

TIVOFLUTE LED™

A decorative LED fixture with illumination eyelets and recessed LED modules for display cases.

| | |
|--------------|-----------------|
| CAT: | QTY: |
| TYPE: | PROJECT: |

FEATURES

- High output LED under counter, cabinet, jewelry case lighting. Customizable lengths for build to order size cabinets/niches
- Even illumination eyelet spacing; 4" O.C. and 6" O.C. with 3 triple chip LED PCB design operating at 0.50W per PCB 12V DC
- Customizable lengths for exact fit to design specifications
- Up to 94 Lumens/ft at 4" O.C. spacing (White LED PCB's)

SPECIFICATIONS

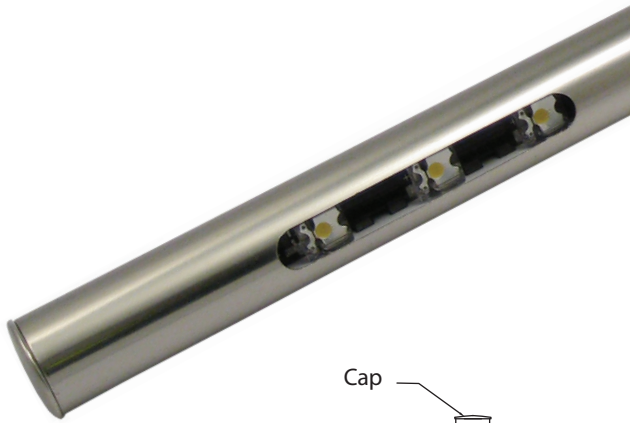
| TIVOFLUTE | EFFICACY LM/WT | LM/FT | LM/MODULE | WT/FT | WT/MODULE |
|-----------------------------------|----------------|-------|-----------|-------|-----------|
| Warm White Triple Chip at 4" O.C. | 59.92 | 89.64 | 29.88 | 1.50 | 0.50 |
| White Triple Chip at 4" O.C. | 62.60 | 94.0 | 31.29 | 1.50 | 0.50 |

Items in bold denote Title 24 High efficacy rating. Measurements are based on 12V DC power design calculations will vary based on power supply and run lengths.

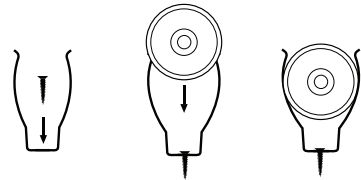
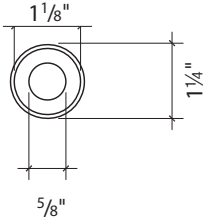
| LED DATA RATED TO LM80 STANDARDS | WATTAGE | LED LIFE* / COLOR TEMP | VIEWING ANGLE |
|----------------------------------|---------------------|--|---------------|
| Ultra Bright Triple Chip | 0.50W per 3 LED PCB | 25,000 hrs. White (5500°k +/-300°k) Neutral White (3200°k +/-200°k) Warm White (2800°k +/-100°k) | 150° |

* LEDs are manufactured on PCB modules in up to 3 LED series orientation and operate at 52% of LED manufacturers maximum current spec rating.

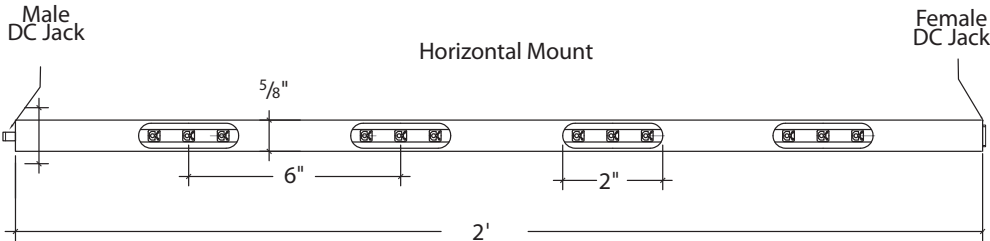
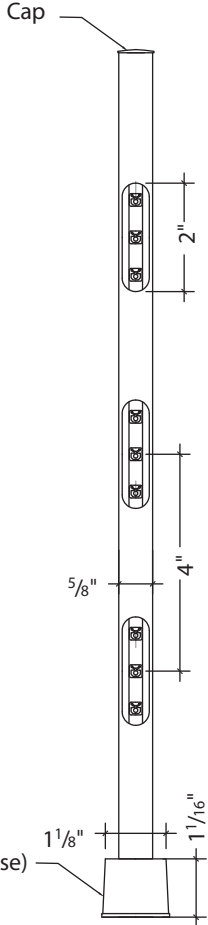
1. **Spacing** - Lamp spacing: 4", 6" O.C.
2. **LED PCB** - Replaceable LED PCBs make maintenance easy
3. **Colors**
Warm White (2800° +/-100°K)
Neutral White (3200° +/-200°K)
White (5500° +/-300°K)
4. **Mounting** - Horizontal or Vertical mount available
5. **Power Supply** - Listed Class I or II 12V DC power supply required
6. **Listing** - ETL dry listed for indoor Class I or II applications
7. **Warranty** - 3 Year Warranty



