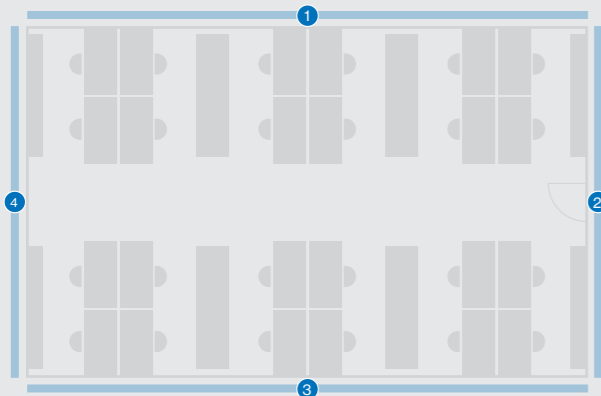


Multi-person office planning example

Room acoustics have a major influence on our well-being and performance. Because noise and disturbing sounds impair concentration and cause stress, one of the central challenges in planning is to create a quiet and balanced acoustic working atmosphere. This is especially true for open-plan and multi-person offices. Since people work here and communicate with each other, the room acoustics must reconcile the two conflicting needs of quiet and communication. In addition to the general volume, reverberation and sound propagation must be reduced to minimise distractions.

On the following pages you will find a selection of different light and acoustic simulations in a typical multi-person office with common structural conditions. It is a 112 m² office space, divided into six working clusters with four employees each. The group areas are divided by sideboards. Both strict grid arrangements and freely placed acoustic elements are simulated. Lighting and acoustic elements were either combined as separate products or used as a joint solution.

Specifications



Acoustic requirements

According to DIN 18041, office spaces fall into room group B4 (rooms requiring noise reduction and room comfort). Thus, the necessary attenuation is specified based on the A/V ratio (ratio of absorption area A to room volume V). VDI 2569 also gives recommendations for the reverberation time and the interference sound level of on-site noises. Depending on the values achieved, the VDI thus classifies rooms into room acoustics classes A, B, and C.

- A/V ratio ≥ 0.23
- Reverberation time $T_{\text{max}} 0.7$ s (room acoustics class B)
- Noise level $L_{\text{NA,Bau}} < 40$ dB (room acoustics class B)

Lighting requirements

- Lighting standard EN 12646-1 minimum requirement
- Illuminance in the visual task area: 500 lx
- Uniformity: ≥ 0.6
- Good glare control: $\text{UGR} \leq 19$
- Luminance: < 3000 cd/m²

Room

24 employees
6 working islands of four persons each
Area: 112 m²
Ceiling height: 3 m
Volume: 336 m³

Equipment

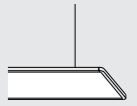
- 1 Exterior wall with smooth plaster and window strip
- 2 Interior wall plasterboard with wooden door
- 3 Interior wall plasterboard
- 4 Exterior wall with smooth plaster

Ceiling: plasterboard
Stone floor
24 filing cabinets (triple height)
24 tables, 24 office chairs

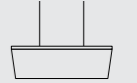
TASK



TASK
suspended



TASK square
acoustic module
suspended



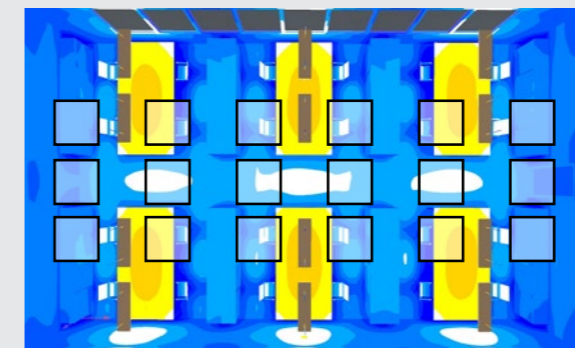
TASK is our ultra-slim office luminaire series with the highest demands on lighting quality. The particularly flat TASK 1200 linear luminaire provides excellent glare-free, standard-compliant workplace lighting. An additional proportion of indirect light brightens up the ceiling, creating a pleasant visual environment while working at the screen. The TASK Acoustic Square acoustic elements can be arranged to form a highly effective grid above the centre of the room. Thus, traffic noise around the corridor is also effectively absorbed near the source.

