# Lighting evidence pack

Office fit-out – Central London (sample, anonymised)

- Lighting design to EN 12464-1:2021
- Lighting energy estimate for the energy model (EN 15193-1 method)
- Control strategy and zoning
- Emergency lighting to BS 5266-1 / EN 1838
- Luminaire schedule

**CALIBO**

calibo.co.uk | 01933 354994 | marketing@calibo.co.uk

This sample is based on a real Calibo design with client details removed.

1 PROJECT SUMMARY

# What was asked, and the result

The tenant of a 191 $m^2$ office floor asked for a lighting scheme that meets EN 12464-1:2021 in every space, keeps installed power and running energy low enough to support the building's energy-rating target, and provides emergency lighting to BS 5266-1. The pack below is what we hand to the design team, the energy modeller and the assessor.

| | |
|---|---|
| Floor area | **191 $m^2$** |
| Rooms designed | **11** |
| Luminaires | **38 (of which 14 with 3-hour emergency packs)** |
| Installed lighting load | **1169 W (6.1 W/$m^2$ overall)** |
| Lighting energy – with controls | **2,054 kWh/yr (10.7 kWh/$m^2$/yr)** |
| Lighting energy – lights simply on | **2,922 kWh/yr (15.3 kWh/$m^2$/yr)** |
| Saving from the control strategy | **30%** |
| EN 12464-1 targets met | **11 of 11 rooms** |
| Emergency (anti-panic) checks met | **11 of 11 areas** |

## How to read this pack

Section 2 shows each room against its EN 12464-1 target. Section 3 is the lighting layout with calculated light levels. Section 4 gives the lighting energy figures your energy modeller or assessor needs, with every assumption stated. Sections 5–7 cover controls, emergency lighting and the luminaire schedule. Section 8 lists the method and limitations.

2 RESULTS BY ROOM

# Every room meets its target

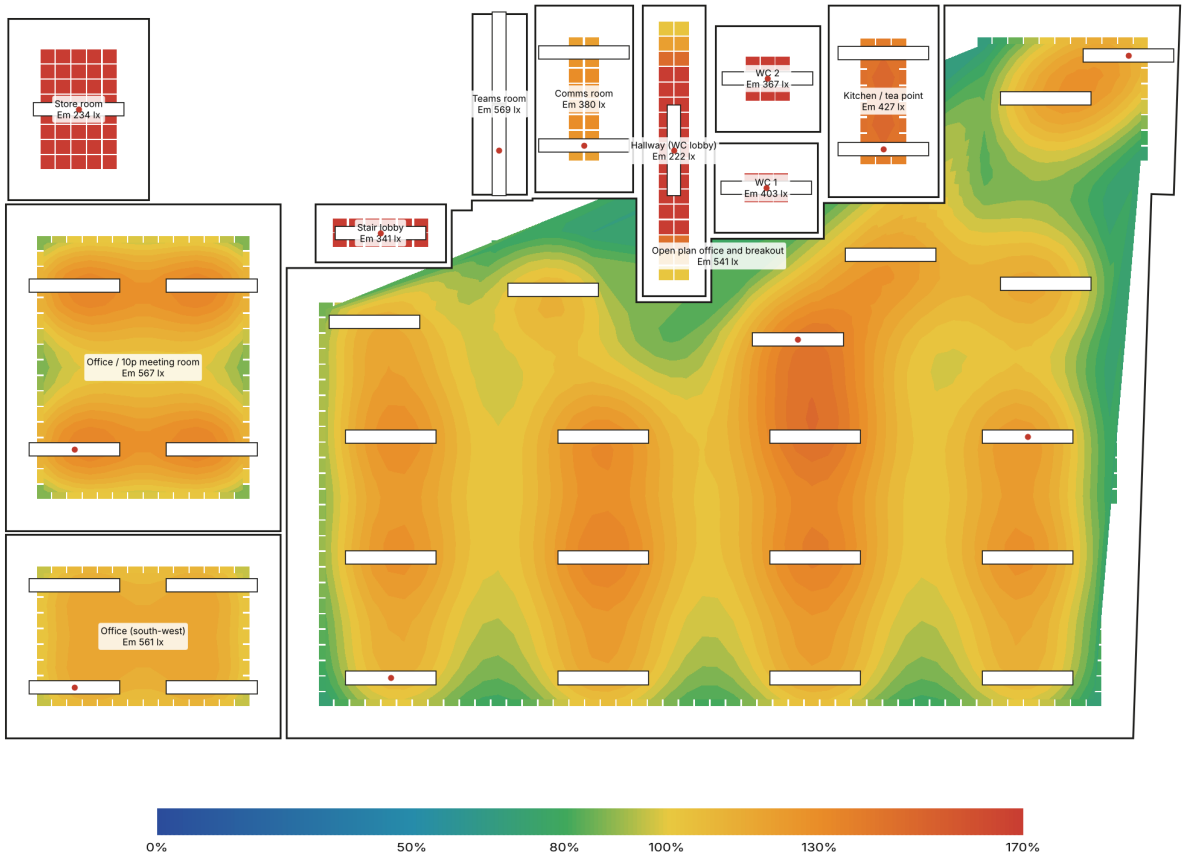
Maintained illuminance (Em) and uniformity (U0) on the working plane at 0.75 m, maintenance factor 0.8, reflectances ceiling 70% / walls 50% / floor 20%, with a 0.5 m border excluded as EN 12464-1 allows.

