

IP65 DOWNLIGHT APPLICATION IN BATHROOM CASE STUDY

VISUAL RESULTS OF CASE STUDY



IP65 Downlight:

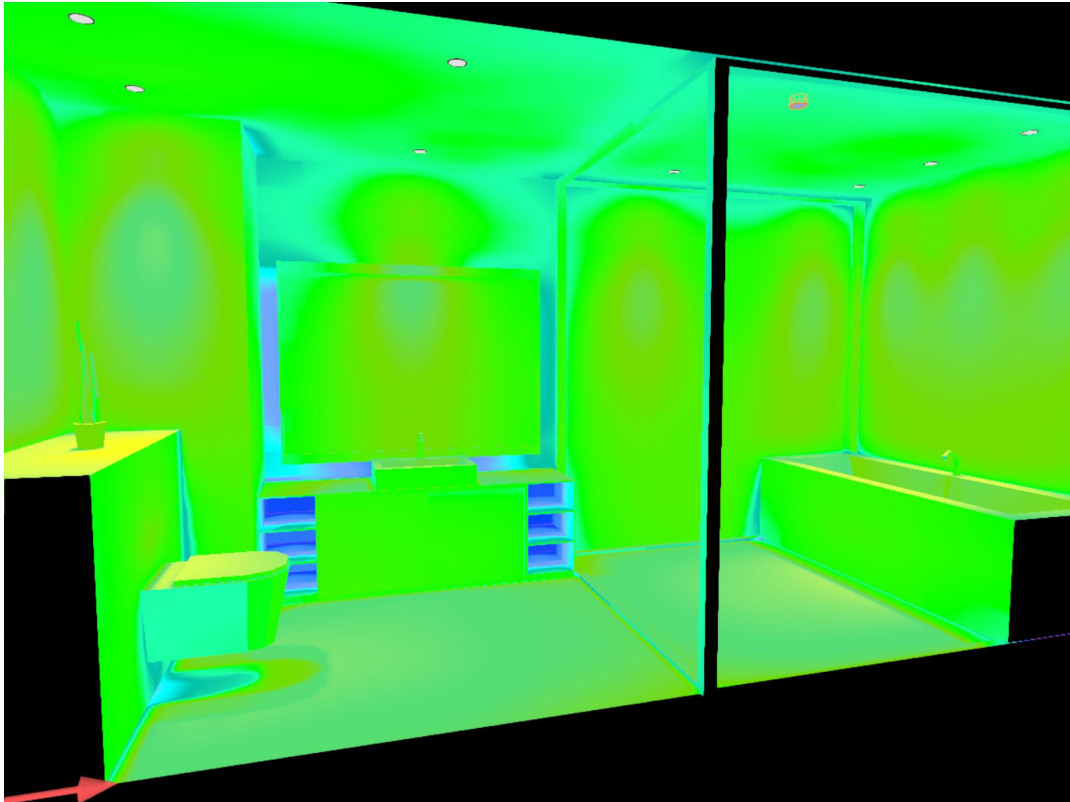
5W LED, 640lm, 4000K, D80x40mm



Bathroom view with applying luminaires



Bathroom view with light distribution curves



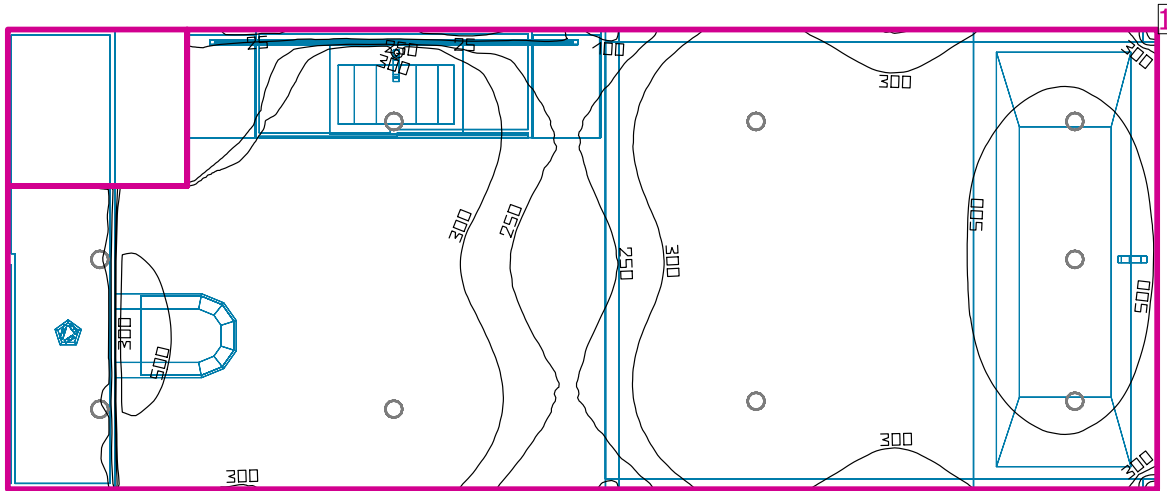
Bathroom view with luminance isolines

IP65 DOWNLIGHT APPLICATION IN BATHROOM CASE STUDY

TECHNICAL ANALYSIS OF BATHROOM CASE STUDY

IP65 Downlight:

5W LED, 640lm, 4000K, D80x40mm



Height of room: 2.500 m, Reflection factors: Ceiling 84.4%, Walls 45.6%, Floor 45.6%, Light loss factor: 0.80

Workplane

Surface	Result
1 Workplane	Perpendicular illuminance [lx] Height: 0.800 m, Wall zone: 0.000 m
	Average (Target) Min Max Min/average Min/max
