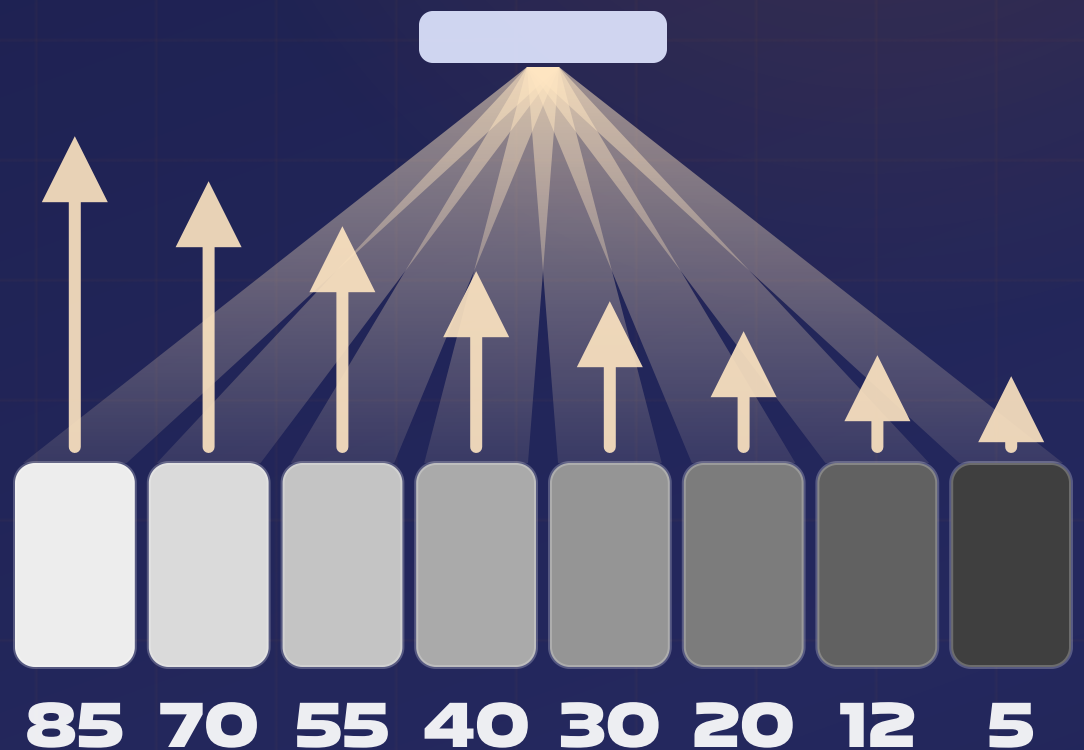
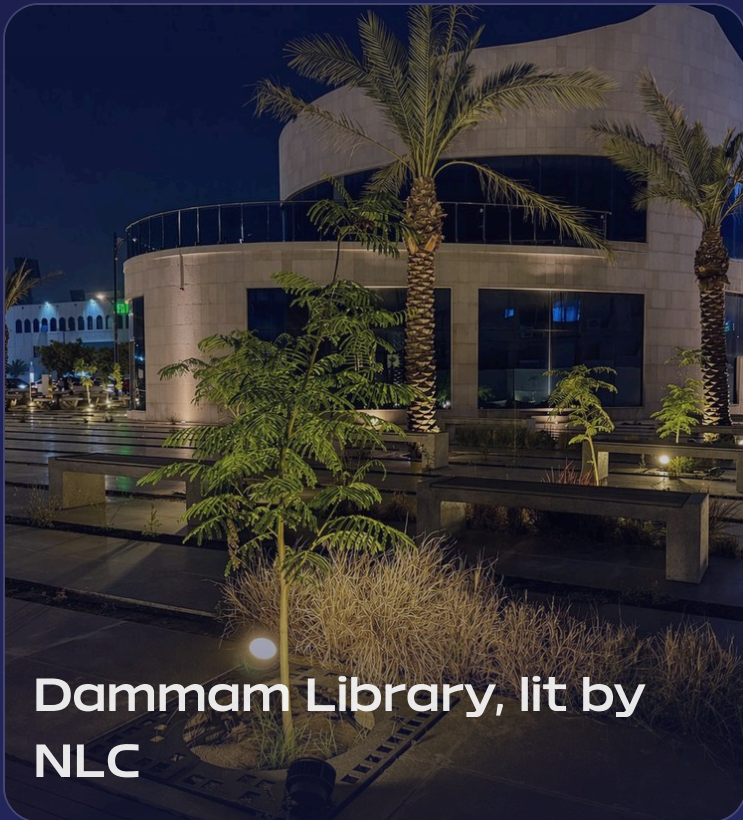




One source, eight finishes, LRV 85 down to 5. Each swatch carries the grey its own reflectance encodes to, and the returning arrow is drawn in proportion.

