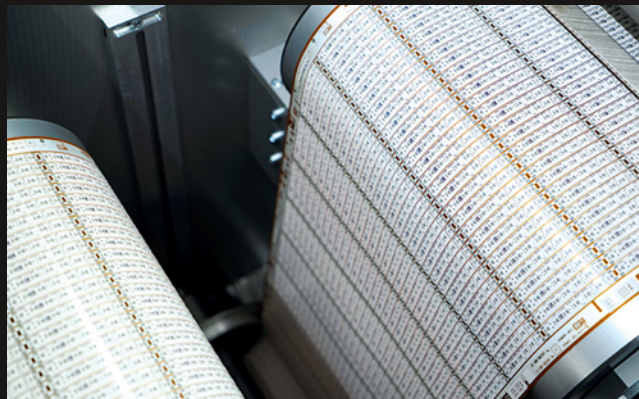


# LED LINEAR TAPES - THE NEW STANDARD



**LED LINEAR™**  
lighting solutions

Member of the  
Fagerhult Group

# REVEALING THE LED LINEAR ADVANTAGES

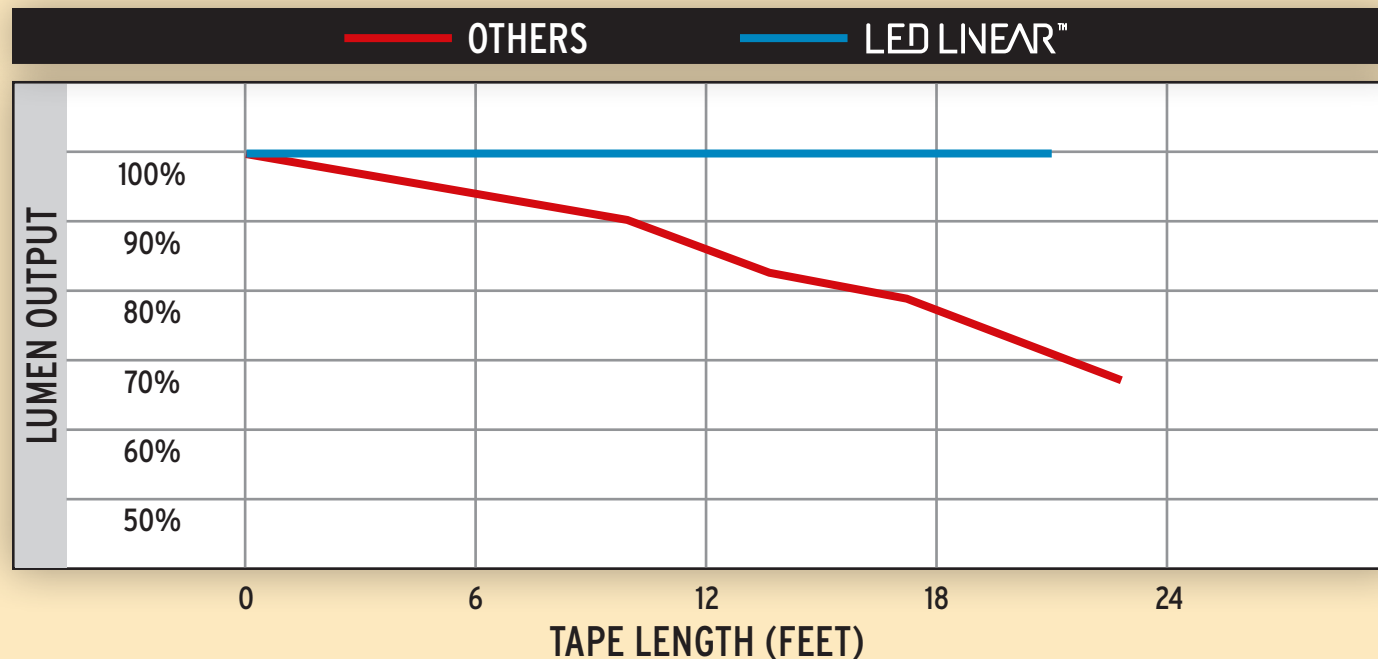
LED Linear offers the world's  
highest quality LED tapes

