NLC ACADEMY
EPISODE 01

ELECTRONICS

2 minutes

EN · العربية

PRACTICAL LIGHTING KNOWLEDGE

Inside the *LED* chip

Why same-watt is not same-light, and the bin code that decides which chip you actually bought.

Same wattage = same light?

Not even close. Two "identical" LEDs can vary 25% in lumens and 200K in colour. The chip and its bin code decide which one you got.

INSIDE · 1 OF 2

The die

A blue InGaN crystal, grown atom by atom.

Every white LED **starts as blue,** near 450 nm.
Crystal quality decides lumens per watt.

INSIDE · 2 OF 2

Phosphor

White is **a coating,** not a colour of LED.

YAG:Ce over the blue chip **sets CCT and CRI.**
Same die, different blend, different white.

THE TRUTH

Lumens = Current

not wattage

An LED is a current device. A 1 W chip at 350 mA gives different lumens than the same chip at 700 mA. The drive-current curve is the truth.

One datasheet.
Three things to check.

Before you sign off on any LED, these three lines decide what lands on the wall.

PACKAGE

Geometry sets the limits

SMD

VS COB

BIN

Flux, CCT, CRI sorted at the fab

±15

% LUMENS

DRIVE

Current, not the watt label

mA

IS TRUTH

Packages worth memorising.

Typical efficacy. Real values depend on bin and drive current. Cite the manufacturer datasheet.

2835 · bars and panels	180 lm/W
3030 · street and highbay	170 lm/W
3535 · spot and stadium	160 lm/W
COB · downlight and gallery	150 lm/W
CSP · compact spot and flash	200 lm/W

The common spec mistake.

Specifying "0.2 W LED" and trusting the wattage. Wattage hides the **bin, the CCT, and the drive current.** Spec the **chip family and bin code** instead, not just the watt.

NEXT TIME YOU SPEC A FIXTURE

Ask for the chip and the bin.

Name the chip family and demand the bin code. If your supplier will not put it on the BOM, that is the answer.

- Chip family by name (Lumileds, Samsung, Osram)
- Bin code with CCT step (3-step MacAdam or tighter)
- LM-80 data and the drive-current curve

PRACTICAL LIGHTING KNOWLEDGE

Save this. Send it to a colleague.

NEXT EPISODE
Lux vs Lumen

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