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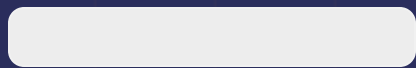
The luminaire is half the room.

The paint is the other half.

Two identical luminaires over two identical desks can hand you two different rooms, because the finish schedule was written by someone who never saw the lighting calculation. What LRV is, what it is not, and the lines to write.

The number

LRV is one number: **how much light comes back.**



LRV 85

Brilliant white

About as high
as
architectural
paint goes



LRV 60

Mid-tone

Still working
for you



LRV 30

**Feature
colour**

Most of the
light stops
here



LRV 10

Deep accent

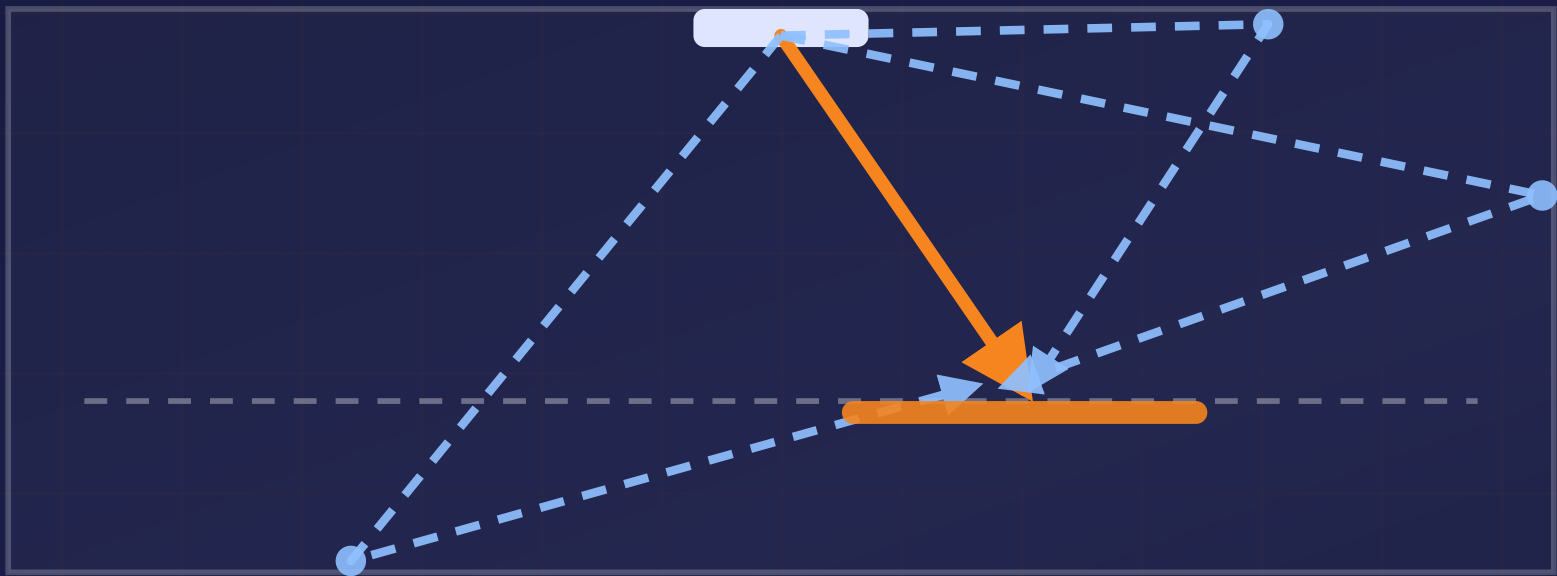
A light trap
wherever you
place it

- 1** LRV is the visible light a finished surface returns, on a 0 to 100 scale. It is measured on the finished surface using a stated method, not judged from a colour card. [1]
- 2** In lighting calculations, this is the surface reflectance: the CIE tristimulus Y value. [2]
- 3** An LRV of 100 represents a perfect diffuser; real paint does not reach it. Many brands publish no LRV at all, so ask for it or pay to measure it. [1]

LRV tells you how much visible light the surface returns.
Gloss tells you how that return is distributed. Specify both.

