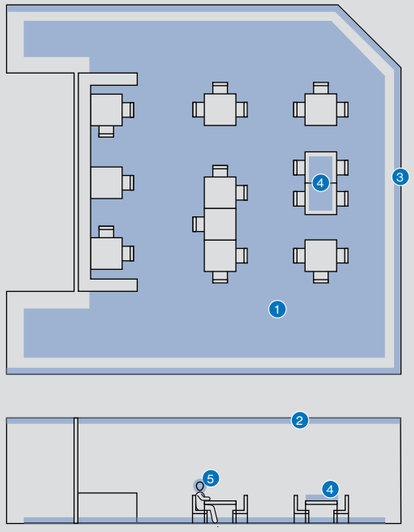
Recreation room planning example

A recreation room's lighting must meet many requirements. Since care home residents usually spend a lot of time in the recreation room, we selected an HCL design in this example. Human Centric Lighting meets both the minimum requirements for the respective visual task and also fulfils biological needs, in our case those of 75-year-old residents. Furthermore, emotional lighting components must also be available. To meet emotional needs, we have chosen a dynamic lighting control system that offers a very high colour rendering of $R_a / R_e \geq 90$ across all colour temperatures. On the walls, narrow-beam CWD spotlights produce a cosy atmosphere at off-peak times.

Lighting standard EN 12646-1 minimum requirement

- Floor, wall, and ceiling with minimum illuminance of 200 lx, 75 lx and 50 lx
- 200 lx are required in the visual task area
- As the recreation room is a communication room, cylindrical illuminance of E_z 150 lx is required
- Glare limitation UGR ≤ 22

Specifications



Measured surfaces
1. Floor
2. Decke
3. Wände
4. Nutzebene
5. Gesichtsfeld

Recreation room dimensions
Floor area: 114,39 m²
Ceiling height: 3 m
Luminaire height: LINEA system 2,05 m / VELA 2,3 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 4000 K 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 lx]. To arrive at the daylight equivalent illuminance, the result is then multiplied by the constant daylight correction factor of 1.103 [333 lx × 1.103 = 368 lx]. This 368 lx is the biologically necessary vertical illuminance for a 32-year-old observer.

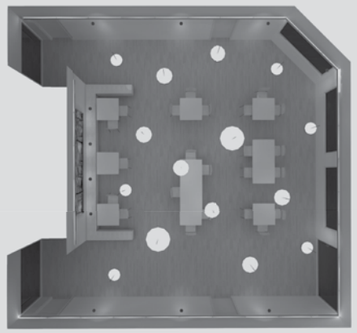
DIN SPEC 5031-100 has age-specific correction factors for lens opacity and pupil constriction. Multiplied by this, the factor for a 75-year-old observer is 0.319. For a 75-year-old observer, 1153 lx of vertical illuminance is calculated [368 lx / 0.319 = 1153 lx].

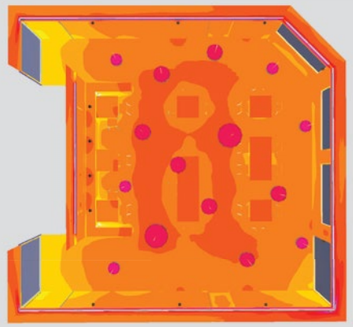
In this example, there is enough vertical illuminance for a 75-year-old resident.

LINEA | VELA | SASSO PRO

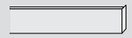
5500 K activating light atmosphere, in the mornings for at least four hours

2500 K relaxing lighting mood, in the evenings





LINEA system
wall



VELA 450 / 600 / 900
suspended

SASSO PRO 100
recessed

Number	Luminaire
35	LINEA system biodynamic (indirect 15° + 30°), 9327 lm (92 W) | XCS
7	VELA 450 (direct/indirect), TW, 4975 lm (7 W / 27 W)
5	VELA 600 (direct/indirect), TW, 8546 lm (14 W / 45 W)
3	VELA 900 (direct/indirect), TW, 15524 lm (25 W / 71 W)
12	SASSO PRO 100, CWD, 1412 lm (14.5 W)

Measured surface	Standard requirement (EN 12464-1)	Luminous intensity (calculated at 4000 K)
1 **Floor**	E_m 200 lx	E_m 1671 lx
2 **Ceiling**	E_m 50 lx	E_m 1968 lx
3 **Walls** (ø of all walls)	E_m 75 lx	E_m 1586 lx
4 **User level** (table 0.8 m)	E_m 200 lx	E_m 2199 lx
5 **Visual field** seated position - for communication	E_m 150 lx	E_m 1452 lx
- biologically effective for:	**Recommendation** (DIN SPEC 67600 / 5031-100)	
≤ 75-year-old patient	$E_m \geq 1153$ lx	✓