Quick tutorial on lighting design

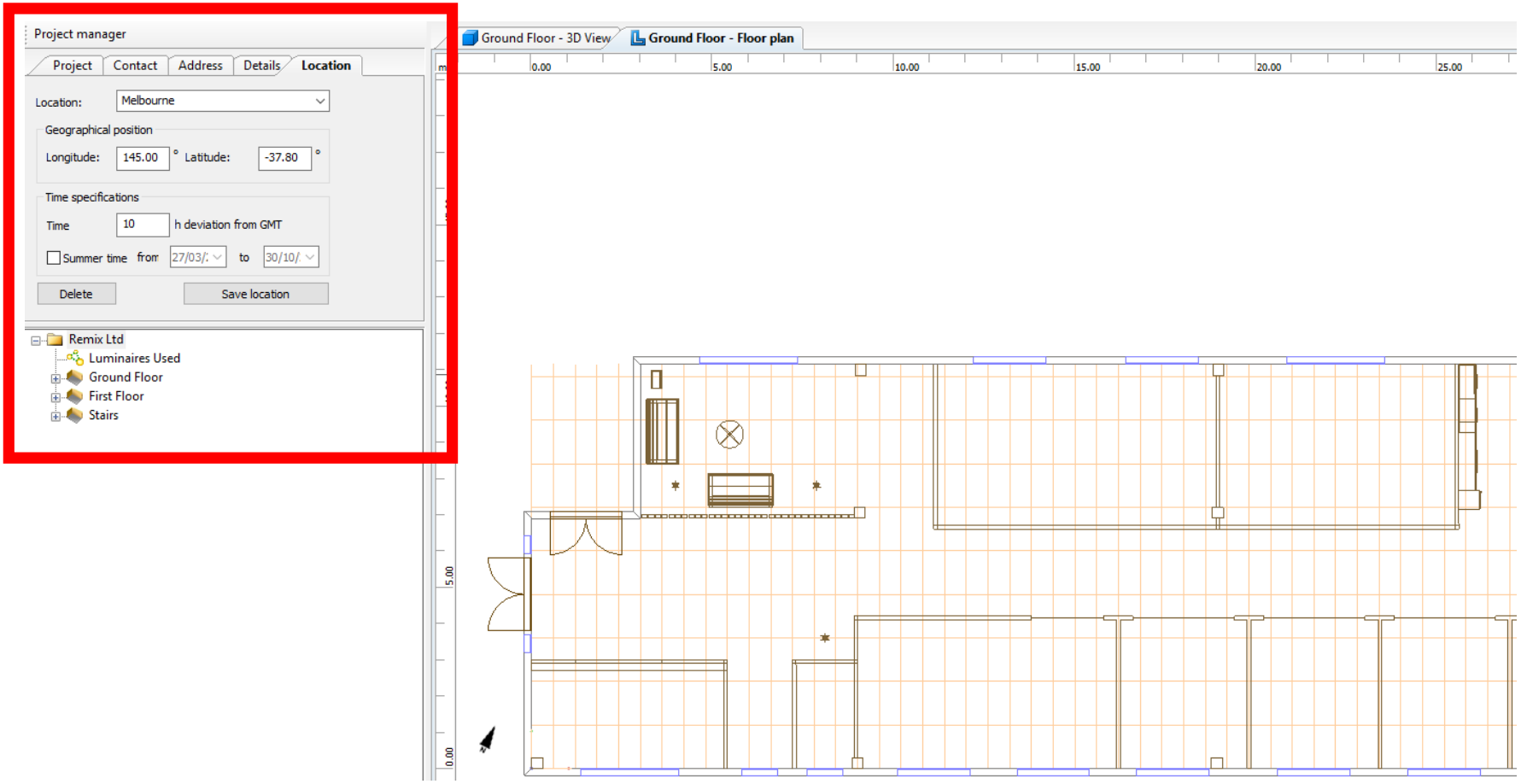
Dr Dariusz Kacprzak

Things to check

- Check the illuminance values required (AS/NZS 1680)
- Check the minimum uniformity of illuminance (AS/NZS 1680)
- Check the maximum glare allowed (AS/NZS 1680)
- Check the calculation surfaces (AS/NZS 1680)
- Check the minimum illuminance in the emergency mode (F6, F8)
- Get familiar with the lighting products recommended by the Client