PROFILES



Fixed Mounting Clips for horizontal applications



(Vertical Mount Base)

TIVOFLUTE ORDER SPECIFICATION GUIDE

Example: TFL-HM-04-U-CH-WW-4

| PRODUCT CODE | MOUNT | SPACING | LED TYPE | FINISH | LED COLOR | LENGTH | REQUIRED POWER SUPPLY |
|--------------|--|--------------------|------------------------------|--------------------------------|---|---|--|
| TFL | - | - | - | - | - | - | PSU |
| TIVOFLUTE | HM = Horizontal Mount VM = Vertical Mount <small>*Manufactured to specified lengths only</small> | 04 = 4" 06 = 6" | U = Ultra Bright Triple Chip | CH=Chrome SA=Satin Aluminum | WH=White NW=Neutral White WW=Warm White | 1 = 1' 2 = 2' 3 = 3' 4 = 4' 6 = 6' C = Custom Length | <small>See power supply specsheets</small> |

REQUIRED POWER SUPPLY OPTIONS

- ADUL-300-5-5-12-D
- ADUL-200-3-5-12-D
- ADUL-75-1-5-12-D
- JT-240-4-5-12-D
- JTH-240-4-5-12-D
- JT-60-1-5-12-D
- JTH-60-1-5-12-D
- MT-60-1-5-12-D

See power supply specifications for more information

OPTIONAL DIMMERS

- N-600
- N-1000
- NH-600
- NH-1000
- DIM-12V-8A
- DIM-OT-1-5-D



TIVOFLUTE LED™

| TRIPLE CHIP 180° - WHITE (0.50 WATTS/PCB) | | | | LUMENS PER FOOT | WATTS PER FOOT | LUMENS PER WATT |
|--|--------|--------|--------|--------------------|-------------------|--------------------|
| Distance from wall | @ 6" | @ 12" | @ 24" | | | |
| 4.0" LED Spacing | 61.7fc | 29.5fc | 10.5fc | 93.50 | 1.50 | 62.34 |
| 6.0" LED Spacing | 36.2fc | 17.4fc | 6.2fc | 52.60 | 1.00 | 52.60 |

| TRIPLE CHIP 180° - WARM WHITE (0.50 WATTS/PCB) | | | | LUMENS PER FOOT | WATTS PER FOOT | LUMENS PER WATT |
|---|--------|--------|-------|--------------------|-------------------|--------------------|
| Distance from wall | @ 6" | @ 12" | @ 24" | | | |
| 4" LED Spacing | 50.0fc | 24.0fc | 9.0fc | 79.70 | 1.50 | 53.14 |
| 6" LED Spacing | 28.4fc | 14.2fc | 5.3fc | 39.84 | 1.00 | 39.40 |

