009 | 0.0007 | 0.0008 | 0.0006 | 0.0006 | 0.0019 | 0.0019 | 0.0041 | | |
| A68 | 6457 | 0.0000 | 0.0013 | 0.0004 | 0.0004 | 0.0002 | 0.0006 | 0.0027 | 0.0026 | 0.0015 | 0.0025 | 0.0053 | 0.0060 | 0.0082 | | |
| A70 | 6229 | 0.0000 | 0.0008 | 0.0005 | 0.0010 | 0.0002 | 0.0008 | 0.0011 | 0.0012 | 0.0001 | 0.0002 | 0.0031 | 0.0036 | 0.0064 | | |
| A76 | 5703 | 0.0000 | 0.0016 | 0.0008 | 0.0003 | 0.0009 | 0.0003 | 0.0013 | 0.0006 | 0.0004 | 0.0003 | 0.0019 | 0.0019 | 0.0046 | | |
| A77 | 5673 | 0.0000 | 0.0013 | 0.0001 | 0.0004 | 0.0003 | 0.0002 | 0.0019 | 0.0016 | 0.0006 | 0.0011 | 0.0037 | 0.0046 | 0.0070 | | |
| | ave | 5982 | 0.0000 | 0.0014 | 0.0008 | 0.0007 | 0.0007 | 0.0008 | 0.0011 | 0.0011 | 0.0008 | 0.0009 | 0.0021 | 0.0024 | 0.0047 | |

$T_S = T_{AIR} = 55^{\circ}\text{C}$, $I_F = 1\text{A}$

$T_S \geq 53\text{C}$, $T_{AIR} \geq 50\text{C}$ in compliance with LM-80-08

TM-21 extrapolation

| | | CCT (t=0) | alpha | B | r ² | L70 |
|-----------------------------------------------|------------|--------------|-------------------|---------------|----------------|----------------|
| DATA SET 9: CCT = 2650K, T _J = 82C | A11 | 2709 | -1.4180E-06 | 0.9641 | 0.031 | -225,761 |
| | A12 | 2696 | 1.9180E-06 | 0.9803 | 0.074 | 175,613 |
| | A13 | 2715 | 7.3056E-07 | 0.9762 | 0.017 | 455,181 |
| | A14 | 2685 | -5.3948E-07 | 0.9719 | 0.010 | -608,334 |
| | A15 | 2704 | 2.2148E-07 | 0.9770 | 0.002 | 1,505,323 |
| | A16 | 2681 | 8.4149E-07 | 0.9516 | 0.024 | 364,959 |
| | A17 | 2745 | -4.9764E-07 | 0.9534 | 0.008 | -620,837 |
| | A18 | 2684 | -4.0346E-07 | 0.9586 | 0.006 | -779,279 |
| | A19 | 2705 | -5.4789E-07 | 0.9609 | 0.010 | -578,248 |
| | A20 | 2663 | -9.3206E-07 | 0.9733 | 0.038 | -353,618 |
| | A31 | 2724 | 9.6734E-07 | 0.9775 | 0.074 | 345,202 |
| | A32 | 2689 | 2.0722E-06 | 0.9803 | 0.177 | 162,517 |
| | A33 | 2673 | 7.2486E-07 | 0.9753 | 0.030 | 457,623 |
| | A34 | 2699 | 2.1112E-06 | 0.9744 | 0.179 | 156,653 |
| | A35 | 2686 | 2.3693E-06 | 0.9713 | 0.359 | 138,237 |
| | A36 | 2615 | 1.3638E-06 | 0.9727 | 0.137 | 241,265 |
| | A37 | 2678 | 4.4006E-06 | 0.9799 | 0.395 | 76,429 |
| | A38 | 2695 | 1.3661E-06 | 0.9771 | 0.057 | 244,142 |
| | A39 | 2679 | 4.9607E-07 | 0.9739 | 0.014 | 665,594 |
| | A40 | 2678 | 2.9443E-06 | 0.9779 | 0.305 | 113,540 |
| A51 | 2702 | 4.6785E-07 | 0.9711 | 0.010 | 699,590 | |
| A52 | 2652 | 1.4427E-06 | 0.9718 | 0.086 | 227,381 | |
| A53 | 2706 | 1.8096E-06 | 0.9689 | 0.181 | 179,617 | |
| A54 | 2738 | 9.6233E-07 | 0.9749 | 0.055 | 344,242 | |
| A55 | 2714 | 1.7058E-06 | 0.9657 | 0.128 | 188,662 | |
| | ave | 2693 | 9.8246E-07 | 0.9712 | 0.041 | 333,293 |