# HOW?

# ADVANTAGE 1

Integrated  
Circuit  
Driver

## LED Linear tapes are controlled by Integrated Circuit (IC) drivers



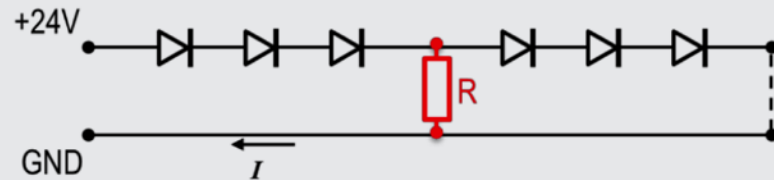
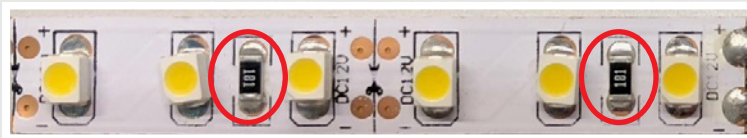
Other tapes use resistors and lose more than 25% of light at the end of the run. The light fades along the tape.

LED Linear uses IC drivers that guarantee 100% consistent light over the full specified length of the products.

# ADVANTAGE 1

It is easy to identify the difference. Just look at the tape!

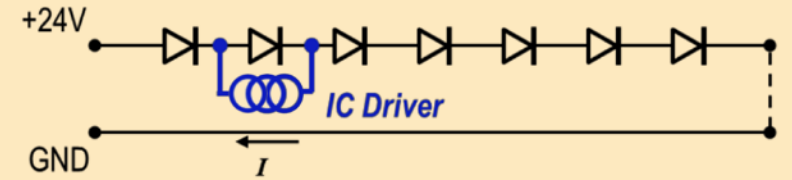
## OTHERS



### Resistor Controlled DC Circuits

- Voltage drop is not balanced along the tape
- Light output decreases over the length
- Resistors heat up and affects lifetime negatively

## LED LINEAR™



### IC Controlled DC Circuits

- Current is regulated on each step
- Light Output is stable over the entire length
- 3V built-in buffer to compensate for voltage drops
- Reverse polarity protection for fool-proof installations

# ADVANTAGE 2

Reel-to-Reel  
R2R  
Production

## LED Linear tapes are produced with Reel-to-Reel (R2R) Technology in Germany

State of the art custom designed  
R2R tape manufacturing facility

100% automation

High production capacity -  
up to 2500 miles of tape annually

Precise batch control through  
QR coding

Low production failure rate  
(0.1 ppm)



<https://www.ledlinearusa.com>

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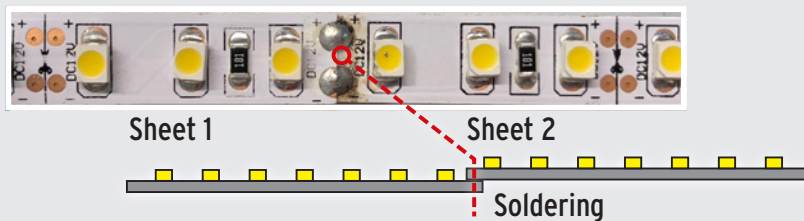
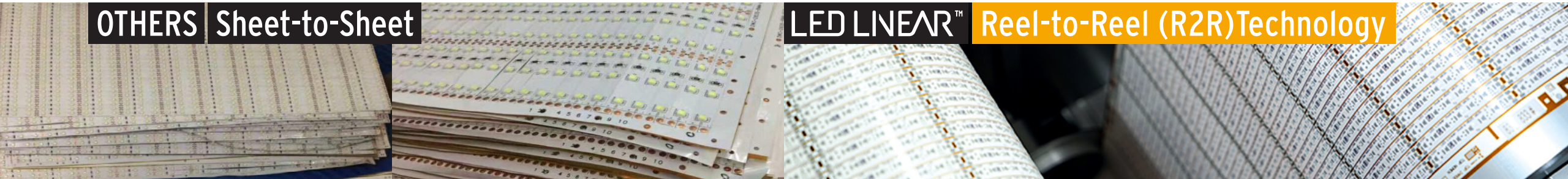
# ADVANTAGE 2