4" oc Standard Lengths

1 Foot
14" actual 3 LED Modules 1.5 Watts at 12v DC



2 Foot
22" actual 5 LED Modules 2.5 Watts at 12v DC



3 Foot
34" actual 8 LED Modules 4.0 Watts at 12v DC

4 Foot
46" actual 11 LED Module: 5.5 Watts at 12v DC

6 Foot
74" actual 18 LED Module: 9.0 Watts at 12v DC



4" oc Tube to Tube connections do not continue exact spacing

6" oc Standard Lengths

1 Foot
12" actual 2 LED Modules 1.0 Watts at 12v DC



2 Foot
24" actual 4 LED Modules 2.0 Watts at 12v DC



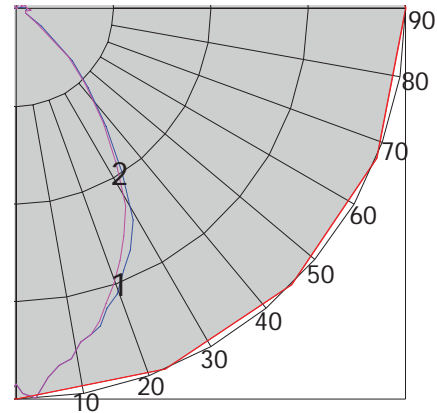
3 Foot
36" actual 6 LED Modules 3.0 Watts at 12v DC

4 Foot
48" actual 8 LED Modules 4.0 Watts at 12v DC

6 Foot
72" actual 12 LED Modules 6.0 Watts at 12v DC



6" oc Tube to Tube connections continue exact spacing



LED BINNING

LED's are made in lots and sorted into bins based on wavelength ranges that achieve colors. Tivoli uses a range of 2700°k to 2900°k for warm white, 3000°k to 3400°k for neutral white and 5200° to 5800°K for white. Individual orders are bin-sorted to within plus or minus 100°k and it is recommended to purchase 10% replacement stock within that bin lot to ensure matched color for needed replacements. White LEDs vary slightly in color temperature from bin to bin. Tivoli references each bin location number on the packing list and labels it on each LED product accordingly. During installation, it is very important that like bins are located in close proximity for color consistency. The overall color will visually appear consistent even with multiple bins located in surrounding areas. However, if different bins are located in close proximity there may be slight color variations visible.

For example:
Bin No. **WB3**
Bin No. **WD3**

B3 should be installed close to each other.
D3 should be installed close to each other
B3 and D3 should **NOT** be installed close to each other.

COEFFICIENTS OF UTILIZATION - ZONAL CAVITY METHOD

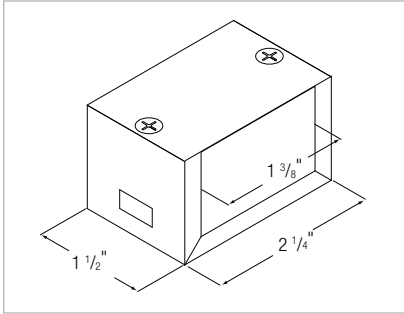
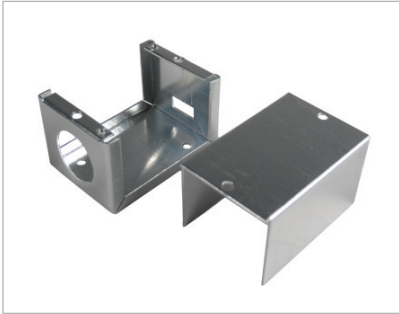
Effective Floor Cavity Reflectance 0.20

| RC RW | 80 | | | 70 | | | 50 | | | 30 | | | 10 | | | 0 | | | |
|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|----|----|----|
| | 70 | 50 | 30 | 10 | 70 | 50 | 30 | 10 | 50 | 30 | 10 | 50 | 30 | 10 | | | | | |
| 0 | 122 | 122 | 122 | 122 | 118 | 118 | 118 | 118 | 111 | 111 | 111 | 111 | 104 | 104 | 104 | 98 | 98 | 98 | 95 |
| 1 | 113 | 109 | 105 | 102 | 109 | 106 | 102 | 99 | 100 | 97 | 94 | 94 | 92 | 90 | 89 | 87 | 86 | 83 | |
| 2 | 105 | 98 | 92 | 87 | 102 | 96 | 90 | 86 | 91 | 86 | 83 | 86 | 82 | 79 | 82 | 79 | 76 | 74 | |
| 3 | 98 | 89 | 82 | 77 | 95 | 87 | 80 | 75 | 83 | 77 | 73 | 79 | 74 | 71 | 75 | 72 | 68 | 66 | |
| 4 | 91 | 81 | 74 | 68 | 89 | 79 | 72 | 67 | 76 | 70 | 65 | 72 | 67 | 63 | 69 | 65 | 62 | 59 | |
| 5 | 85 | 74 | 66 | 61 | 83 | 73 | 65 | 60 | 70 | 63 | 59 | 67 | 61 | 57 | 64 | 60 | 56 | 54 | |
| 6 | 80 | 68 | 60 | 55 | 78 | 67 | 59 | 54 | 64 | 58 | 53 | 62 | 56 | 52 | 59 | 55 | 51 | 49 | |
| 7 | 75 | 63 | 55 | 50 | 73 | 62 | 54 | 49 | 59 | 53 | 48 | 57 | 52 | 47 | 55 | 50 | 47 | 45 | |
| 8 | 70 | 58 | 51 | 45 | 68 | 57 | 50 | 45 | 55 | 49 | 44 | 53 | 48 | 44 | 52 | 47 | 43 | 41 | |
| 9 | 66 | 54 | 47 | 42 | 64 | 53 | 46 | 41 | 51 | 45 | 41 | 50 | 44 | 40 | 48 | 43 | 40 | 38 | |
| 10 | 63 | 51 | 43 | 39 | 61 | 50 | 43 | 38 | 48 | 42 | 38 | 47 | 41 | 37 | 45 | 40 | 37 | 35 | |