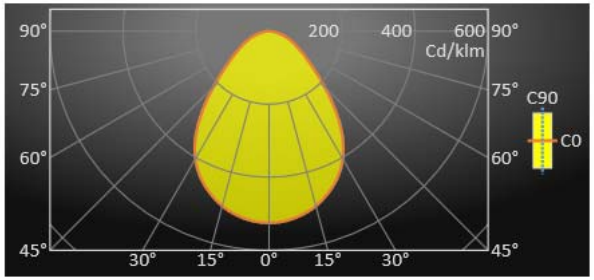
Room 104. SALE

Confirming location - Melbourne



Selecting product

- Light colour (4000K)
- Glare (UGR)
- Efficacy
- LLMF
- Dimensions



ETAP
EXCELLENT LIGHTING, SAVING ENERGY

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Products | Applications | Services | References | Customization

Home → Series → U25 → U25M1/LEDN25D

U25M1/LEDN25D

IP 20 | IK 07 | 850 °C

Download product data sheet

Downloads
ULD
LDT
More...

recessed luminaire • linear

application: office, healthcare, education, horeca, retail, leisure

housing: lacquered sheet steel

light source: LED LP • 4000 K

optics: Diffuser • clear glass with diffuser foil • wide-angle

UGR classification: <= 16

luminous flux: 2750 lm

luminous efficacy: 145 lm/W

LLMF: 99% @ 50khrs (Tq=25°C)

photobiological safety: IEC/TR 62778: RG 0

Product info | Dimensional drawing | Photometric data | References | Downloads | Accessories & pictograms

Product info

Mechanical properties

dimensions: 1196 mm x 296 mm x 85 mm

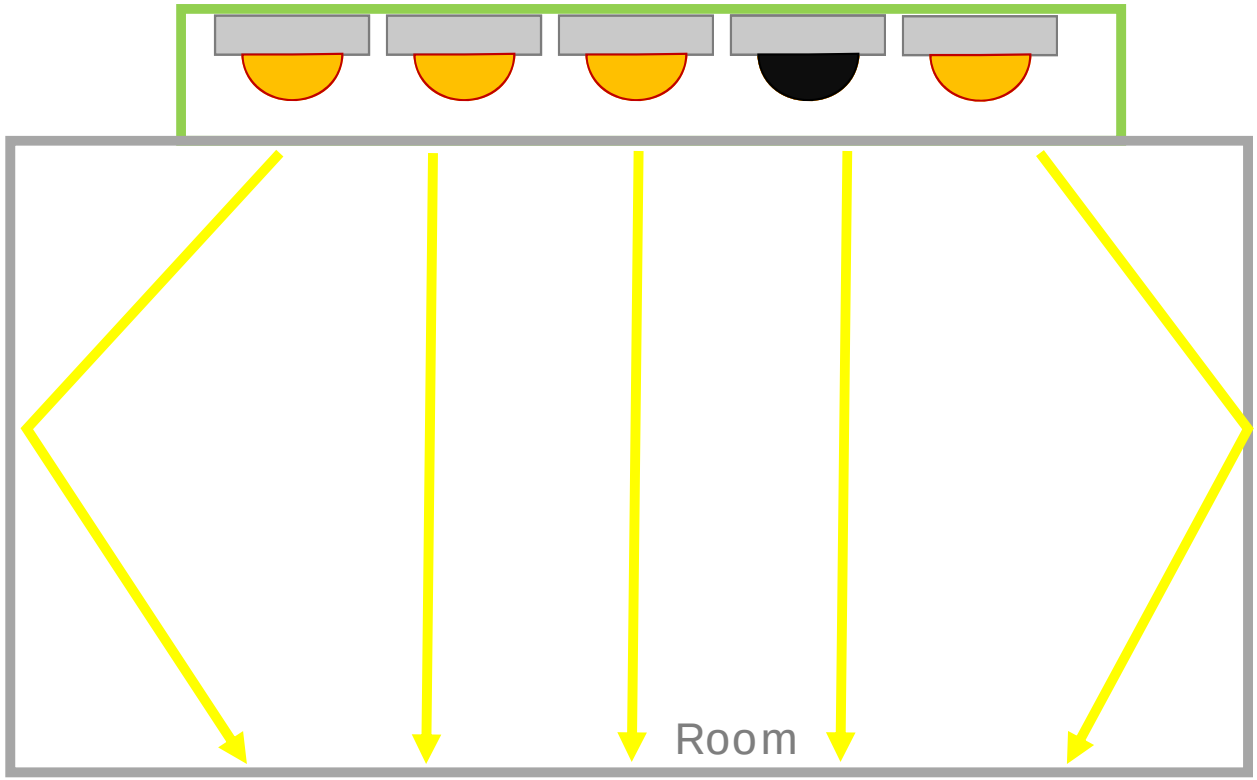
Light source

correlated colour temperature: 4000 K

Electrical Properties

driver: DALI dimmable

Understanding Light Loss Factor



- Lamp Lumen Maintenance Factor (LLMF)
- Luminaire Maintenance Factor (LMF)
- Room Surface Maintenance Factor (RSMF)
- Lamp Survival Factor (LSF)