Reel-to-Reel  
R2R  
Production

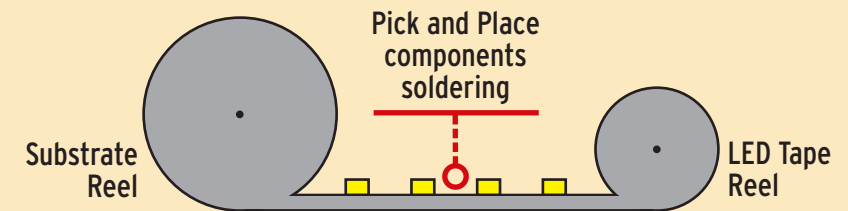
## LED Linear tapes are produced with Reel-to-Reel (R2R) Technology in Germany

OTHERS Sheet-to-Sheet

LED LINEAR™ Reel-to-Reel (R2R) Technology



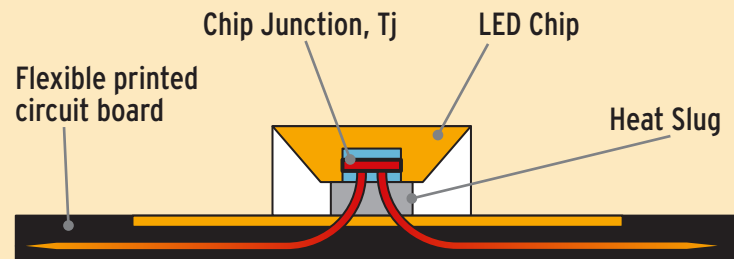
- 18" tape sections are cut and soldered by hand
- Each solder point is a potential break point
- Poor thermal contact to heat sink
- Thicker and less flexible sheet material



- Fully automated continuous process with in-line inspection
- No stairway-effect between cut-lengths
- Excellent thermal contact to heat sink
- Precision pick and place process
- Thin and homogeneous flexible material

# ADVANTAGE 3

## LED Linear tapes have patented TjAway thermal management technology



5 W per 1.8 in<sup>2</sup> = 2.7 W/in<sup>2</sup>



Back side of flexible printed circuit board

The Tj-Away® (Thermal Junction Away) - Technology is characterized by large copper areas below the LED, which ensure rapid heat dissipation and heat spread away from the LED.

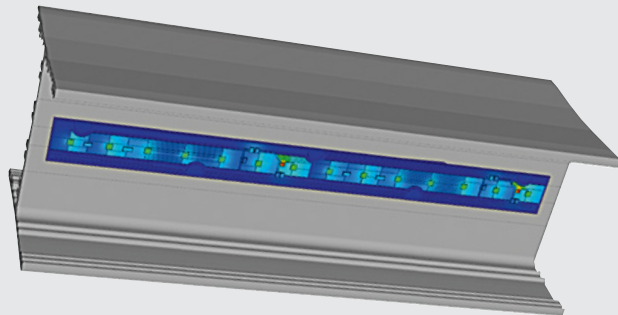
Due to Tj-Away® we achieve thermal power densities less than 2.7 W/in<sup>2</sup> with electrical input power of 12.5 W/ft. This is **30% cooler** than other's tapes. Thin adhesive tape with superior heat conduction guarantees rapid heat transfer into aluminum profiles.

# ADVANTAGE 3



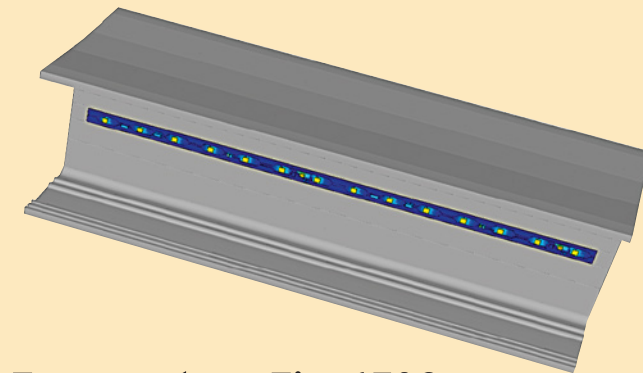
## LED Linear tapes have patented TjAway® thermal management technology