Planned products:

12 × TASK 1200 suspended direct/indirect
18 × TASK acoustic square 1200 suspended

Lighting planning

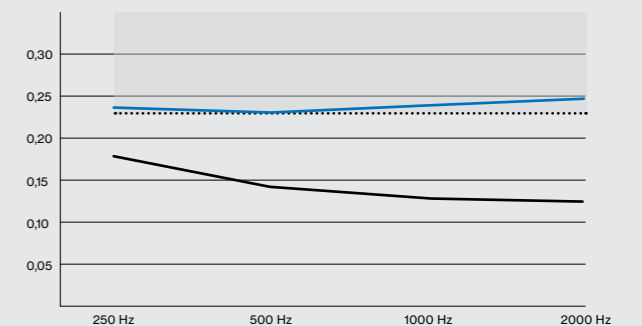
- Illuminance in the field of vision: $E_m 719$ lx
- Uniformity in the field of vision: $U_0 0.65$
- Glare reduction (viewer): $\text{UGR} \leq 17$
- Lamp luminance: < 3000 cd/m²



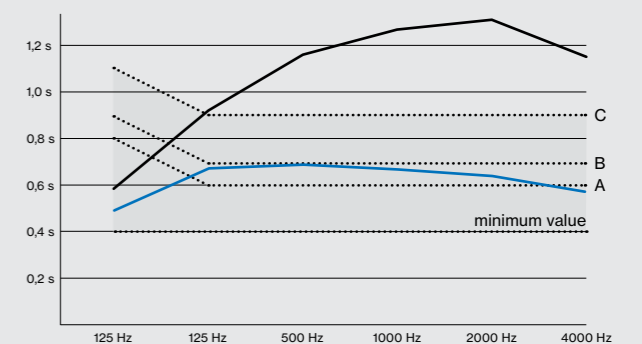
0,1 75 100 150 200 300 500 750 1000 1500 2000 3000 [lx]

Acoustics planning

- A/V ratio: ≥ 0.23
- Average reverberation time: 0.64 s
- Room acoustics class B



..... min. A/V ratio ■ target area
— A/V ratio without acoustic elements — A/V ratio TASK

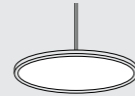


..... max. reverberation time class A, B, C ■ target area
— reverberation time without acoustic elements — reverberation time TASK

TASK round



TASK 450 / 600
suspended



TASK round
acoustic module
suspended



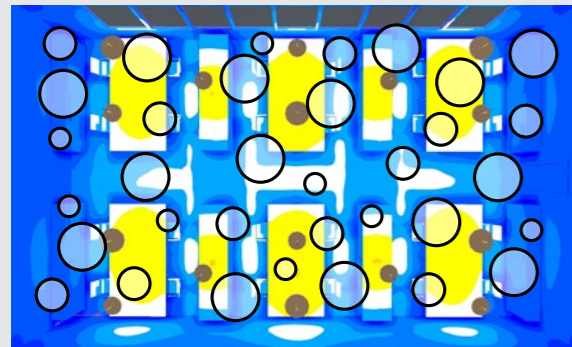
TASK Round is a minimalist circular luminaire that can be freely positioned, thus allowing immense design diversity. Combined with likewise round, highly effective acoustic panels of various diameters, decorative structures and arrangements can be created. Custom colouring further extends the design scope. In addition to standard-compliant, well glare-reduced task lighting, TASK Round emits indirect light to the ceiling, creating a visually pleasant working environment.

Planned products:

16 x TASK round 1600 / 450 suspended direct/indirect
29 x TASK acoustic round 1200 / 900 / 600 suspended

Lighting planning

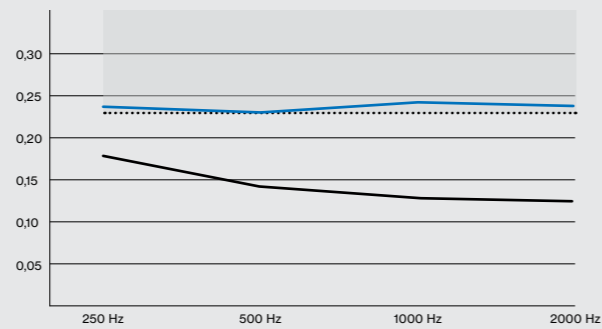
- Illuminance in the field of vision: E_m 601 lx
- Uniformity in the field of vision: U_o 0.68
- Glare reduction (viewer): $UGR \leq 18$
- Lamp luminance: $< 3000 \text{ cd/m}^2$