The system

You never light a task. You light a room that lights the task.



- 1** Direct: luminaire straight to the working plane.
- 2** Interreflected: everything arriving after a ceiling, wall or floor. Those surfaces are optical components. [5]

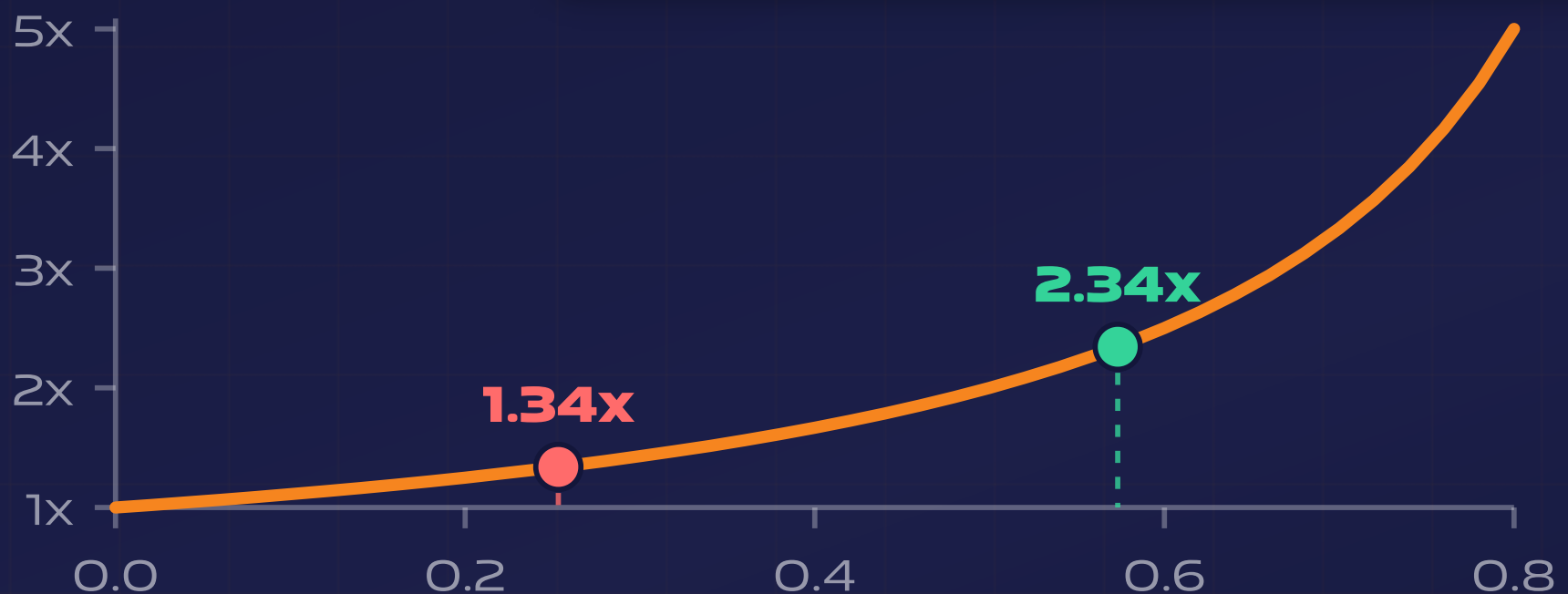
The split depends on room geometry, surface reflectances, luminaire distribution and the model's assumptions. Historical utilisation-factor tables put the interreflected share near a fifth to a quarter for one direct luminaire; illustrative only, not a figure to reuse. [5]

Repaint the room and you have re-specified the luminaire's world. **The photometric file did not change. The result did.** [6]

The mechanism

Every bounce that survives is added to the room.