	353 (≥300) 1.02 688 0.00 0.00

No. 1 Quantity 9

5W IP65 Downlight
 Light output ratio: 100.67%
 Lamp luminous flux: 643 lm
 Luminaire luminous flux: 647 lm
 Power: 5.0 W
 Luminous efficacy: 129.5 lm/W

Colorimetric data
 5W LED Downlight:
 CCT 4000 K, CRI 80

Total lamp luminous flux: 5787 lm,

Total luminaire luminous flux: 5823 lm, Total Load: 45.0 W,

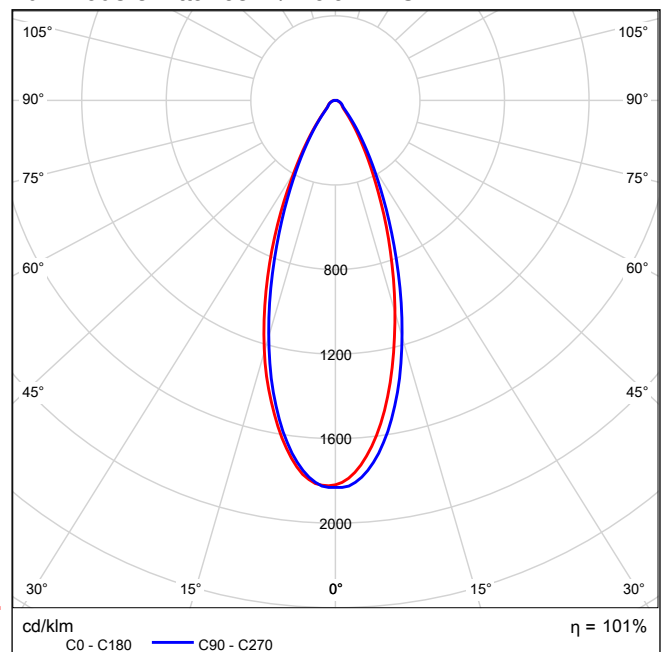
Luminous efficacy: 129.4 lm/W

Lighting power density: 4.50 W/m² = 1.27 W/m²/100 lx

(Ground area 10.00 m²)

Consumption: 37 kWh/a of maximum 400 kWh/a

Luminous emittance 1 / Polar LDC



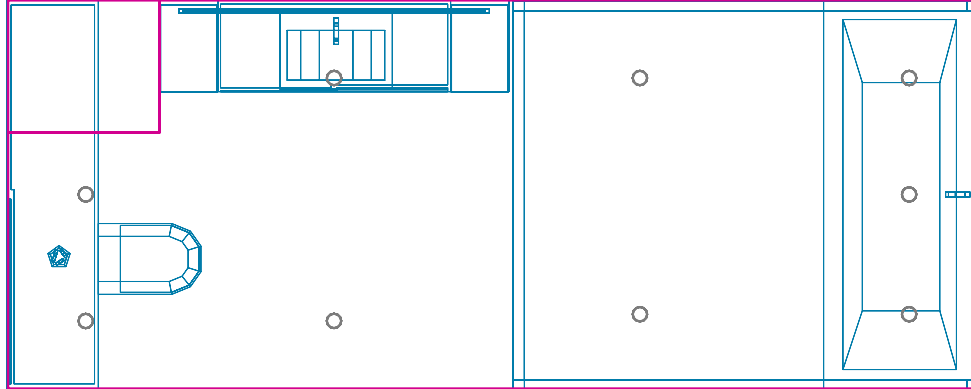
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TECHNICAL ANALYSIS OF BATHROOM CASE STUDY

