

Patient room planning example

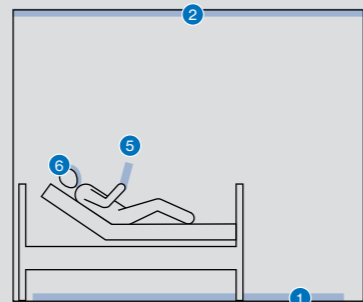
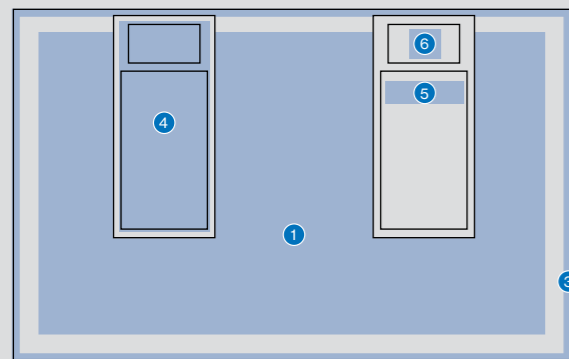
The lighting in a patient's room must meet many requirements. We selected two RECOVER PRO units of 1350mm length in this example. The minimum requirements of the lighting standard are only sufficient to fulfil the visual task in question. Since the biological light effect especially contributes to patients' healing success, significantly higher illuminance levels are available at the patient's eye in this example.

In this case, the biologically necessary vertical illuminance and age-related correction factors are considered. The RECOVER luminaires run a full day's curve, from dawn to dusk in the room. This activates patients in the morning and relaxes them in the evening.

Lighting standard EN 12646-1 minimum requirement

- Floor, wall, and ceiling with minimum illuminance of 100 lx, 75 lx, and 50 lx
- Size of reading range defined in DIN 5035-3, minimum 300 lx
- 300 lx at the examination level, at a height of 85 cm for simple examinations
- 1000 lx at the examination level, at a height of 85 cm for examinations and treatments, with a colour rendering of $R_a \geq 90$
- Glare limitation $UGR \leq 19$

Specifications



Measured surfaces

- 1 Floor
- 2 Ceiling
- 3 Walls
- 4 Examination level
- 5 Reading area
- 6 Visual field

Room dimensions twin room:

5,66 × 3,6 m
Ceiling height: 3 m
Luminaire height: 1,80 m

Reflection

Floor 40 %, walls 80 %, ceiling 90 %
Maintenance factor: 0.8

MEDI lux – what biological illuminance is required vertically at the resident's eye?

According to DIN SPEC 67600, 250 MEDI lux (Melanopic Equivalent Daylight Illuminance) must be present vertically on the eye for at least four hours in the mornings. MEDI lux is the melanopic and daylight equivalent assessed illuminance.

How does one convert to visual lux?

In our example we assume 4000K with a MR of 0.75. First, the assumed 250 MEDI lux are divided by the melanopic effect factor of $MR = 0.75$ [$250 / 0.75 = 333 \text{ lx}$]. To arrive at the daylight equivalent illuminance, the result is then multiplied by the constant daylight correction factor of 1.103 [$333 \text{ lx} \times 1.103 = 368 \text{ lx}$]. This 368 lx is the biologically necessary vertical illuminance for a 32-year-old observer.

DIN SPEC 5031-100 has two age-specific correction factors. Multiplying both factors produces 0.664. For a 50-year-old observer, 554 lx vertical illuminance is calculated [$368 \text{ lx} / 0.664 = 554 \text{ lx}$].

The age-specific correction factors for a 75-year-old observer result in a factor of 0.319. Thus, 1153 lx vertical illuminance is calculated [$368 \text{ lx} / 0.319 = 1153 \text{ lx}$].

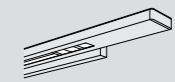
In this example, there is sufficient vertical illuminance for a 75-year-old patient.

RECOVER PRO

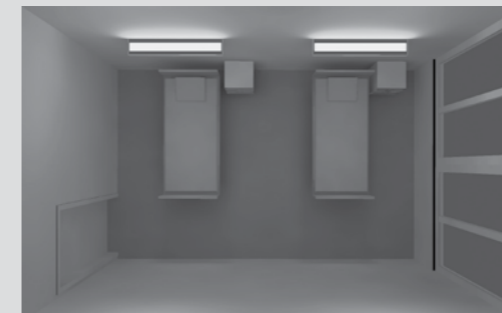
Ambient light / 5500K activating light mood, in the mornings for at least four hours



RECOVER PRO wall



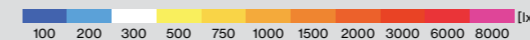
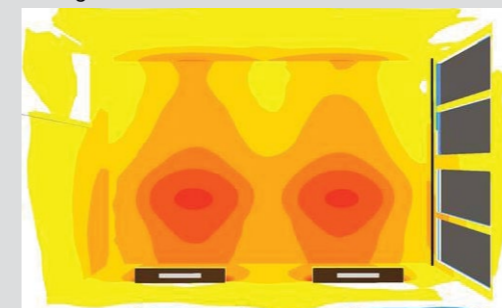
Ambient light / 2500K relaxing lighting mood, in the evenings



Ambient & examination light



Ceiling soffit



Number	Luminaire
2	RECOVER PRO 1350 / 2200K – 31000K - ambient light 14600 lm (160 W) - examination light 1969 lm (35 W) - reading light 626 lm (12 W) - nurse night light 2 × 147 lm (2 × 2.3 W)



Measured surface	Standard requirement (EN 12464-1)	Luminous intensity (calculated at 4000K ambient & examination light)
1 Floor	E_m 100 lx	E_m 662 lx
2 Ceiling	E_m 50 lx	E_m 1348 lx
3 Walls (ø of all walls)	E_m 75 lx	E_m 756 lx
4 Examination level a) simple examination b) examination & treatment	E_m 300 lx E_m 1000 lx	☑ E_m 1199 lx
5 Reading area	E_m 300 lx	E_m 364 lx (reading light)
6 Visual field - for communication - biologically effective	E_m 150 lx	E_m 1292 lx
		Recommendation (DIN SPEC 67600/5031-100)
a) 32-year-old patient	$E_m \geq 368 \text{ lx}$	☑
b) 50-year-old patient	$E_m \geq 554 \text{ lx}$	☑
c) 75-year-old patient	$E_m \geq 1153 \text{ lx}$	☑