⚠ Simplified illustration, not a calculation



Horizontal: area-weighted mean reflectance ρ · Vertical: flux amplification $1 / (1 - \rho)$

- 1 Light scheme: ceiling 0.80, walls 0.60, floor 0.30.
- 2 Dark scheme: ceiling 0.50, walls 0.20, floor 0.10. Same luminaires, same room.

Simplified closed-cavity illustration, one $8 \times 6 \times 3$ m room, perfectly diffuse surfaces assumed. Use the curve qualitatively; these values are not project data. [5]

How much you collect depends on where the luminaire throws its light. **A downlight barely feels the ceiling; an uplight lives on it.** [5]

The standard

The standard already tells you the reflectances.

Ceiling

0.70 - 0.90

Walls

0.50 - 0.80

Floor

0.20 - 0.60

Major objects

0.20 - 0.70

Each track runs 0 to 1, shaded in the greys those reflectances encode to.

- 1 BS EN 12464-1 recommends reflectance ranges for ceiling, walls and floor, plus one for major objects. Ranges to design inside, not single correct values. [4]
- 2 It also asks for maintained illuminance on the walls and ceiling in their own right, with a uniformity floor. [4]

A schedule outside these ranges is a legitimate choice. **It is not a legitimate surprise.**

The correction

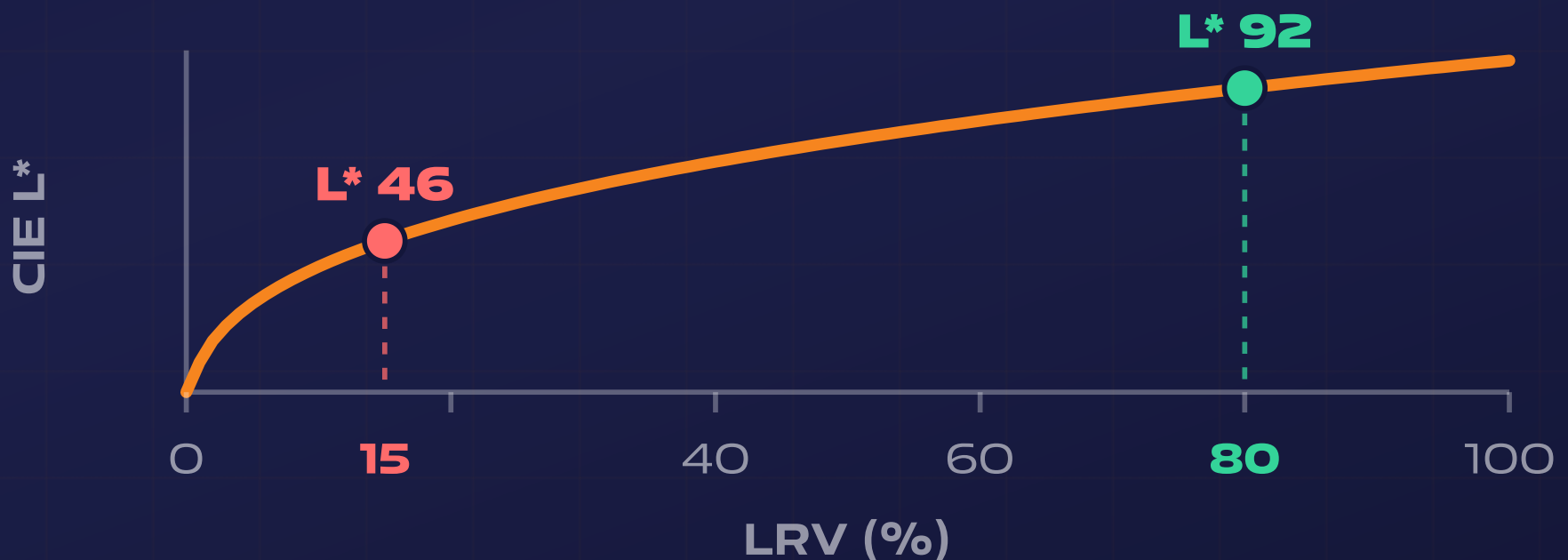
Bright walls do not lower the lux target. **They can lower the load.**

The claim to stop repeating

"Light walls mean we need less lux." BS EN 12464-1 lists its own reasons to raise or lower a maintained illuminance. Surface reflectance is on neither list. [4]

