

REPORT : ASD-R-1470-A

TYPE : Dimming Output Range

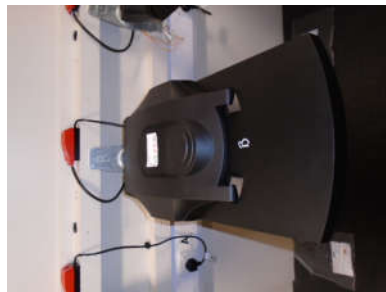
Project Number: 5141
Customer : ASD Lighting PLC
Product Type : Street Light
Project Instigator : D Butler
Project Start Date : 13/09/2018
Test Orientation : Installed Attitude
Project Notes : HWD6 68 LED range test

Product Manufact. : ASD Lighting PLC
Product Descrip. : HWD6 68 LED
Product Code : HWD6-#4K68xx
Product Ref. : N.A.
Driver Type : Osram OT 4 DIM
Dimmable : Yes
Thermal Management : Passive

Luminaire Details
Length (mm) : 680
Width (mm) : 330
Height (mm) : 170
Test Item A : 2443990
Test Item B : 2444036
Test Item C : 2444038
Test Item D : 2444030
Test Item E : 2444023



Item A



Item B



Item C



Item D



Item E

REPORT : ASD-R-1470-A

TYPE : Dimming Output Range

Test Number: T1494
 Test Date: 13/09/2018
 Stabilization Time (mins): 21
 Output (%): 29
 Test Notes : T5
 Test Start Temp (°C) : 20.16

Nom. Drive Current (mA): 200
 Test Type: Std
 Tested By: D Butler
 Frequency Start Test (Hz) : 50.00
 Frequency End Test (Hz) : 50.00
 Test End Temp (°C) : 19.95

| ITEM | Voltage (V) | Current (mA) | Power (W) | VA | PF | Lead/Lag |
|------|-------------|--------------|-----------|-------|-------|----------|
| A | 250.03 | 204 | 43.16 | 51.07 | 0.845 | Leading |
| B | 250.06 | 204 | 43.16 | 50.98 | 0.847 | Leading |
| C | 250.07 | 205 | 43.03 | 51.18 | 0.841 | Leading |
| D | 250.08 | 205 | 43.33 | 51.23 | 0.846 | Leading |
| E | 250.10 | 204 | 43.18 | 50.99 | 0.847 | Leading |
| A | 240.05 | 208 | 43.03 | 49.83 | 0.864 | Leading |
| B | 240.04 | 207 | 43.04 | 49.67 | 0.867 | Leading |
| C | 240.05 | 208 | 42.90 | 49.89 | 0.860 | Leading |
| D | 240.04 | 208 | 43.14 | 49.95 | 0.864 | Leading |
| E | 240.05 | 207 | 43.00 | 49.68 | 0.865 | Leading |
| A | 230.03 | 212 | 42.93 | 48.70 | 0.882 | Leading |
| B | 230.05 | 211 | 42.97 | 48.60 | 0.884 | Leading |
| C | 230.03 | 212 | 42.82 | 48.72 | 0.879 | Leading |
| D | 229.97 | 212 | 42.96 | 48.72 | 0.882 | Leading |
| E | 229.97 | 211 | 42.87 | 48.66 | 0.883 | Leading |
| A | 220.06 | 217 | 42.89 | 47.73 | 0.899 | Leading |
| B | 220.04 | 216 | 42.89 | 47.58 | 0.901 | Leading |
| C | 220.09 | 217 | 42.79 | 47.74 | 0.896 | Leading |
| D | 220.06 | 217 | 42.98 | 47.83 | 0.898 | Leading |
| E | 219.98 | 216 | 42.79 | 47.55 | 0.900 | Leading |
| A | 210.02 | 223 | 42.81 | 46.81 | 0.915 | Leading |
| B | 210.03 | 222 | 42.82 | 46.72 | 0.917 | Leading |
| C | 210.07 | 223 | 42.73 | 46.83 | 0.912 | Leading |
| D | 209.99 | 224 | 42.93 | 46.97 | 0.914 | Leading |
| E | 210.01 | 223 | 42.80 | 46.76 | 0.915 | Leading |

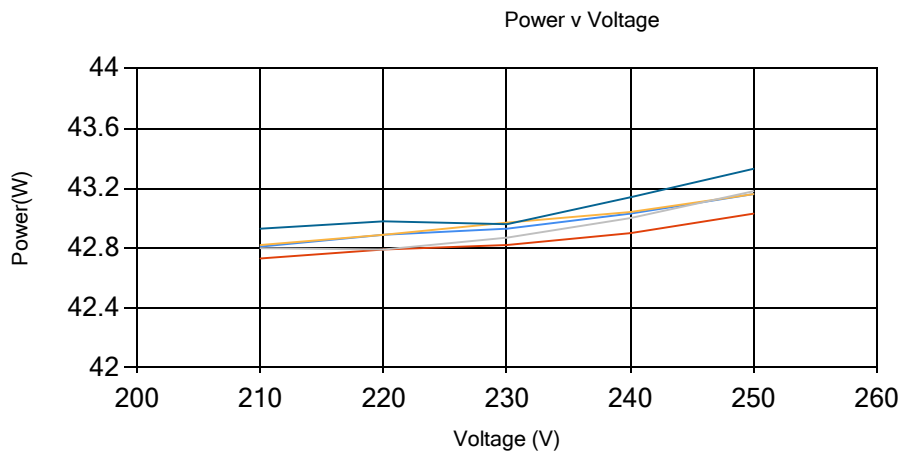
REPORT : ASD-R-1470-A

TYPE : Dimming Output Range

Test Number: T1494 Graphical Results Of Previous Page Tests.