ACCESSORIES

| WIRING ACCESSORIES | CAT.NO |
|---------------------------------|----------------|
| Junction Box | TFL-JBOX |
| Terminal Block | TFL-TERM-BLK |
| 30" Lead Connector | TFL-DC-LEAD-30 |
| 2" Corner Connector Male/Female | TFL-02-CORNER |



JUNCTION BOX

Use to cover terminal block connections. One end of the terminal block screws directly into the Platinum Cove lead wires, the other end accepts AWG # 10, 12, 14 wire from power supply. 1 each terminal block included.

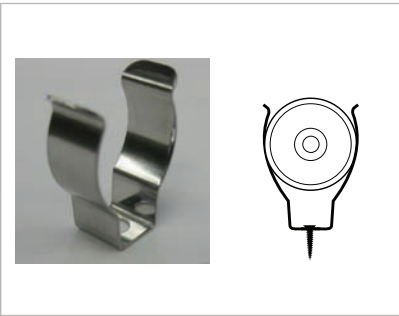


TFL-DC-LEAD-30 DC Adapter
DC jack adapter (90° Male) with 30" lead wire.



TFL-02-CORNER
2" Corner connector: Male/Female

| MOUNTING ACCESSORIES | CAT.NO |
|----------------------|--------|
| Fixed Mounting Clips | TFL-MC |



MOUNTING CLIP
Fixed mounting clips for horizontal applications.



1/2" space required for unit disconnection for easy maintenance.