| Room | Task (EN 12464-1) | Area $m^2$ | Target Em / U0 | Achieved Em | Achieved U0 | Fittings | $W/m^2$ | Result |
|---|---|---|---|---|---|---|---|---|
| Open plan office and breakout | Writing, typing, reading, data processing | 123.2 | 500 lx / 0.6 | 541 lx | 0.62 | 19 × A | 5.7 | Pass |
| Office (south-west) | Writing, typing, reading, data processing | 14.3 | 500 lx / 0.6 | 561 lx | 0.85 | 4 × B | 6.9 | Pass |
| Office / 10p meeting room | Conference and meeting rooms | 22.9 | 500 lx / 0.6 | 567 lx | 0.77 | 4 × A | 6.4 | Pass |
| Store room | Store rooms | 6.5 | 100 lx / 0.4 | 234 lx | 0.76 | 1 × C | 2.9 | Pass |
| Stair lobby | Stairs | 1.9 | 150 lx / 0.4 | 341 lx | 0.93 | 1 × C | 10.0 | Pass |
| Teams room | Conference / video call | 2.5 | 500 lx / 0.6 | 569 lx | 0.92 | 2 × B | 19.7 | Pass |
| Comms room | Plant / switch rooms | 4.7 | 300 lx / 0.4 | 380 lx | 0.95 | 2 × C | 8.2 | Pass |
| Hallway (WC lobby) | Circulation areas | 4.6 | 100 lx / 0.4 | 222 lx | 0.46 | 1 × C | 4.1 | Pass |
| WC 1 | Toilets | 2.3 | 200 lx / 0.4 | 403 lx | 0.99 | 1 × C | 8.1 | Pass |
| WC 2 | Toilets | 2.8 | 200 lx / 0.4 | 367 lx | 0.98 | 1 × C | 6.8 | Pass |
| Kitchen / tea point | Kitchen / tea point | 5.4 | 300 lx / 0.4 | 427 lx | 0.95 | 2 × C | 7.1 | Pass |

Design note: the main working spaces are designed close to target rather than far above it, because over-lighting costs energy every hour the building is occupied. Small rooms with a single fitting sit above target; with DALI they are trimmed to the required level at commissioning.

# Layout and calculated light levels

Colours show light on the working plane as a percentage of each room's target. White bars are luminaires; red dots are luminaires fitted with emergency packs.



# Figures for the energy model

Estimated annual lighting energy using the EN 15193-1 approach: installed power × constant-illuminance factor × operating hours × occupancy (Fo) and daylight (Fd) factors. Result: **10.7 kWh/m$^2$/yr** with controls, against 15.3 kWh/m$^2$/yr with lights simply switched on – a 30% reduction.

| Room | Installed W | Control | Fo | Fd | kWh/yr (lights on) | kWh/yr (with controls) |
|---|---|---|---|---|---|---|
| Open plan office and breakout | 701 | Absence detection + daylight dimming (perimeter rows) | 0.9 | 0.8 | 1,753 | 1,164 |
| Office (south-west) | 99 | Absence detection + daylight dimming | 0.9 | 0.8 | 248 | 164 |
| Office / 10p meeting room | 148 | Absence detection + scene setting | 0.9 | 1.0 | 369 | 299 |
| Store room | 19 | Presence detection | 0.8 | 1.0 | 48 | 34 |
| Stair lobby | 19 | Presence detection, 10% standby level | 0.9 | 1.0 | 48 | 39 |
| Teams room | 50 | Absence detection + scene setting | 0.9 | 1.0 | 124 | 100 |
| Comms room | 38 | Presence detection | 0.8 | 1.0 | 95 | 69 |
| Hallway (WC lobby) | 19 | Presence detection, 10% standby level | 0.9 | 1.0 | 48 | 39 |
| WC 1 | 19 | Presence detection | 0.8 | 1.0 | 48 | 34 |
| WC 2 | 19 | Presence detection | 0.8 | 1.0 | 48 | 34 |
| Kitchen / tea point | 38 | Presence detection | 0.9 | 1.0 | 95 | 77 |
| **Total** | **1169** | | | | **2,922** | **2,054** |

## Assumptions

| | |
|---|---|
| Operating hours | 2250 h daytime + 250 h night-time per year (office use) |
| Constant illuminance factor (Fc) | 0.9 – output trimmed to the maintained level when new |
| Occupancy factor (Fo) | 0.9 absence/presence detection in occupied rooms; 0.8 in rarely used rooms |
| Daylight factor (Fd) | 0.8 for daylight-dimmed perimeter zones; 1.0 elsewhere |
| Not included | Parasitic energy (emergency charging and control standby) – added from the selected products' data at detailed design |

These are design-stage estimates for the energy model. Actual use depends on occupancy, commissioning and how the building is run – which is why the controls are commissioned and set up before handover.