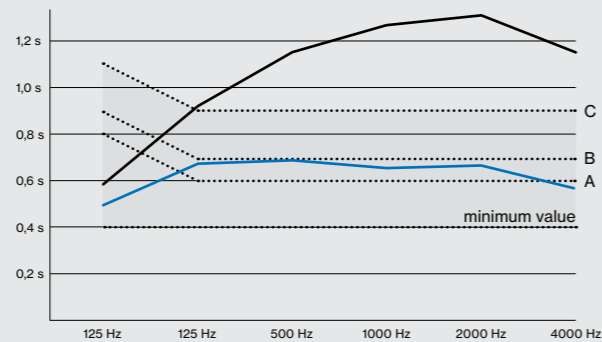
0,1 75 100 150 200 300 500 750 1000 1500 2000 3000 [lx]

Acoustics planning

- A/V ratio: ≥ 0.23
- Average reverberation time: 0.64 s
- Room acoustics class B



..... min. A/V ratio ■ target area
— A/V ratio without acoustic elements — A/V ratio TASK

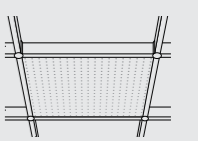


..... max. reverberation time class A, B, C ■ target area
— reverberation time without acoustic elements — reverberation time TASK

MOVE IT 45



MOVE IT 45
suspended



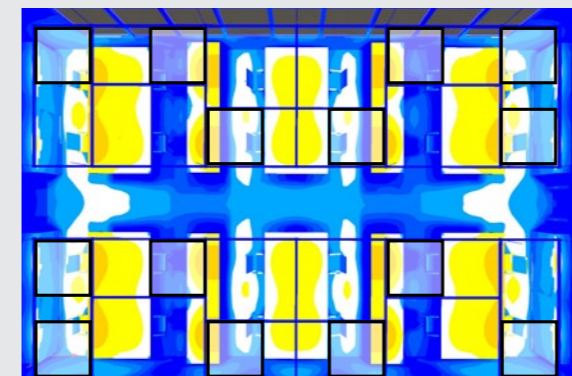
As a track system, MOVE IT 45 can be adapted to individual office situations as needed. Different lighting inserts can be combined as required in the 45 mm narrow track: e.g., special lighting optics for use in offices that provide glare-free light and protects the eyes, with spotlights, wallwashers, or decorative luminaires. In this way, the impression of the room and the architectural design can be changed as desired. The square MOVE IT Acoustic 1200 acoustic elements can be inserted into the track system from behind – for easy-to-implement, visually appealing, and optimised room acoustics.

Planned products:

MOVE IT 45 tracks of various lengths (with indirect component) with 16 x L24 inset
14 x MOVE IT acoustic square

Lighting planning

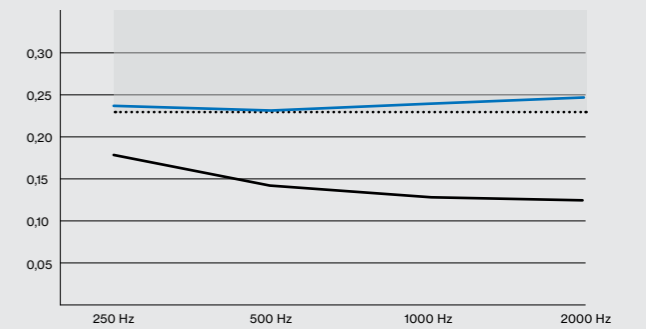
- Illuminance in the field of vision: E_m 685 lx
- Uniformity in the field of vision: U_o 0.72
- Glare reduction (viewer): $UGR \leq 17$
- Lamp luminance: $< 3000 \text{ cd/m}^2$