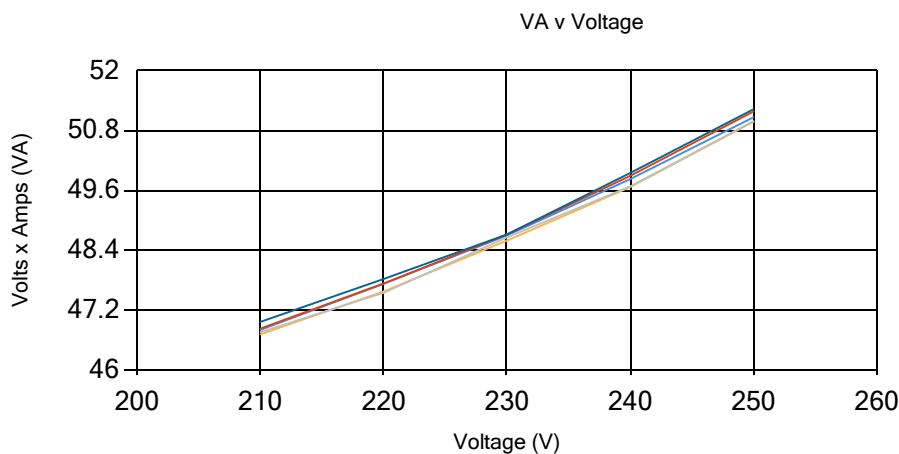
Drive (mA): 200

Output (%): 29



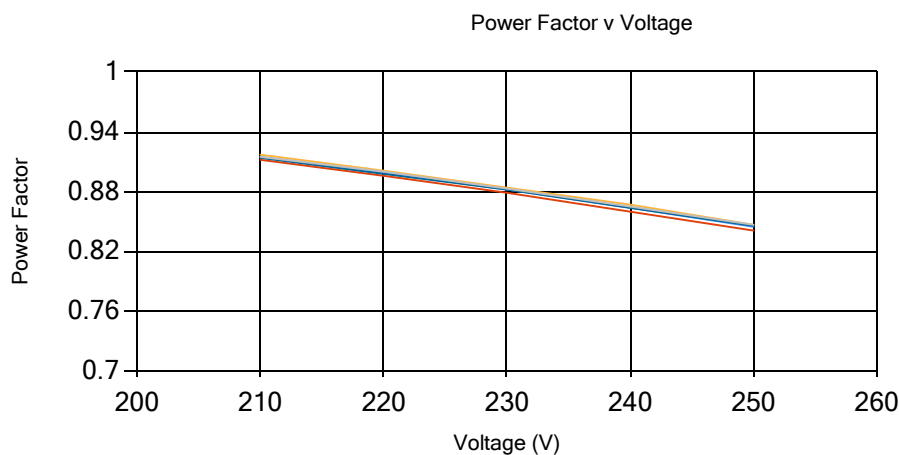
Fitting Designation

- A
- B
- C
- D
- E



Fitting Designation

- A
- B
- C
- D
- E



Fitting Designation

- A
- B
- C
- D
- E

REPORT : ASD-R-1470-A

TYPE : Dimming Output Range

Test Number: T1493
 Test Date: 13/09/2018
 Stabilization Time (mins): 21
 Output (%): 46
 Test Notes : T4
 Test Start Temp (°C) : 19.60

Nom. Drive Current (mA): 325
 Test Type: Std
 Tested By: D Butler
 Frequency Start Test (Hz) : 50.00
 Frequency End Test (Hz) : 50.00
 Test End Temp (°C) : 20.79

| ITEM | Voltage (V) | Current (mA) | Power (W) | VA | PF | Lead/Lag |
|------|-------------|--------------|-----------|-------|-------|----------|
| A | 250.05 | 292 | 67.38 | 73.00 | 0.923 | Leading |
| B | 250.05 | 291 | 67.31 | 72.82 | 0.925 | Leading |
| C | 250.06 | 292 | 67.25 | 73.05 | 0.921 | Leading |
| D | 250.02 | 292 | 67.40 | 73.03 | 0.923 | Leading |
| E | 249.96 | 291 | 67.31 | 72.85 | 0.924 | Leading |
| A | 240.03 | 300 | 67.31 | 72.12 | 0.933 | Leading |
| B | 240.03 | 300 | 67.26 | 71.94 | 0.935 | Leading |
| C | 240.07 | 301 | 67.22 | 72.16 | 0.931 | Leading |
| D | 240.06 | 301 | 67.38 | 72.22 | 0.933 | Leading |
| E | 240.07 | 300 | 67.35 | 72.06 | 0.935 | Leading |
| A | 230.03 | 310 | 67.19 | 71.27 | 0.943 | Leading |
| B | 230.04 | 309 | 67.21 | 71.17 | 0.944 | Leading |
| C | 230.06 | 310 | 67.16 | 71.36 | 0.941 | Leading |
| D | 230.06 | 310 | 67.31 | 71.42 | 0.943 | Leading |
| E | 230.01 | 310 | 67.25 | 71.21 | 0.945 | Leading |
| A | 220.03 | 321 | 67.21 | 70.63 | 0.952 | Leading |
| B | 220.04 | 320 | 67.20 | 70.50 | 0.953 | Leading |
| C | 220.09 | 321 | 67.20 | 70.69 | 0.951 | Leading |
| D | 220.07 | 321 | 67.28 | 70.69 | 0.952 | Leading |
| E | 220.01 | 321 | 67.23 | 70.53 | 0.953 | Leading |
| A | 210.01 | 333 | 67.24 | 70.04 | 0.960 | Leading |
| B | 210.06 | 333 | 67.22 | 69.93 | 0.961 | Leading |
| C | 210.04 | 333 | 67.15 | 70.04 | 0.959 | Leading |
| D | 209.98 | 334 | 67.23 | 70.09 | 0.959 | Leading |
| E | 209.99 | 333 | 67.22 | 69.93 | 0.961 | Leading |