### OTHERS



LED-Junction Temperature  $T_j > 95^\circ\text{C}$

### LED LINEAR™



LED-Junction Temperature  $T_j < 65^\circ\text{C}$

# ADVANTAGE 4

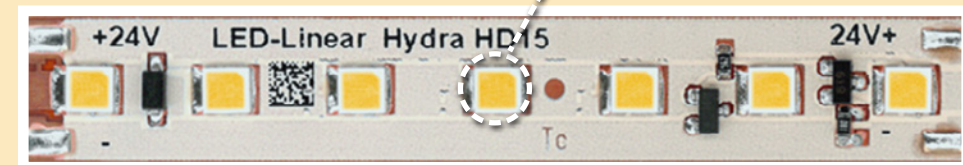
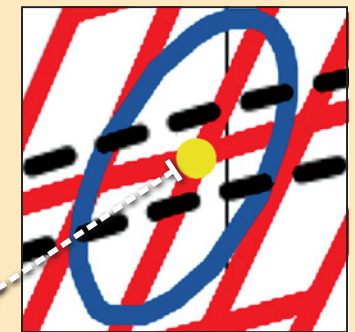
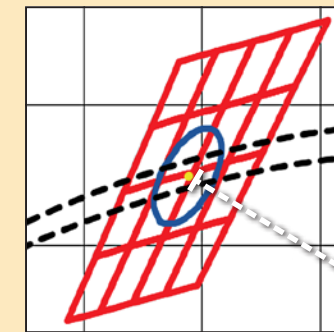
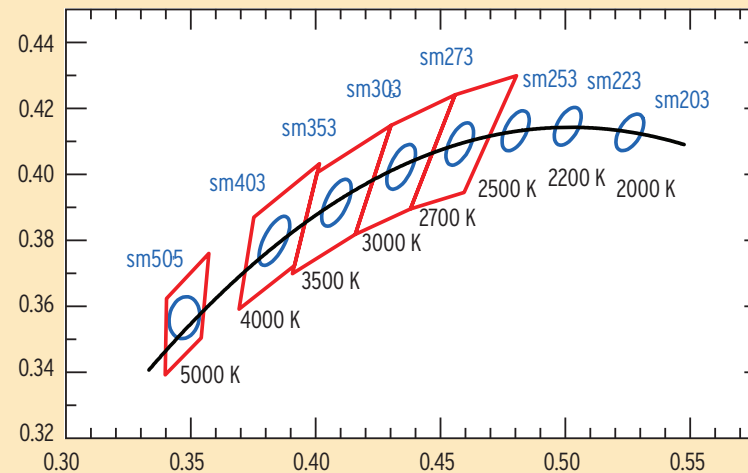
One Bin Only

## LED Linear tapes have One Bin Only Technology for color consistency

One Bin Only stands for true color consistency within a 3 step MacAdams Ellipse located in the center ANSI bin.

During the standardized LM80 test cycle time of 10,000 hours the maximum color shift  $\rightarrow u'v'$  is better than 0.001 (< 1 SDCM) which guarantees impressive color consistency over time.

The absolute CIE (x,y) drift stays well within a 3 step MacAdams ellipse and cannot be recognized by the human eye.

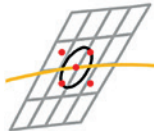
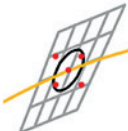
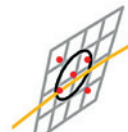


# ADVANTAGE 4

One Bin Only

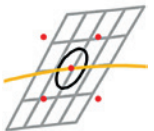
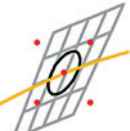
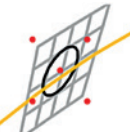
## LED Linear tapes have One Bin Only Technology for color consistency