IP65 Downlight:

5W LED, 640lm, 4000K, D80x40mm

Workplane 1 / Perpendicular illuminance (adaptive)

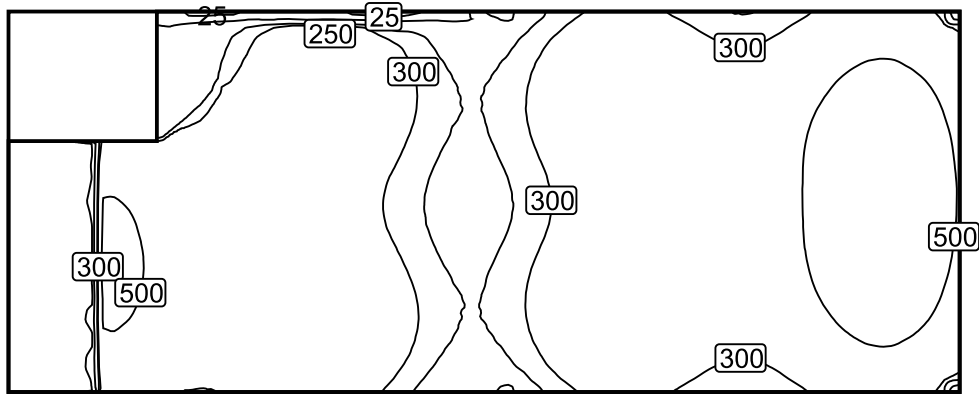


Workplane 1: Perpendicular illuminance (adaptive) (Surface)

Light scenes: 1

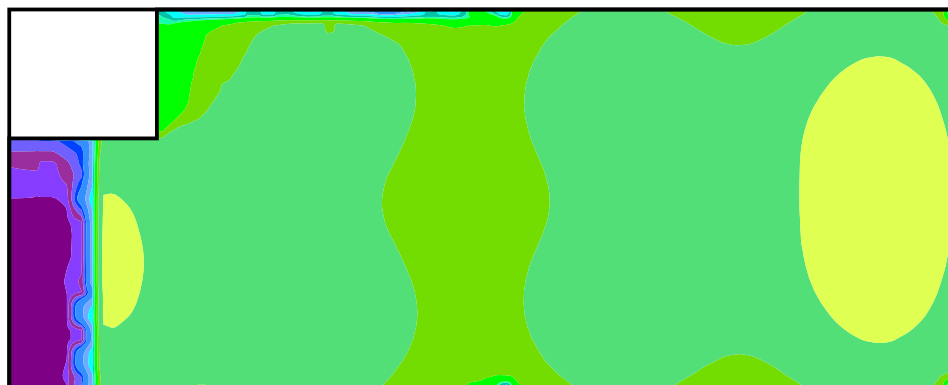
Average: 353 lx (Target: ≥ 300 lx), Min: 1.02 lx, Max: 688 lx,
Min/average: 0.00, Min/max: 0.00 Height: 0.800 m, Wall zone: 0.000 m

Isolines [lx]

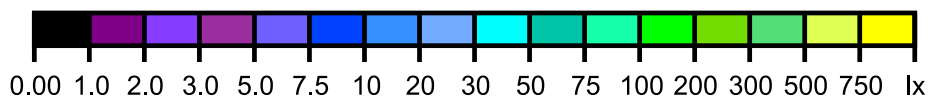


Scale: 1 : 50

False colors [lx]