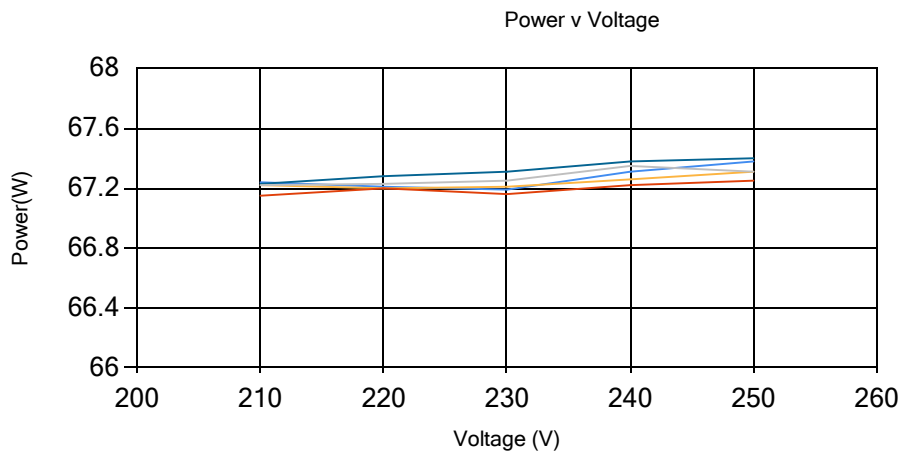
REPORT : ASD-R-1470-A

TYPE : Dimming Output Range

Test Number: T1493 Graphical Results Of Previous Page Tests.

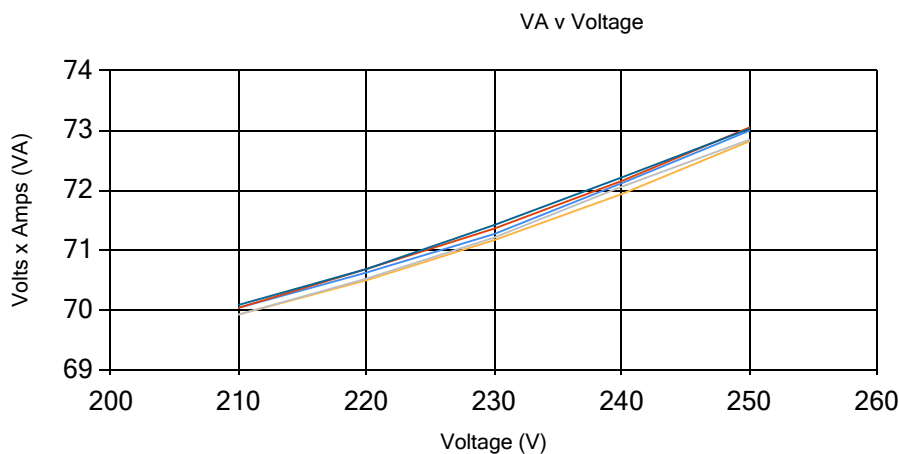
Drive (mA): 325

Output (%): 46



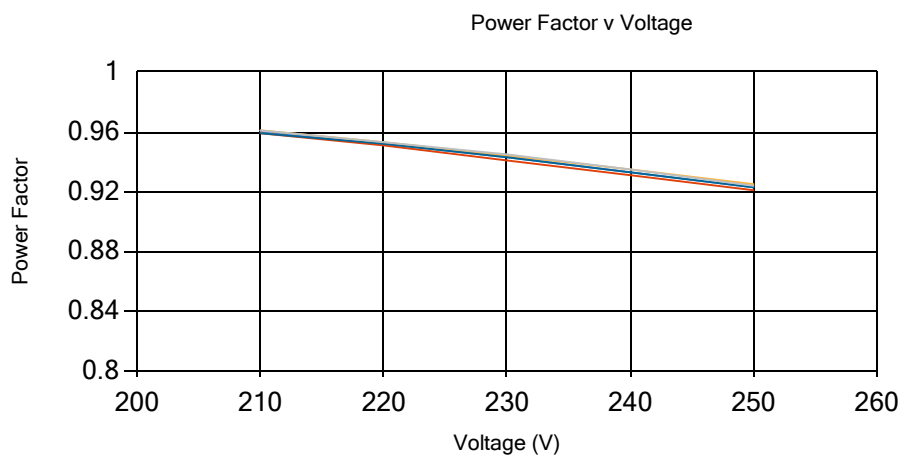
Fitting Designation

- A
- B
- C
- D
- E



Fitting Designation

- A
- B
- C
- D
- E



Fitting Designation

- A
- B
- C
- D
- E

REPORT : ASD-R-1470-A

TYPE : Dimming Output Range

Test Number: T1492
 Test Date: 13/09/2018
 Stabilization Time (mins): 21
 Output (%): 64
 Test Notes : T3
 Test Start Temp (°C) : 20.56