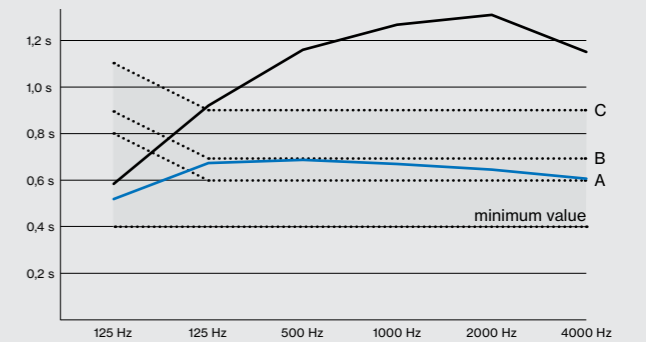
0,1 75 100 150 200 300 500 750 1000 1500 2000 3000 [lx]

Acoustics planning

- A/V ratio: ≥ 0.23
- Average reverberation time: 0.65 s
- Room acoustics class B



..... min. A/V ratio ■ target area
— A/V ratio without acoustic elements — A/V ratio MOVE IT

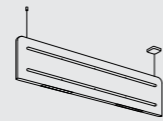


..... max. reverberation time class A, B, C ■ target area
— reverberation time without acoustic elements — reverberation time MOVE IT

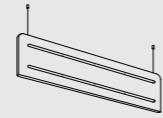
MUSE



MUSE single light suspended



MUSE baffle suspended



MUSE desk high



The MUSE product family is designed specifically for spaces where people communicate and work together. In addition to glare-free workplace lighting, MUSE ensures optimal acoustic furnishing of the office space through the perfect interplay of light and acoustics, combined in one product. Bespoke solutions, such as MUSE Light and MUSE Baffle, specifically reduce reverberation time and are therefore ideal for open-plan offices and shared spaces. Matching desk panels support privacy in multi-person offices by both creating visual separation and reducing sound propagation.

In large multi-person offices, sound propagation must be considered in addition to reverberation. The parameters for this are firstly the spatial decay rate of speech $D_{2,5}$ and secondly the sound pressure level of speech at a distance of 4 m $L_{p,A,S,4m}$. Speech intelligibility (Speech Transmission Index) is an additional meaningful characteristic of pleasant room acoustics, which is why it is taken into account in our acoustic simulation. Since speech noise is a major distraction in multi-person offices, the STI should not exceed 0.5 over as large an area as possible.

Acoustic requirements

- A/V ratio: ≥ 0.22
- Reverberation time T_{max} 0.7 s (room acoustics class B)
- Noise level $L_{NA,Bau} < 40$ dB (room acoustics class B)
- Spatial decay rate of speech ≥ 6 dB (level of sound propagation: 2)
- Sound pressure level of speech at a distance of 4 m < 49 dB (level of sound propagation: 2)
- Speech Transmission Index STI: if possible ≤ 0.5

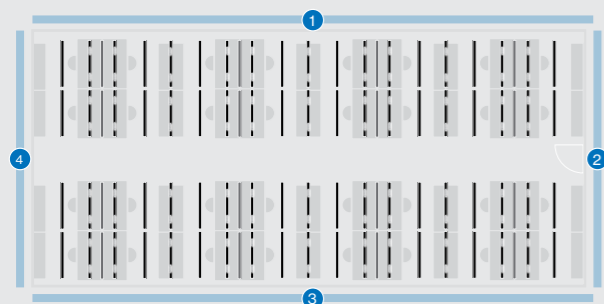
Lighting requirements

- Lighting standard EN 12646-1 minimum requirement
- Illuminance in the visual task area: 500 lx
- Uniformity ≥ 0.6
- Glare limitation $UGR \leq 19$
- Luminance: < 3000 cd/m²

Planned products:

- 44 × MUSE light
- 24 × MUSE baffle
- 16 × MUSE desk high

Specifications



Room

32 employees
8 working islands of 4 persons each
Area: 150 m²
Ceiling height: 3.20 m
Volume: 478 m³

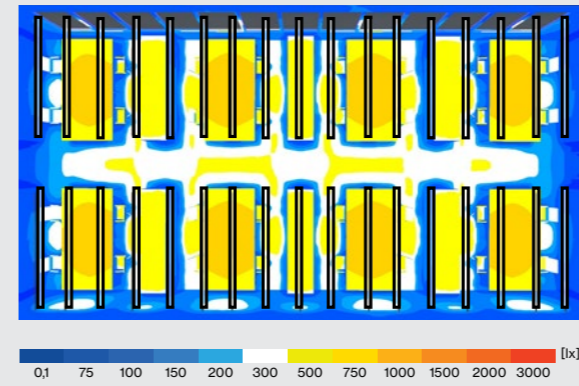
Ceiling: plasterboard
Stone floor
32 filing cabinets (triple height)
32 tables, 32 office chairs