What is actually true

Bright walls can reduce the installed power required to achieve the same target illuminance, by raising the utilisation factor. [4][5]

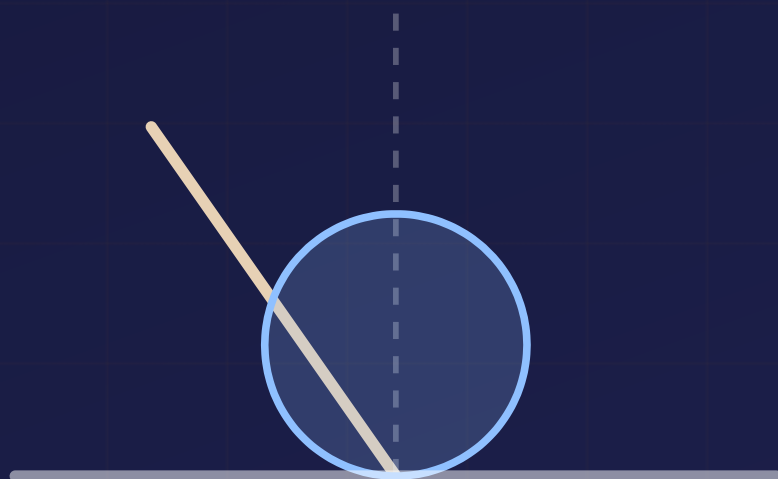


Appearance does not track reflectance either: CIE L* rises steeply at the dark end and flattens near white. [3]

Never write a percentage brighter. **Write the reflectances you assumed and the lux you must still achieve.**

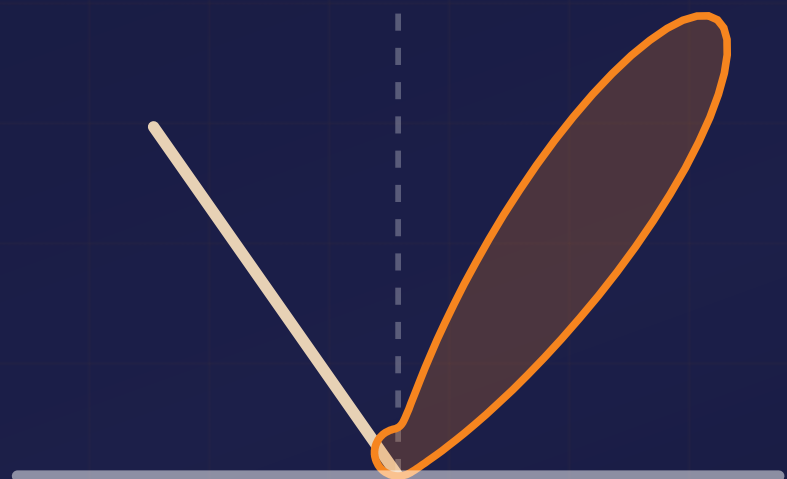
The second spec line

Same LRV, a completely different surface.