### OTHERS 1

CCT	Reported CCT Variation
2,200 K	<b>+/- 96 K</b>
	
3,000 K	<b>+/- 126 K</b>
	
4,000 K	<b>+/- 164 K</b>
	

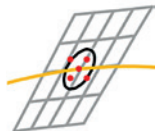

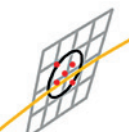
CIE (x,y) = +/- 0.005

### OTHERS 2

CCT	Reported CCT Variation
2,200 K	<b>+/- 192 K</b>
	
3,000 K	<b>+/- 252 K</b>
	
4,000 K	<b>+/- 328 K</b>
	

CIE (x,y) = +/- 0.010

### LED LINEAR™

CCT	Reported CCT Variation
2,200 K	<b>+/- 39 K</b>
	
3,000 K	<b>+/- 56 K</b>
	
4,000 K	<b>+/- 78 K</b>
	

CIE (x,y) = +/- 0.003

LED Color Initial Measuring Tolerance

<https://www.ledlinearusa.com>

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lighting solutions

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# ADVANTAGE 5

L/B  
Lifetime

## LED Linear spec sheets publish L/B Lifetime values for all tape products

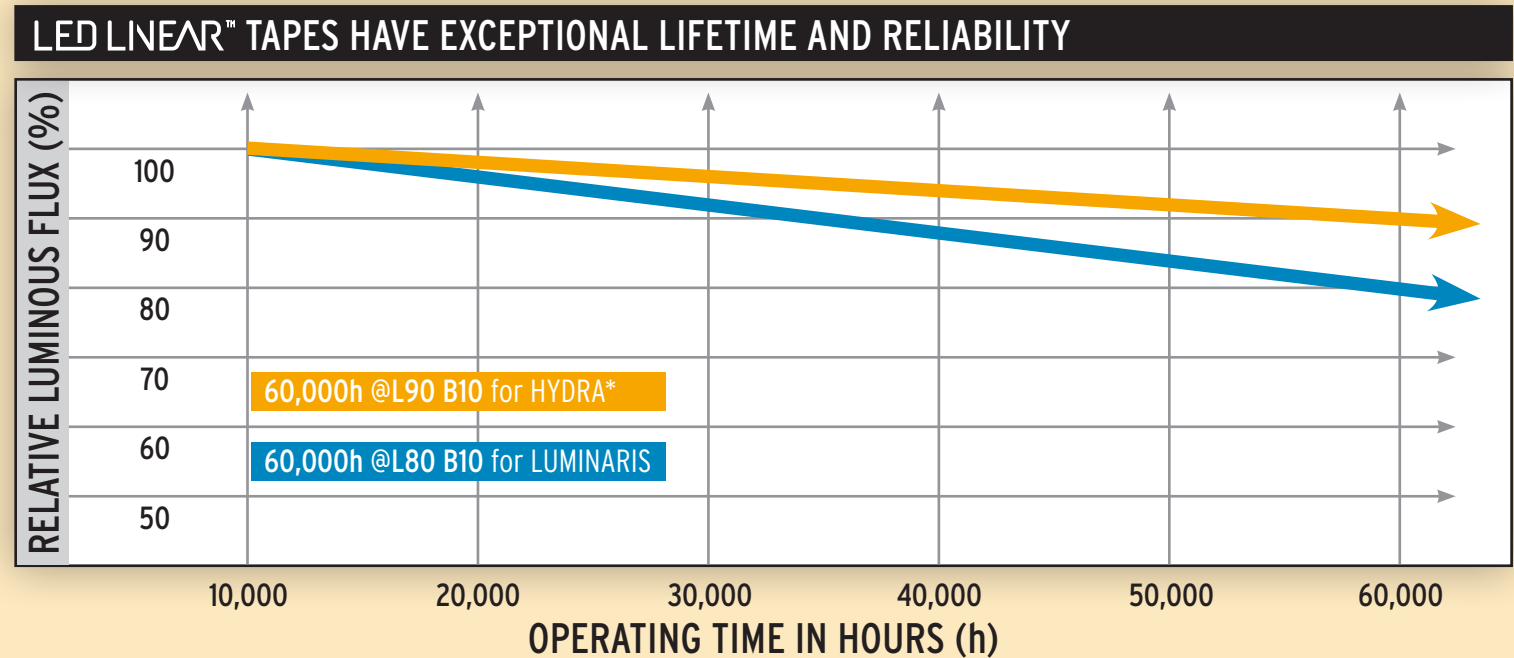
### L Value

Percentage of LED chips with initial lumen output at rated lifetime

### B Value

Percentage of LED chips that will not deliver L value at rated lifetime

If a manufacturer does not state B Value, they accept at least 50% of the chips will fail to deliver L value at rated lifetime.