Nom. Drive Current (mA): 450
 Test Type: Std
 Tested By: DButler
 Frequency Start Test (Hz) : 50.00
 Frequency End Test (Hz) : 50.00
 Test End Temp (°C) : 21.49

| ITEM | Voltage (V) | Current (mA) | Power (W) | VA | PF | Lead/Lag |
|------|-------------|--------------|-----------|-------|-------|----------|
| A | 250.07 | 386 | 92.39 | 96.61 | 0.956 | Leading |
| B | 250.09 | 386 | 92.35 | 96.49 | 0.957 | Leading |
| C | 250.07 | 386 | 92.18 | 96.51 | 0.955 | Leading |
| D | 250.07 | 386 | 92.16 | 96.41 | 0.956 | Leading |
| E | 250.15 | 386 | 92.35 | 96.44 | 0.958 | Leading |
| A | 240.03 | 400 | 92.37 | 95.98 | 0.962 | Leading |
| B | 240.05 | 399 | 92.29 | 95.77 | 0.964 | Leading |
| C | 240.06 | 399 | 92.16 | 95.85 | 0.962 | Leading |
| D | 240.05 | 399 | 92.16 | 95.75 | 0.963 | Leading |
| E | 240.13 | 399 | 92.34 | 95.78 | 0.964 | Leading |
| A | 230.03 | 415 | 92.43 | 95.44 | 0.969 | Leading |
| B | 230.06 | 414 | 92.34 | 95.26 | 0.969 | Leading |
| C | 230.09 | 414 | 92.21 | 95.29 | 0.968 | Leading |
| D | 230.05 | 414 | 92.19 | 95.25 | 0.968 | Leading |
| E | 230.08 | 414 | 92.33 | 95.22 | 0.970 | Leading |
| A | 220.03 | 432 | 92.46 | 94.95 | 0.974 | Leading |
| B | 220.04 | 431 | 92.30 | 94.72 | 0.975 | Leading |
| C | 220.06 | 431 | 92.22 | 94.78 | 0.973 | Leading |
| D | 220.05 | 431 | 92.19 | 94.74 | 0.973 | Leading |
| E | 220.06 | 431 | 92.38 | 94.79 | 0.975 | Leading |
| A | 210.02 | 450 | 92.49 | 94.57 | 0.978 | Leading |
| B | 210.03 | 450 | 92.43 | 94.41 | 0.979 | Leading |
| C | 210.07 | 450 | 92.34 | 94.41 | 0.978 | Leading |
| D | 210.04 | 449 | 92.27 | 94.36 | 0.978 | Leading |
| E | 210.05 | 450 | 92.46 | 94.46 | 0.979 | Leading |

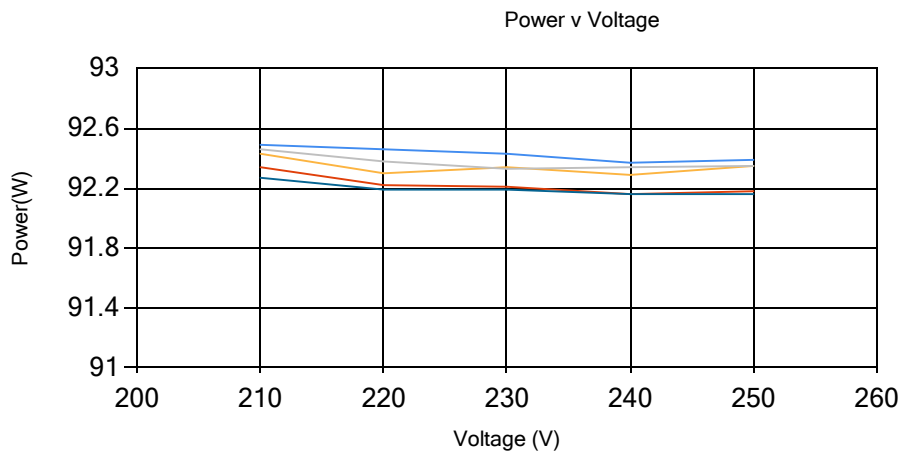
REPORT : ASD-R-1470-A

TYPE : Dimming Output Range

Test Number: T1492 Graphical Results Of Previous Page Tests.

