

PRACTICAL LIGHTING KNOWLEDGE

Tunnel Lighting Zones

Threshold, transition, interior, exit — and why the entrance is the brightest part.

Why is a tunnel mouth so bright?

Because eyes adapting from daylight can't see into a dark hole. The threshold zone matches the outside brightness, then steps down as eyes adjust.

DEFINITION · 1 OF 2

Threshold

Highest level, **at the portal.**



Set from the L20 access-zone luminance. **Beats the black-hole effect** at the entrance.

DEFINITION · 2 OF 2

Interior

Steady level **deep inside.**



Constant, far lower than the portal. **Set by speed and traffic,**
not by daylight.

THE STEP-DOWN

$$L_{th} = k$$

$$\times L_{20} \text{ (access zone)}$$

Threshold luminance is a fraction k of the L_{20} brightness a driver sees approaching the portal. Levels then decay through transition to the interior.

One tunnel. Four zones.

Daytime luminance falls zone by zone (CIE 88, illustrative).

THRESHOLD

At the portal

highest

TRANSITION

Stepping down

decaying

INTERIOR

Deep inside

lowes

Tunnel zones **to know.**

Sequence and driver of each zone (CIE 88, illustrative).

Access zone

L₂₀ outside

Threshold

highest inside

Transition

decay curve

Interior

steady low

Exit

daylight re-adapt



One level for the whole tunnel.

Light a tunnel at a single level and you get a **black hole by day** at the entrance, or wasted energy deep inside. The zones exist because the eye adapts gradually.

NEXT TIME YOU LIGHT A TUNNEL

Start from the access zone.

Measure L_{20} , set the threshold from it, then design the step-down through transition to interior.

- ✓ L_{20} access-zone luminance
- ✓ Threshold & transition step-down
- ✓ Interior level by speed & traffic

PRACTICAL LIGHTING KNOWLEDGE

Save this. Send it to a colleague.



NEXT EPISODE

Roadway Lighting (EN 13201)

→ nlc.com.sa/academy