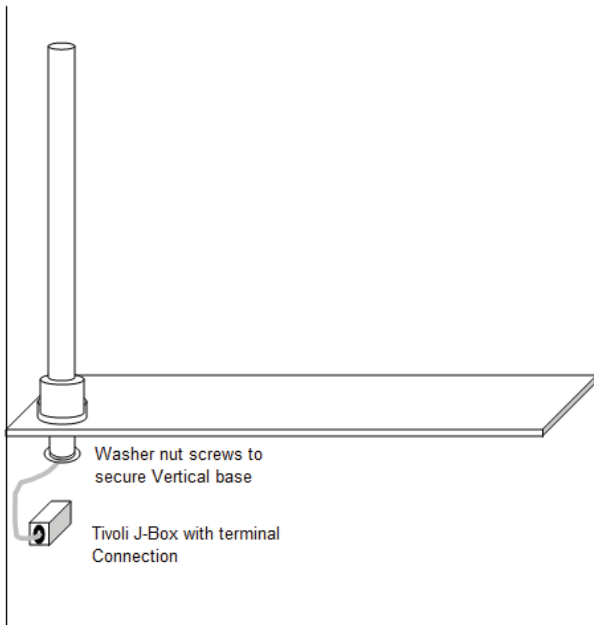
Tube-to-lead connection



Tube-to-tube connection

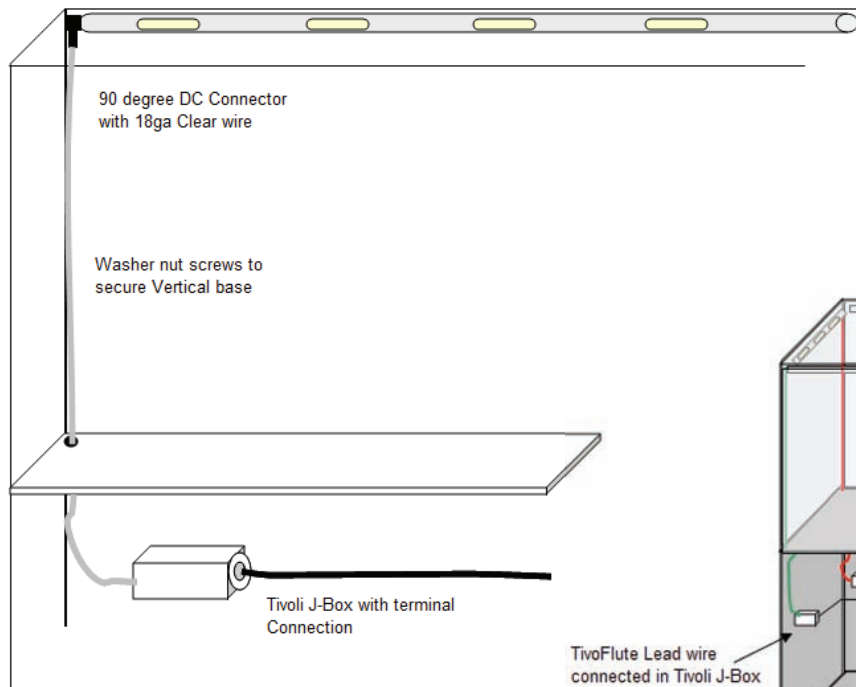
TIVOFLUTE LED™

VERTICAL MOUNT - WIRING DIAGRAM

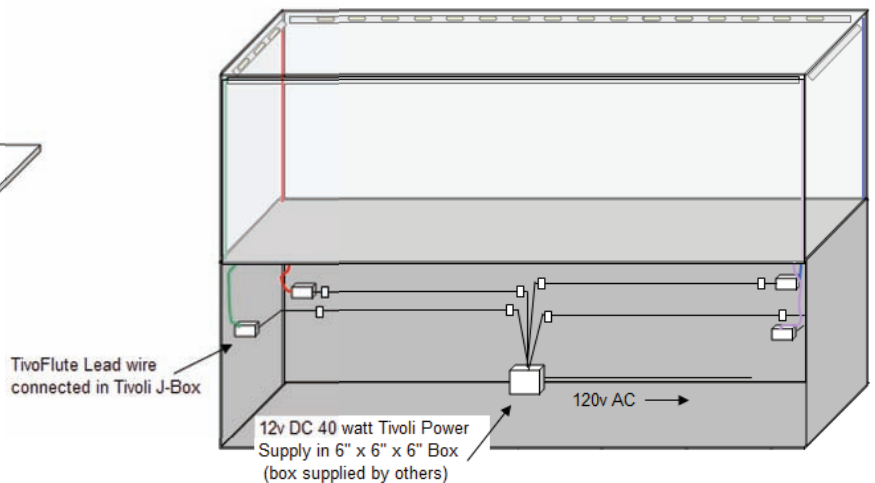


Tivoli J-Box with terminal connection

HORIZONTAL MOUNT - WIRING DIAGRAM



Tivoli 20 watt 12VDC power supply in 2 gang box



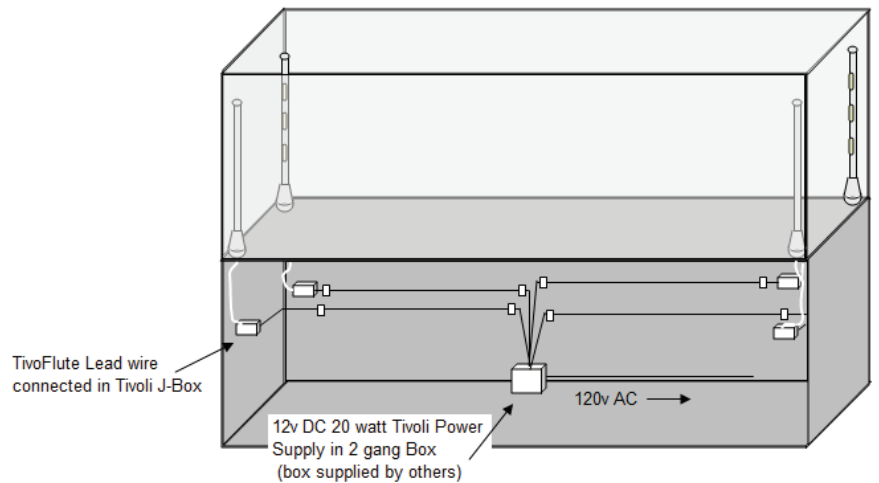
RECOMMENDED POWER SUPPLIES

| PART # | PRIMARY AND SECONDARY | TOTAL WATTAGE / AMPERAGE PER BREAKER | LISTING | DIMENSIONS | WEIGHT | ELECTRONIC OR AC MAGNETIC | DIMMABLE (Y OR N) |
|-------------------|-----------------------|--------------------------------------|---------|---------------------------|--------|---------------------------|-------------------|
| ADUL-75-1-5-12-D | 85-264V AC / 12V DC | 75 / 1X5A | UL/ETL | 10"W X 10"L X 4"D | | Electronic | Y: C & D |
| ADUL-200-3-5-12-D | 85-264V AC / 12V DC | 200 / 3X5A | UL/ETL | 10"W X 10"L X 4"D | | Electronic | Y: C & D |
| ADUL-300-5-5-12-D | 85-264V AC / 12V DC | 300 / 5X5A | UL/ETL | 10"W X 10"L X 4"D | | Electronic | Y: C & D |
| JT-60-1-5-12-D | 120V AC / 12V DC | 60 / 1X5A | ETL | 4.25"W X 8.50"L X 3.25"D | | Magnetic | Y: A, B, C & D |
| JTH-60-1-5-12-D | 277V AC / 12V DC | 60 / 1X5A | ETL | 4.25"W X 8.50"L X 3.25"D | | Magnetic | Y: C, D, E & F |
| JT-240-4-5-12-D | 120V AC / 12V DC | 240 / 4X5A | ETL | 8.50"W X 16.00"L X 4.50"D | | Magnetic | Y: A, B, C & D |
| JTH-240-4-5-12-D | 277V AC / 12V DC | 240 / 4X5A | ETL | 8.50"W X 16.00"L X 4.50"D | | Magnetic | Y: C, D, E & F |
| MT-60-1-5-12-D | 100-240V AC / 12V DC | 60 / 1X5A | UL | 4.25"W X 12.32"L X 4.00"D | | Electronic | N |

DIMMERS