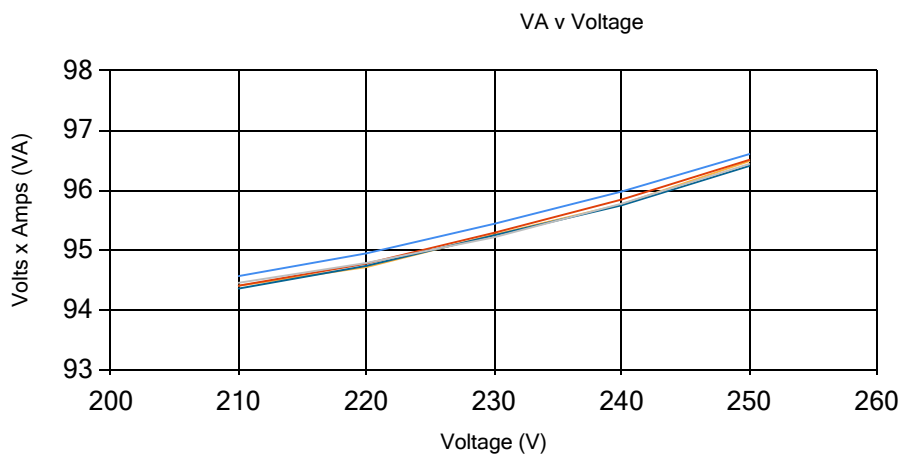
Drive (mA): 450

Output (%): 64



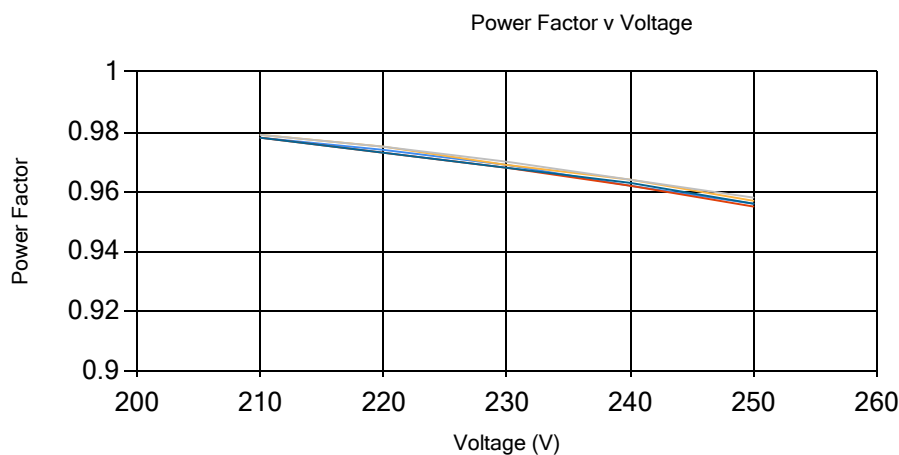
Fitting Designation

- A
- B
- C
- D
- E



Fitting Designation

- A
- B
- C
- D
- E



Fitting Designation

- A
- B
- C
- D
- E

REPORT : ASD-R-1470-A

TYPE : Dimming Output Range

Test Number: T1491
 Test Date: 13/09/2018
 Stabilization Time (mins): 21
 Output (%): 82
 Test Notes : T2
 Test Start Temp (°C) : 20.31

Nom. Drive Current (mA): 575
 Test Type: Std
 Tested By: D Butler
 Frequency Start Test (Hz) : 50.00
 Frequency End Test (Hz) : 50.00
 Test End Temp (°C) : 20.59

| ITEM | Voltage (V) | Current (mA) | Power (W) | VA | PF | Lead/Lag |
|------|-------------|--------------|-----------|--------|-------|----------|
| A | 250.04 | 483 | 117.67 | 120.88 | 0.974 | Leading |
| B | 250.05 | 483 | 117.70 | 120.79 | 0.974 | Leading |
| C | 250.06 | 483 | 117.58 | 120.88 | 0.973 | Leading |
| D | 250.06 | 483 | 117.54 | 120.79 | 0.973 | Leading |
| E | 250.08 | 483 | 117.64 | 120.76 | 0.974 | Leading |
| A | 240.03 | 502 | 117.70 | 120.41 | 0.978 | Leading |
| B | 240.05 | 501 | 117.71 | 120.33 | 0.978 | Leading |
| C | 240.06 | 502 | 117.65 | 120.40 | 0.977 | Leading |
| D | 240.05 | 501 | 117.57 | 120.31 | 0.977 | Leading |
| E | 240.06 | 501 | 117.62 | 120.25 | 0.978 | Leading |
| A | 230.03 | 522 | 117.71 | 119.97 | 0.981 | Leading |
| B | 230.05 | 521 | 117.77 | 119.93 | 0.982 | Leading |
| C | 230.08 | 521 | 117.65 | 119.94 | 0.981 | Leading |
| D | 230.05 | 521 | 117.64 | 119.93 | 0.981 | Leading |
| E | 230.07 | 521 | 117.64 | 119.81 | 0.982 | Leading |
| A | 220.03 | 544 | 117.79 | 119.64 | 0.985 | Leading |
| B | 220.04 | 544 | 117.91 | 119.70 | 0.985 | Leading |
| C | 220.06 | 544 | 117.79 | 119.66 | 0.984 | Leading |
| D | 220.04 | 544 | 117.74 | 119.63 | 0.984 | Leading |
| E | 220.06 | 543 | 117.74 | 119.53 | 0.985 | Leading |
| A | 210.02 | 569 | 117.91 | 119.44 | 0.987 | Leading |
| B | 210.03 | 569 | 118.05 | 119.51 | 0.988 | Leading |
| C | 210.04 | 568 | 117.88 | 119.40 | 0.987 | Leading |
| D | 210.04 | 569 | 117.89 | 119.44 | 0.987 | Leading |
| E | 210.05 | 568 | 117.88 | 119.35 | 0.988 | Leading |