Scale: 1 : 50

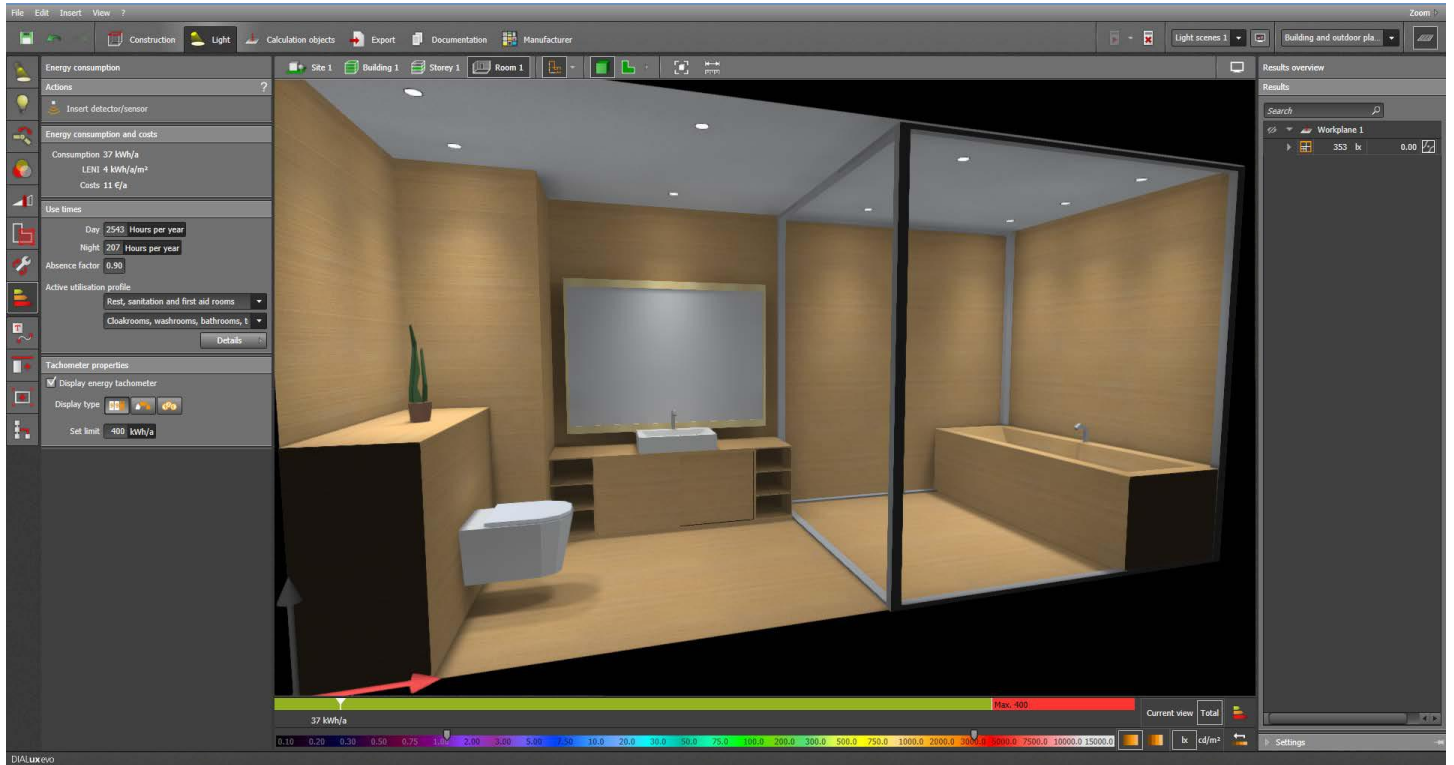


IP65 DOWNLIGHT APPLICATION IN BATHROOM CASE STUDY

ENERGY CONSUMPTION AND COST ANALYSIS OF BATHROOM CASE STUDY

IP65 Downlight:

5W LED, 640lm/W, 4000K, D80x40mm



IP65 DOWNLIGHT APPLICATION IN BATHROOM CASE STUDY

TABLE OF RESULTS FOR BATHROOM CASE STUDY

POWER	5.0 W
LAMP LUMINOUS FLUX	643 lm
LUMINAIRE LUMINOUS FLUX	647 lm
LUMINOUS EFFICACY	129.5 lm/W
LIGHT OUTPUT RATIO	100.67 %
TOTAL LAMP LUMINOUS FLUX	5787 lm
TOTAL LUMINAIRE LUMINOUS FLUX	5823 lm
TOTAL LOAD	45.0 W
ENERGY CONSUMPTION	37 kWh/a
COSTS	11 €/a
LUX MEAN VALUE (TARGET FOR OFFICE=300lx)	353 lx

STUDY CONCLUSION:

This case provides an efficient solution, which leads to low energy consumption and thus low cost at an annual basis.

The Lux requirement for bathroom lighting application, is met by being included in the desired range of 300-400lx. In this case study, the light is evenly distributed around the room and shades and glare are avoided especially on the working planes of the bathtub and sink cabinet. In general, this requirement is set to ensure a better environment by providing psychological comfort to the occupants.

The LED technology ensures lower consumption in principle, but the technical analysis provided is the clear proof that this case study is leading to a sustainable solution for the investment's finance as well as the environmental impact.

The costs are calculated by considering the operating time to be 2453 hours per annum for daily use and 207 hours per annum for nightly use.