| SELECTOR | DIMMER | TYPE | CONTROL SIGNAL | INPUT VOLTAGE | OUTPUT VOLTAGE | MAX LOAD | BREAKER RATING | DIMENSIONS |
|----------|--------------|-------------------|----------------|---------------|----------------|-----------|----------------|--------------------------|
| A | N-600 | AC Magnetic | N/A | 120V AC | 120V AC | 450W Max. | N/A | Recessed Single gang box |
| B | N-1000 | AC Magnetic | N/A | 120V AC | 120V AC | 800W Max. | N/A | Recessed Dual gang box |
| C | DIM-12V-8A | DC Digital | N/A | 12V DC | 12V DC | 96W | 8A* | Single gang box |
| D | DIM-OT-1-5-D | Control Interface | 1-10VDC | 12V DC | 12/24V DC | 60W | 5A** | 7"L X 1½"W X ¾"H |
| E | NH-600 | AC Magnetic | N/A | 277V AC | 277V AC | 450W | N/A | Recessed Single gang box |
| F | NH-1000 | AC Magnetic | N/A | 277V AC | 277V AC | 800W | N/A | Recessed Dual gang box |

**OTDIM applications require 1 each OTDIM per 5 amp circuit



MTBF

Mean Time Between Failures (MTBF) for LEDs: While Tivoli utilizes LEDs provided by industry leading vendors, these are electrical components with calculated manufacturers mean time between failures (MTBF). MTBF is rated as the average point at which 1/2 of color LEDs will lose 50% of their original brightness. MTBF for White LEDs is based on when 1/2 are reduced to 70% of their original brightness.

Typically, LED product failures occur within fixture construction, interdependent component failure, or operation under adverse conditions. Tivoli operates LEDs at a derated current to insure that LED MTBF values are based on product fixture construction and real application standards.

Still, conditions such as excessive voltage, vibration, heat, and other adverse conditions may negatively effect the life of LEDs.