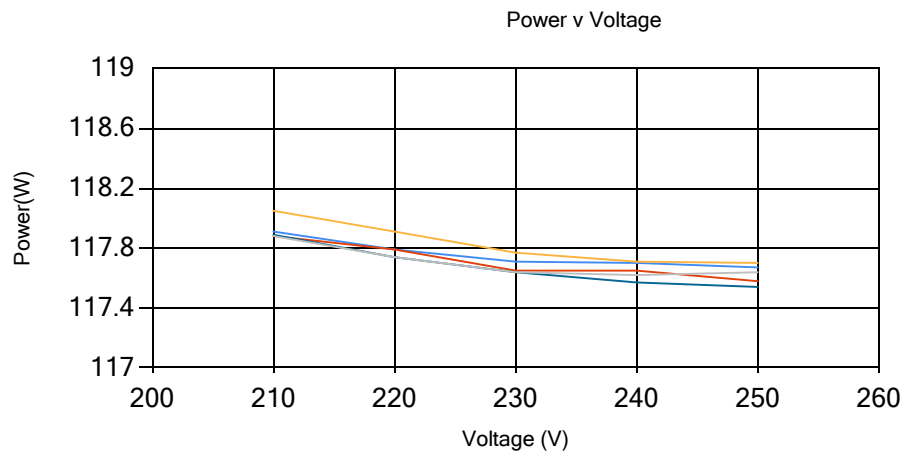
REPORT : ASD-R-1470-A

TYPE : Dimming Output Range

Test Number: T1491 Graphical Results Of Previous Page Tests.

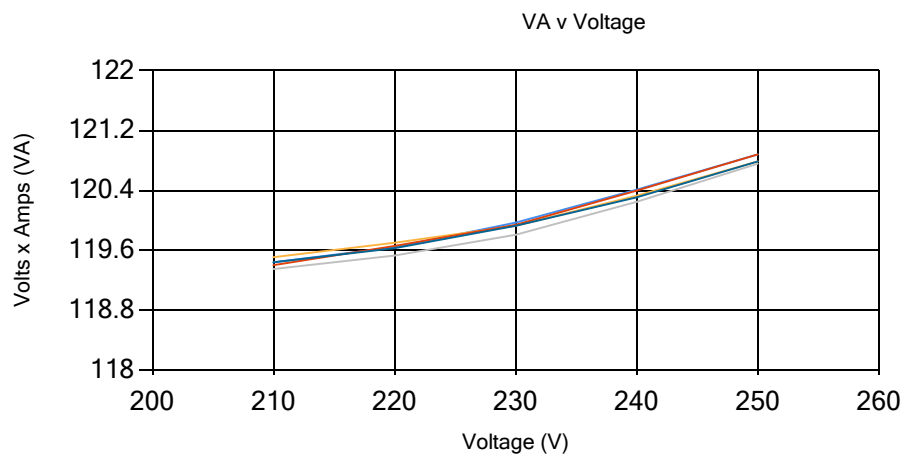
Drive (mA): 575

Output (%): 82



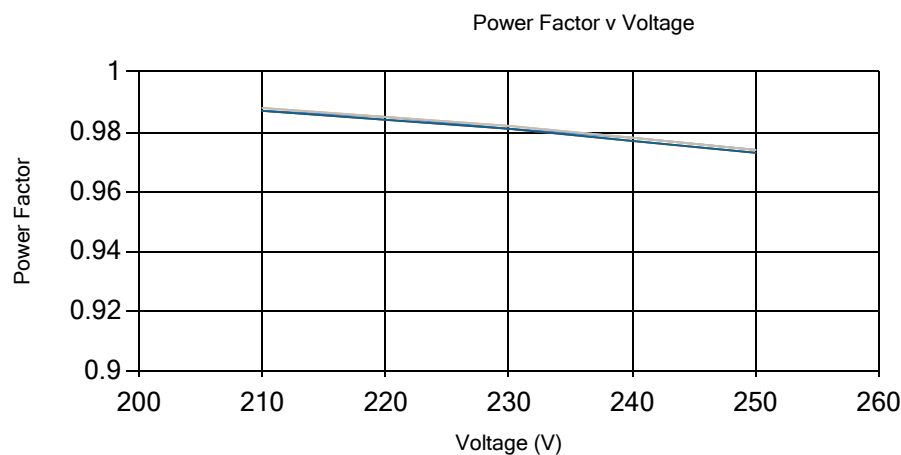
Fitting Designation

- A
- B
- C
- D
- E



Fitting Designation

- A
- B
- C
- D
- E



Fitting Designation

- A
- B
- C
- D
- E

REPORT : ASD-R-1470-A

TYPE : Dimming Output Range

Test Number: T1490
 Test Date: 13/09/2018
 Stabilization Time (mins): 31
 Output (%): 100
 Test Notes : T1
 Test Start Temp (°C) : 19.45