Matt

Diffuse reflection



Gloss

Specular reflection

1 Matt scatters close to a diffuse lobe, so the wall acts as an even area source.

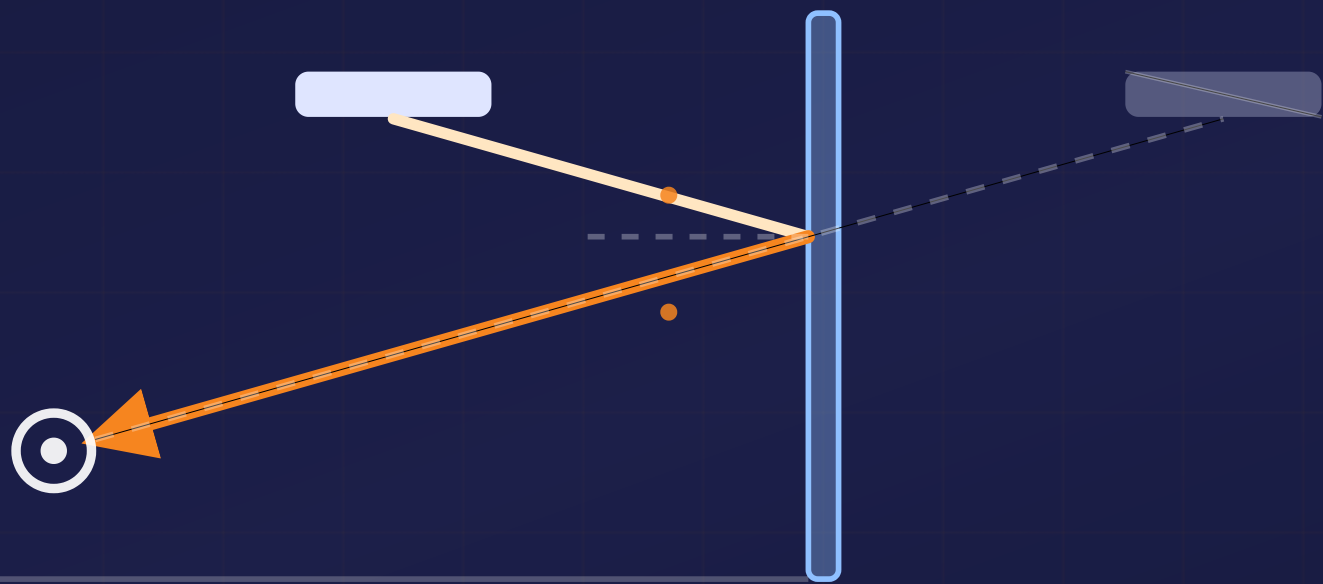
2 Gloss sends the same energy into a narrow specular lobe. Matt, satin and gloss are trade names, not standardised bands. [7][8]

Both lobes enclose the same area: with the specular component included, gloss barely changes the total returned, only its angular distribution. Quote gloss units and the angle. [7][8]

LRV tells you how much light the surface returns. **Gloss tells you how that return is distributed.** Specify both. [1][7]

The cost of sheen

Gloss creates no new light. It can create a second apparent source.



- 1** Where angle in equals angle out, the observer sees the source itself in the surface: small, very bright, high contrast.
- 2** That is reflected glare, treated separately from luminaire glare. UGR rates the luminaires in the field of view and cannot be used for reflected glare off surfaces. [9][10]

Matt or eggshell on large vertical surfaces, especially near screens. Keep gloss for trim and doors.

The surfaces everyone forgets

The ceiling pays you back. The floor quietly bills you.

Ceiling

The largest single reflector in most rooms [4]

Light floor

Contributes upward light to faces and can improve vertical illuminance

Deep carpet

Absorbs on the first hit, and often reads darker than the sample looked

- 1** A ceiling delivered with one coat missing, or in a different sheen from the sample, is a lighting change nobody logged. Check it at commissioning.
- 2** Floors sit at the bottom of the recommended range, and a floor that looks light can land below it. [4]

An on-site reading is an approximate in-situ reflectance unless the stated laboratory method and conditions are followed. Record the instrument, method, geometry and measurement conditions. [1]

A reflectance nobody verified is an assumption. Measure the surfaces you inherit.

The lifecycle

The lighting model expires when surface reflectances change materially.

At handover

The design met its numbers against a stated set of surface reflectances. Those were an input, and inputs belong in the record.

After a repaint

The lighting model must be reviewed whenever repainting materially changes surface reflectance, sheen, or another modelled property.