| | | | | | | |
|------------------------------------------------|------------|-------------|--------------------|---------------|--------------|-----------------|
| DATA SET 18: CCT = 3000K, T _J = 82C | A1 | 3033 | -2.6333E-06 | 0.9750 | 0.191 | -125,824 |
| | A2 | 3026 | -1.6192E-06 | 0.9871 | 0.103 | -212,258 |
| | A3 | 3035 | -9.6663E-07 | 0.9775 | 0.046 | -345,429 |
| | A4 | 3059 | -2.0297E-06 | 0.9779 | 0.176 | -164,722 |
| | A5 | 3066 | -8.1361E-07 | 0.9779 | 0.044 | -410,926 |
| | A6 | 2987 | -7.3622E-07 | 0.9770 | 0.024 | -452,870 |
| | A7 | 3068 | -1.2539E-06 | 0.9839 | 0.073 | -271,531 |
| | A8 | 3055 | 7.5544E-08 | 0.9802 | 0.000 | 4,457,274 |
| | A9 | 3017 | 5.7086E-07 | 0.9804 | 0.015 | 590,068 |
| | A10 | 3055 | -2.0044E-06 | 0.9810 | 0.147 | -168,356 |
| | A21 | 3083 | -9.5349E-07 | 0.9785 | 0.055 | -351,271 |
| | A22 | 3112 | -4.5027E-07 | 0.9796 | 0.013 | -746,376 |
| | A23 | 3090 | -1.5954E-06 | 0.9808 | 0.130 | -211,404 |
| | A24 | 3032 | -8.4609E-07 | 0.9810 | 0.036 | -398,891 |
| | A25 | 3041 | -3.5693E-07 | 0.9798 | 0.007 | -942,207 |
| | A26 | 3043 | -1.2333E-06 | 0.9757 | 0.086 | -269,288 |
| | A27 | 3092 | -1.3161E-06 | 0.9776 | 0.094 | -253,812 |
| | A28 | 3060 | -1.8443E-06 | 0.9779 | 0.178 | -181,265 |
| | A30 | 3038 | -1.6765E-06 | 0.9823 | 0.210 | -202,107 |
| | A41 | 3036 | 1.4526E-06 | 0.9802 | 0.130 | 231,761 |
| A42 | 3101 | 1.3772E-06 | 0.9848 | 0.135 | 247,861 | |
| A43 | 3111 | 3.3528E-06 | 0.9819 | 0.360 | 100,932 | |
| A44 | 3092 | 1.7287E-06 | 0.9822 | 0.117 | 195,964 | |
| A45 | 3065 | 1.5657E-06 | 0.9903 | 0.239 | 221,553 | |
| A46 | 3147 | 1.2387E-06 | 0.9756 | 0.090 | 268,035 | |
| | ave | 3062 | -4.4344E-07 | 0.9802 | 0.012 | -759,338 |

Company Information

Philips Lumileds is a leading provider of power LEDs for everyday lighting applications. The company's records for light output, efficacy and thermal management are direct results of the ongoing commitment to advancing solid-state lighting technology and enabling lighting solutions that are more environmentally friendly, help reduce CO₂ emissions and reduce the need for power plant expansion. Philips Lumileds LUXEON® LEDs are enabling never before possible applications in outdoor lighting, shop lighting, home lighting, digital imaging, display and automotive lighting.

Philips Lumileds is a fully integrated supplier, producing core LED material in all three base colors, (red, green, blue) and white. Philips Lumileds has R&D centers in San Jose, California and in the Netherlands, and production capabilities in San Jose, Singapore and Penang, Malaysia. Founded in 1999, Philips Lumileds is the high flux LED technology leader and is dedicated to bridging the gap between solid-state technology and the lighting world. More information about the company's LUXEON LED products and solid-state lighting technologies can be found at www.philipslumileds.com.

www.philipslumileds.com
www.philipslumileds.cn.com
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