Equipment

- 1 Exterior wall with smooth plaster and window strip
- 2 Interior wall plasterboard with wooden door
- 3 Interior wall plasterboard
- 4 Exterior wall with smooth plaster

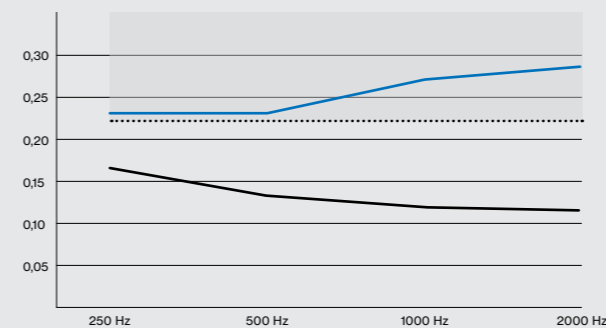
Lighting planning

- Illuminance in visual range E_m 536 lx
- Uniformity in the field of vision: U_0 0.65
- Glare reduction (viewer): $UGR \leq 19$
- Lamp luminance: < 3000 cd/m²

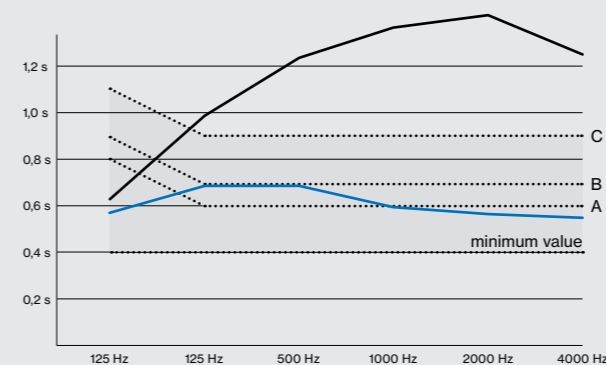


Acoustics planning – Reverberation

- A/V ratio ≥ 0.22
- Average reverberation time 0.62 s
- Room acoustics class B



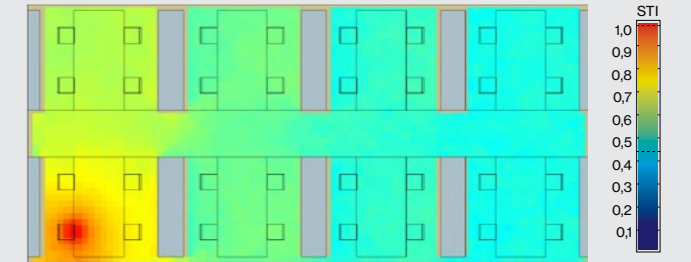
..... min. A/V ratio ■ target area
— A/V ratio without acoustic elements — A/V ratio MUSE



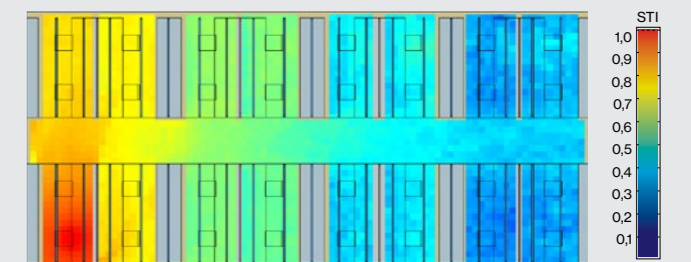
..... max. reverberation time class A, B, C ■ target area
— reverberation time without acoustic elements — reverberation time MUSE

Acoustics planning – Sound propagation

- Spatial decay rate $D_{2,5} \geq 6.2$ dB
- Sound pressure level of speech at a distance of 4 m $L_{p,A,S,4m} < 48.8$ dB
- Sound propagation level: 2



Speech Transmission Index: without acoustic elements



Speech Transmission Index: XAL MUSE