

LED Tape products such as TPR's Westflex provide an exciting creative alternative for lighting and set designers. The structure and electrical properties of LED Tape also pose some important challenges to system designers and production electricians that must be met to insure good performance.

Basic rules:

1. Locate Dimmers as close to the connection end of the Tape as possible
2. Be aware of all run length limitations and meet them or devise de-rated alternatives
3. Use 12AWG wire minimum for all Line and Load connection wiring
4. Total Line and Load runs may not exceed 25' with 12 AWG wire
5. Line (supply) wiring: Use (2) 12AWG Conductors (+ and -) for each dimmer.
6. Load (output) wiring: Use (2) 12AWG Conductors (+ and -) for each 10 section of Tape.
7. The maximum length of a single run of tape should be kept to 10 feet
8. Check all terminations to confirm they are tight and correctly formed
9. Minimize wire transitions and terminations when ever possible

DETAILS

LED Tape typically consists of a strip of flexible printed circuit board material, backed with peel and stick adhesive, and populated with multiple LEDs (each with individual current-limiting resistors) wired in parallel. Single color tape has one +VDC buss trace and one -VDC buss trace. RGB Tape has one -VDC buss for each LED color and one common +VDC buss.

The copper in these buss traces must be adequate to carry the current needed for the maximum allowable run length of the tape, while staying as small as possible. It is important to note that the copper in the LED tape also serves as the heat sink for the LEDs and their current limiting resistors.

The Dragon Eats It's Own Tail:

If the maximum run length of the tape is exceeded, the copper busses will be overloaded and will heat up more than they are supposed to. In the long run, this will defeat the heat-sinking function and so fatigue the mounted components. In the short run, the heat will raise the impedance of the copper and contribute to operating problems. Heat stressed-copper can increase in impedance permanently. As the copper is heat-corrupted, the added impedance increases the heat generated and the copper is damaged further, which increases the heat, which increases the impedance, which increases the heat, which increases the impedance,...

Exceeding tape run length with single color LED tape can result in the following problems:

1. Excessive heat from the overloaded busses on the tape
2. Heat based component failure
3. Loss of output
4. Difference in brightness between the beginning and the end of the Tape
5. Permanent damage of the tape

Exceeding Tape run length with RGB LED tape can result in the following problems:

6. Excessive heat from the overloaded busses on the tape

7. Heat based component failure
8. Loss of output
9. Difference in brightness between the beginning and the end of the Tape
10. Interaction between the R,G and B Channels
11. Flickering or strobing at dimmed levels
12. Permanent damage of the tape

Distribution Issues

Again, because of the copper limitations in the Tape and the relatively low operating voltage, excessive run lengths in the Line wiring (power to the dimmers) or Load wiring (output from dimmers to tape) can also cause problems. All WDS 5520 Dimmers should be located as close as possible to the connection point on the Tape.