**LRV on the
colour schedule**



**Verified at
handover**

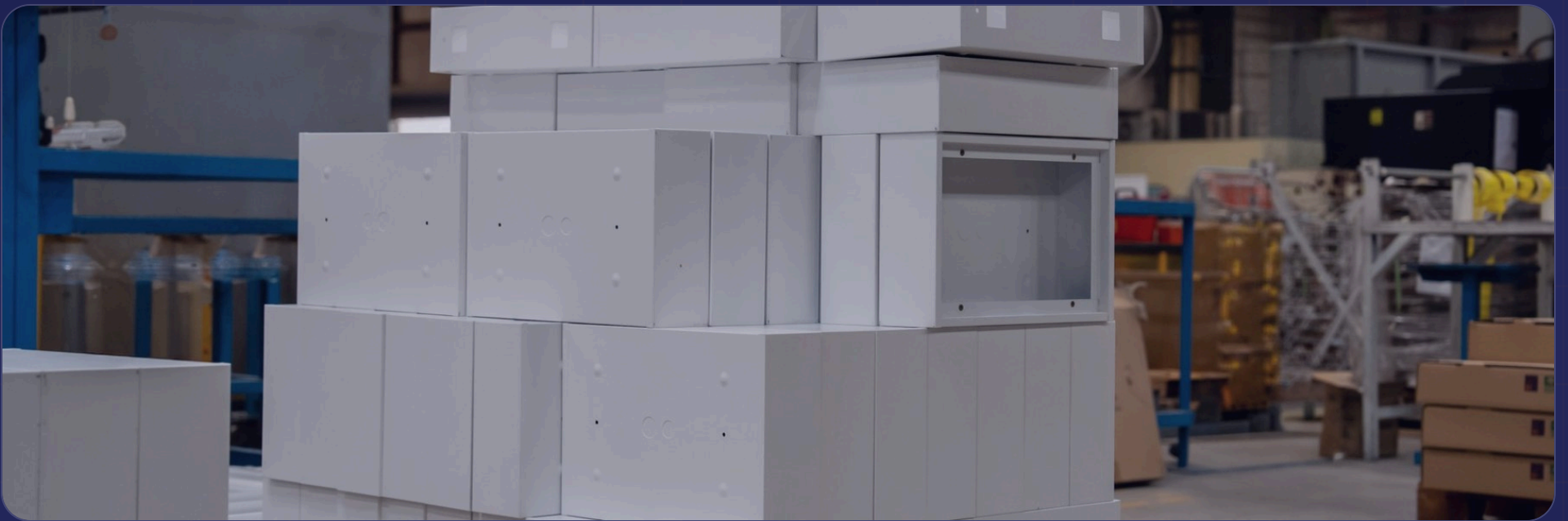


**Recorded in the
O&M manual**

Write the assumed reflectances into the O&M manual. The next tenant may change them, but not by accident.

From the Academy to the field

We completely control one finish: **the luminaire's own.**



NLC luminaire bodies off our own painting line: one finish we control end to end.

Fabrication and painting under one roof

NLC finishes its own luminaire bodies in-house, so the finish on the luminaire is a controlled input to the project rather than whatever arrived in the crate.

Ask for the number, not the colour name

For any surface that feeds the calculation, ask for a measured value against a stated method. A colour name is not a specification.

A finish you can measure is a finish you can specify.
Everything else is a preference.

Before you sign

Five lines that keep **the model honest.**

- ☐ Write the reflectance, not just the colour: **"walls: LRV 70 minimum"** beside the paint code. [1]
- ☐ Write the sheen as a **separate line**: gloss units at a stated angle per ISO 2813. [7][8]
- ☐ State the **reflectances the calculation assumed** for ceiling, walls, floor and major objects. [4]
- ☐ Ask for **measured values on the delivered batch**. Many brands publish no LRV at all. [1]
- ☐ Put the assumed reflectances in the **O&M manual**, so a future repaint is a decision, not an accident.

The sources

Key technical claims, **sourced.**

[1] BS 8493:2008+A1:2010, LRV of a surface, method of test

[2] CIE 015:2018, Colorimetry, 4th Edition

[3] ISO/CIE 11664-4:2019, CIE 1976 L*a*b* colour space

[4] BS EN 12464-1:2021, Lighting of work places, Part 1

[5] CIBSE TM5, Utilisation Factors, 1980 · **WITHDRAWN 2004**, historical illustration only

[6] BS EN 13032-1:2004+A1:2012, photometric data of luminaires

[7] ISO 2813:2014, gloss value at 20°, 60° and 85°

[8] ASTM D523-25, Standard Test Method for Specular Gloss

[9] ZVEI 2021, UGR method, application and limits

[10] CIE 117-1995, Discomfort Glare in Interior Lighting

Editions are current at publication except where marked WITHDRAWN. The interreflection charts are outputs of a stated model, not measurements. Full bibliography with publishers and URLs: nlc.com.sa/academy/painting-and-light.html

PRACTICAL LIGHTING ENGINEERING

**Save this. Send it to
whoever writes the finish
schedule.**



Read the full episode article

<https://nlc.com.sa/academy/painting-and-light.html>



Next episode
Fixture Lens Types