Nom. Drive Current (mA): 700
 Test Type: Std
 Tested By: D Butler
 Frequency Start Test (Hz) : 50.00
 Frequency End Test (Hz) : 50.00
 Test End Temp (°C) : 21.55

| ITEM | Voltage (V) | Current (mA) | Power (W) | VA | PF | Lead/Lag |
|------|-------------|--------------|-----------|--------|-------|----------|
| A | 250.04 | 586 | 144.11 | 146.62 | 0.983 | Leading |
| B | 250.06 | 584 | 143.69 | 146.09 | 0.984 | Leading |
| C | 250.08 | 586 | 144.03 | 146.59 | 0.983 | Leading |
| D | 250.07 | 586 | 144.04 | 146.53 | 0.983 | Leading |
| E | 250.08 | 585 | 143.85 | 146.25 | 0.984 | Leading |
| A | 240.02 | 609 | 144.05 | 146.13 | 0.986 | Leading |
| B | 240.05 | 606 | 143.58 | 145.58 | 0.986 | Leading |
| C | 240.06 | 609 | 144.05 | 146.17 | 0.986 | Leading |
| D | 240.05 | 609 | 144.02 | 146.13 | 0.986 | Leading |
| E | 240.07 | 607 | 143.74 | 145.73 | 0.986 | Leading |
| A | 230.03 | 634 | 144.07 | 145.80 | 0.988 | Leading |
| B | 230.05 | 632 | 143.62 | 145.28 | 0.989 | Leading |
| C | 230.06 | 633 | 143.94 | 145.70 | 0.988 | Leading |
| D | 230.05 | 634 | 144.00 | 145.75 | 0.988 | Leading |
| E | 230.07 | 632 | 143.78 | 145.44 | 0.989 | Leading |
| A | 220.03 | 662 | 144.14 | 145.56 | 0.990 | Leading |
| B | 220.05 | 659 | 143.76 | 145.10 | 0.991 | Leading |
| C | 220.06 | 661 | 144.13 | 145.52 | 0.990 | Leading |
| D | 220.05 | 661 | 144.12 | 145.52 | 0.990 | Leading |
| E | 220.06 | 660 | 143.87 | 145.22 | 0.991 | Leading |
| A | 210.01 | 693 | 144.36 | 145.51 | 0.992 | Leading |
| B | 210.02 | 690 | 143.91 | 145.00 | 0.993 | Leading |
| C | 210.03 | 692 | 144.24 | 145.36 | 0.992 | Leading |
| D | 210.03 | 693 | 144.31 | 145.48 | 0.992 | Leading |
| E | 210.03 | 691 | 144.03 | 145.13 | 0.993 | Leading |

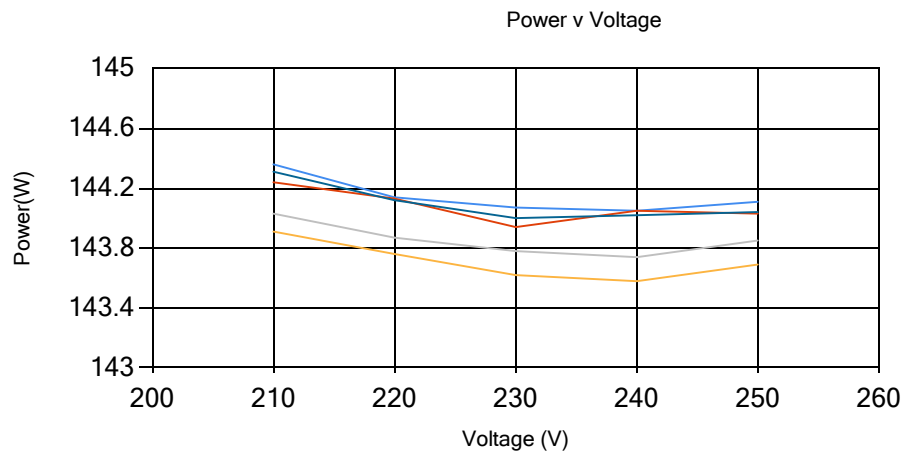
REPORT : ASD-R-1470-A

TYPE : Dimming Output Range

Test Number: T1490 Graphical Results Of Previous Page Tests.