5 CONTROLS

# Control strategy and zoning

The controls are where most of the energy saving comes from, so they are designed alongside the layout rather than added later.

| Zone | Control | Notes |
|---|---|---|
| Open plan office and breakout | Absence detection + daylight dimming (perimeter rows) | Perimeter rows on a separate daylight zone |
| Office (south-west) | Absence detection + daylight dimming | Auto-off after 15 min without movement |
| Office / 10p meeting room | Absence detection + scene setting | Manual scene override at the door |
| Store room | Presence detection | Auto-off after 15 min without movement |
| Stair lobby | Presence detection, 10% standby level | Auto-off after 15 min without movement |
| Teams room | Absence detection + scene setting | Manual scene override at the door |
| Comms room | Presence detection | Auto-off after 15 min without movement |
| Hallway (WC lobby) | Presence detection, 10% standby level | Auto-off after 15 min without movement |
| WC 1 | Presence detection | Auto-off after 15 min without movement |
| WC 2 | Presence detection | Auto-off after 15 min without movement |
| Kitchen / tea point | Presence detection | Auto-off after 15 min without movement |

All luminaires DALI dimmable; lighting on its own sub-meter so the energy rating can be checked in use.

6 EMERGENCY LIGHTING

# Emergency lighting

14 luminaires fitted with 3-hour emergency packs (emergency output taken as 10% of normal). Open areas are checked to EN 1838 anti-panic criteria: at least 0.5 lx on the floor with a max/min ratio of no more than 40:1.

| Area | Min lx | Max lx | Max/min | Result |
|---|---|---|---|---|
| Open plan office and breakout | 0.7 | 24.6 | 33.0 | **Pass** |
| Office (south-west) | 2.1 | 19.9 | 9.3 | **Pass** |
| Office / 10p meeting room | 1.3 | 28.5 | 21.5 | **Pass** |
| Store room | 11.0 | 15.3 | 1.4 | **Pass** |
| Stair lobby | 13.0 | 14.8 | 1.1 | **Pass** |
| Teams room | 7.2 | 15.5 | 2.1 | **Pass** |
| Comms room | 6.2 | 12.2 | 2.0 | **Pass** |
| Hallway (WC lobby) | 5.5 | 17.7 | 3.3 | **Pass** |
| WC 1 | 17.0 | 17.3 | 1.0 | **Pass** |
| WC 2 | 16.2 | 16.8 | 1.0 | **Pass** |
| Kitchen / tea point | 6.4 | 15.3 | 2.4 | **Pass** |

7 LUMINAIRE SCHEDULE

# Luminaire schedule

| Type | Description | Output | Power | Efficacy | Qty | With EM pack |
|---|---|---|---|---|---|---|
| A | LED linear, opal diffuser, 1450 mm, 4000K, CRI 80+, DALI | 4,423 lm | 36.9 W | 120 lm/W | 23 | 5 |
| B | LED linear, opal diffuser, 1450 mm (reduced output), 4000K, CRI 80+, DALI | 3,089 lm | 24.8 W | 125 lm/W | 6 | 2 |
| C | LED linear, opal diffuser, 1450 mm (low output), 4000K, CRI 80+, DALI | 2,395 lm | 19.1 W | 126 lm/W | 9 | 7 |

One luminaire family in three outputs keeps the ceiling consistent and simplifies spares and maintenance. Photometric files (LDT/IES) and data sheets are supplied with the full pack.

8 METHOD AND LIMITATIONS

# How the figures were produced

– Rooms taken from the architect’s drawing on the inner wall faces; open plan treated as one space.

– Point-by-point calculation on a grid at the working plane using the manufacturer’s photometric data, with an estimated inter-reflected component.

– Final compliance is confirmed in DIALux evo; the DIALux model (IFC) is supplied with the pack for the design team.

– Glare (UGR) is confirmed in DIALux for the selected luminaire and room geometry.

– Energy figures follow the EN 15193-1 approach with the assumptions in section 4 and should be read alongside the building energy model.

## What the full pack includes

This report · layout drawing and DXF overlay on your drawings · DIALux model · luminaire positions (CSV) · photometric files · data sheets · emergency layout · supply quotation on request.

**Calibo Lighting** – calibo.co.uk – 01933 354994 – marketing@calibo.co.uk