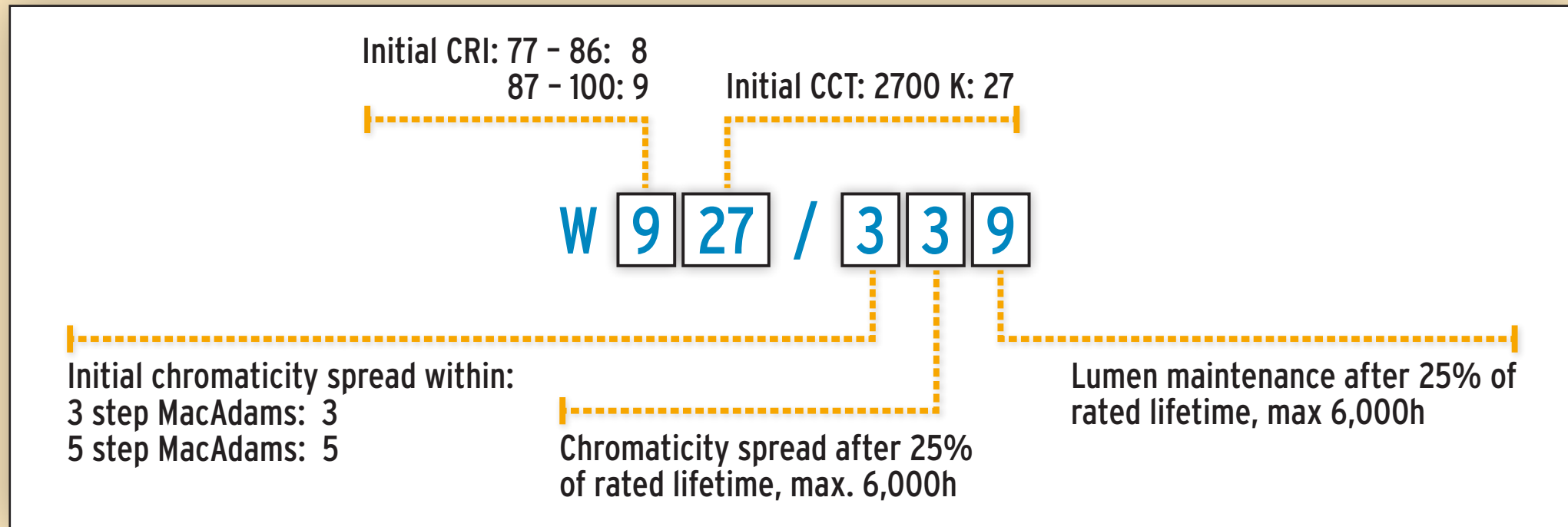
\*The HYDRA series has a luminous flux of minimum 90% (L90) of the initial luminous flux within 60,000h, with 10% (B10) of the LEDs can be lower and thus consequently 90% are above at specification based conditions