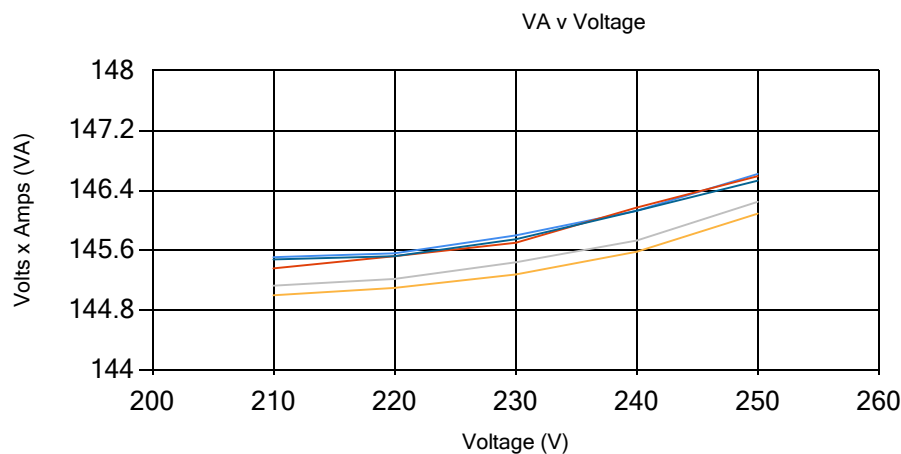
Drive (mA): 700

Output (%): 100



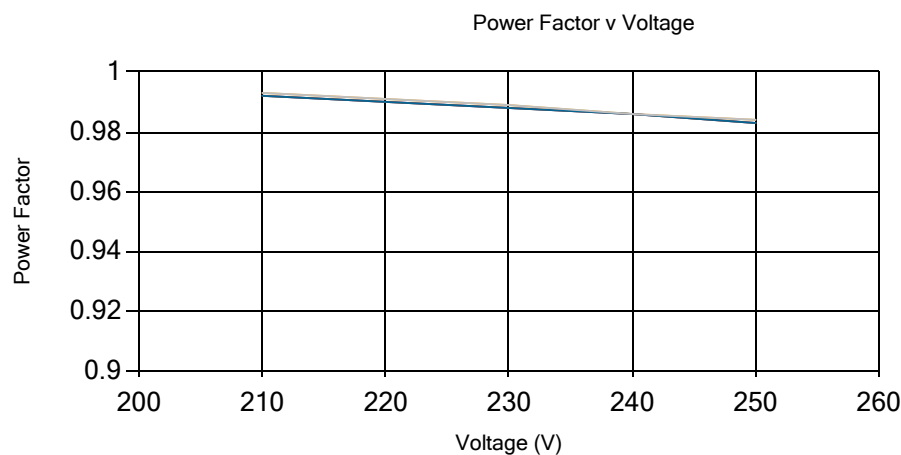
Fitting Designation

- A
- B
- C
- D
- E



Fitting Designation

- A
- B
- C
- D
- E



Fitting Designation

- A
- B
- C
- D
- E

REPORT : ASD-R-1470-A

TYPE : Dimming Output Range

Test Method.

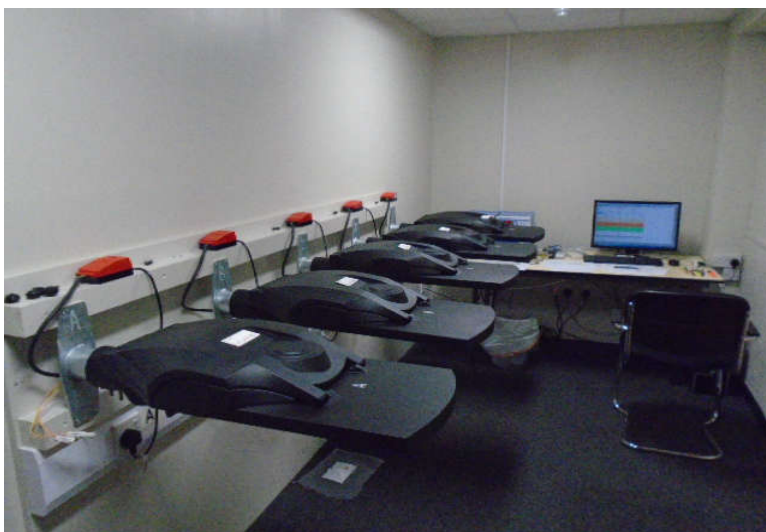
This UMSUG test was conducted in line with the requirements of the Unmetered Supplies Operational Information Document Version 17.0. Using a batch of 5 luminaires of identical product specification, Wattage and VA v Voltage readings were taken at 210, 220, 230, 240, and 250 Volt 50Hz.

The measurements included the drivers required to operate from the mains supply. Before results were recorded the equipment under test was allowed to reach steady state load conditions. This was achieved by powering up at 250V nominal voltage and taking power readings of all five fittings at one minute intervals, in line with LM79-08. The Pre-Burn test period at 250V was set at 15 minutes. The recording of the results commenced after the Pre-Burn period had expired and all five individual fittings had a % difference in power of less than 0.5% taken over a subsequent 15 minute rolling period. The dwell time before recording results, at the 4 reduced voltage levels, was 10 minutes at each reduction. All testing was conducted at a nominal ambient temperature of 20 degrees C. (+/- 3 deg). When testing for a dimming / range code data is taken at full load output, minimum dimmed load and 3 additional dim levels between these extremes. The percentage output dimming level is shown with each set of data. Equipment used: KiKusui PCR 2000M stabilised supply, Yokogawa WT332E and Yokogawa WT333E Digital Power Meters.

Measurement Uncertainty Between 4W and 500W.

| Measured Value. | Accuracy. |
|---------------------------------|-------------|
| Voltage (300V range, 250V 50Hz) | +/- 0.40 V |
| Current (500 mA, 250V 50Hz) | +/- 0.75 mA |
| Current (1000 mA, 250V 50Hz) | +/- 1.5 mA |
| Current (2000 mA, 250V 50Hz) | +/- 3.0 mA |
| Power (50W , 250V 50Hz) | +/- 0.125 W |
| Power (150W , 250V 50Hz) | +/- 0.225 W |
| Power (250W , 250V 50Hz) | +/- 0.40 W |
| Power (500W , 250V 50Hz) | +/- 0.80 W |
| Frequency(50Hz) | +/- 0.03 Hz |

Measurements of Power of 4W or greater are made with an uncertainty of less than or equal to +/- 2% at a 95% confidence level. Below 4W Uncertainty is less than +/- 0.08 W at a 95% confidence level.



Typical Test Setup.

REPORT : ASD-R-1470-A

TYPE : Dimming Output Range

Dimming Curve: Avg. Power Of A To E Luminaires at 240V v Dimming Level Set