# ADVANTAGE 6

6 Digit  
Photometric  
Code

## LED Linear spec sheets publish 6 Digit Photometric Code for all tape products

### 6 DIGIT PHOTOMETRIC CODE (IEC/PAS 62717):

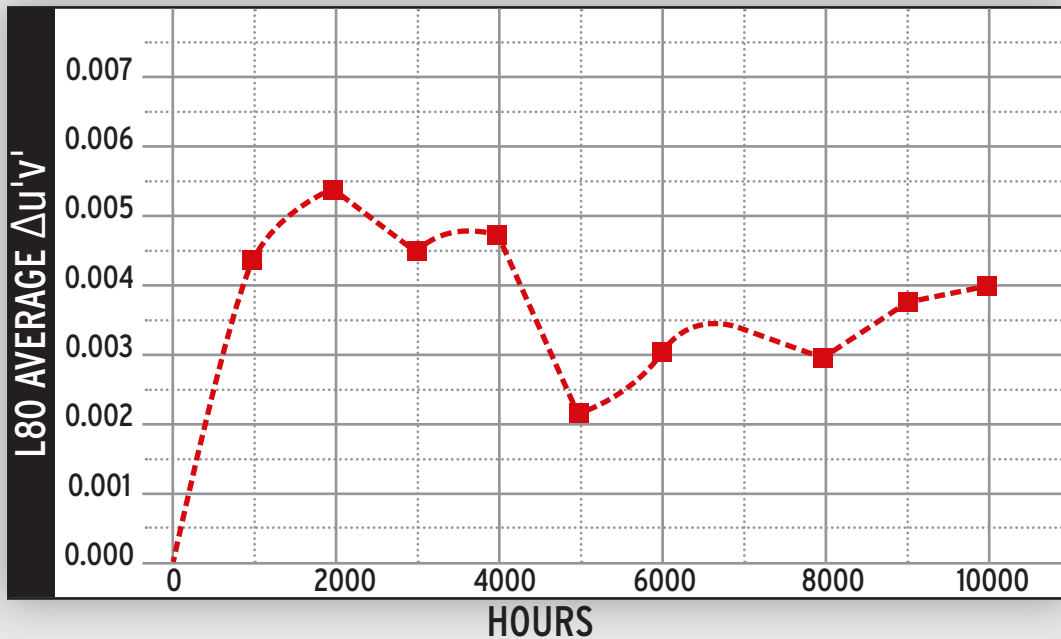


# ADVANTAGE 6

6 Digit  
Photometric  
Code

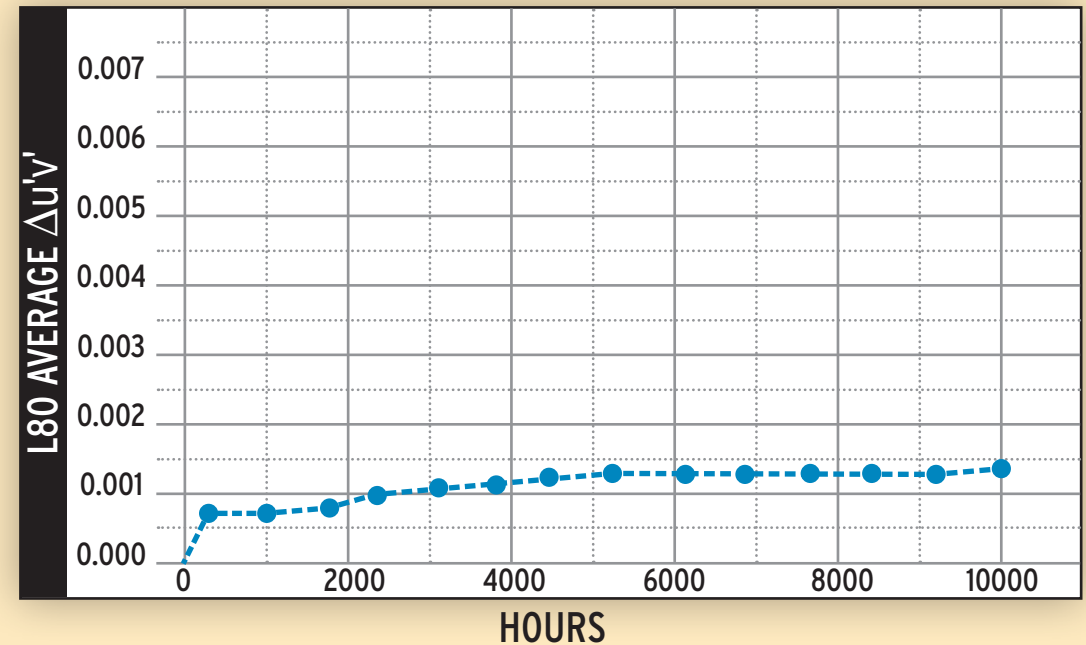
## LED Linear tapes have minimal color shift over time

### OTHERS



W 8 27 / 3 6 9

### LED LINEAR™



W 9 27 / 3 3 9

# The LED LINEAR™ Advantages

Integrated  
Circuit  
Driver

Reel-to-Reel  
R2R  
Production

TjAway®  
Thermal  
Management

One Bin  
Only

L/B  
Lifetime

6 Digit  
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