Lamp Lumen Maintenance Factor (LLMF)

U25M1/LEDN25D

IP 20 | IK 07 | 850 °C

recessed luminaire • linear

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luminous efficacy: 145 lm/W

LLMF: 99% @ 50khrs (Tq=25°C)

Luminaire Maintenance Factor (LMF) – Confirmation from manufacturer

ETAP EXCELLENT LIGHTING, SAVING ENERGY

DECLARATION

TO WHOM IT MAY CONCERN

Malle, 22nd September 2014

Dear sir/madam,

Based on the report issued by TNO (https://www.tno.nl/) under the authority of ETAP LIGHTING – ZUMTOBEL STAFF – PHILIPS LIGHTING and OSRAM for the sake of having a reliable determination of the maintenance factors with respect to the EN12464 (The European Norm for lighting working spaces), the reported values authorize ETAP LIGHTING to adopt a luminaire maintenance factor of 0,95 for direct lighting luminaires in a low to medium polluted environment.

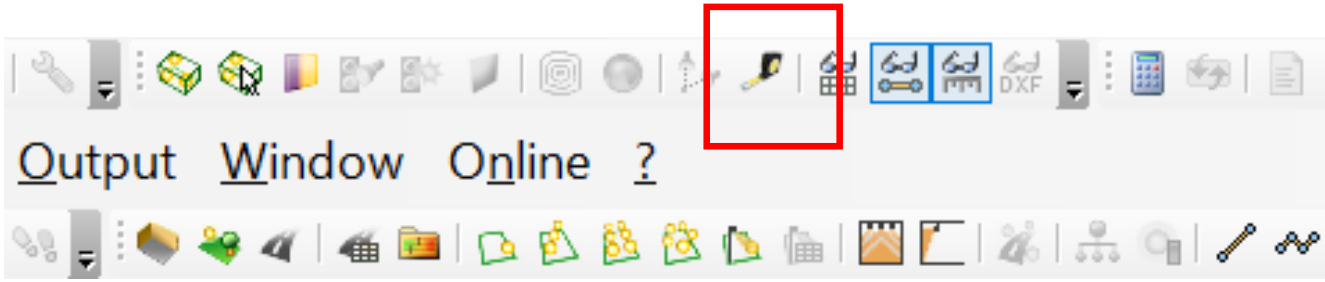
Attached TNO-report 2004-GGI-R027.

Yours sincerely,

Wim Sliepenbeek
International Sales Director ETAP Lighting

ETAP

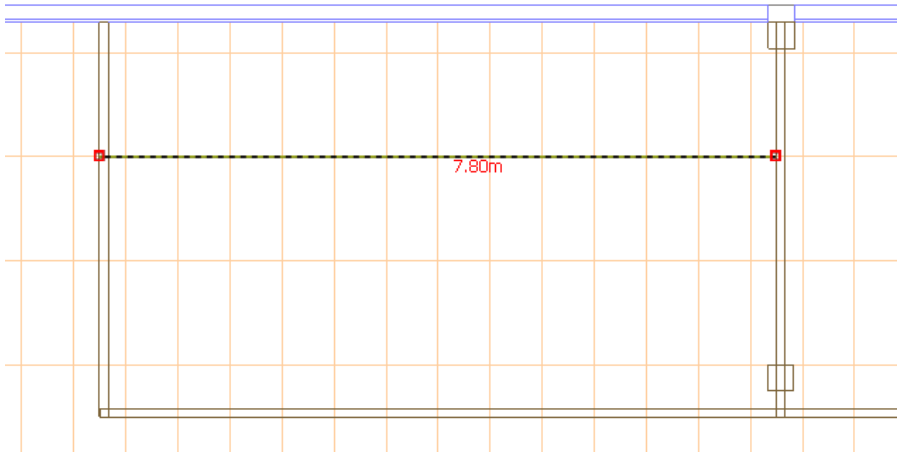
Room Index *K*

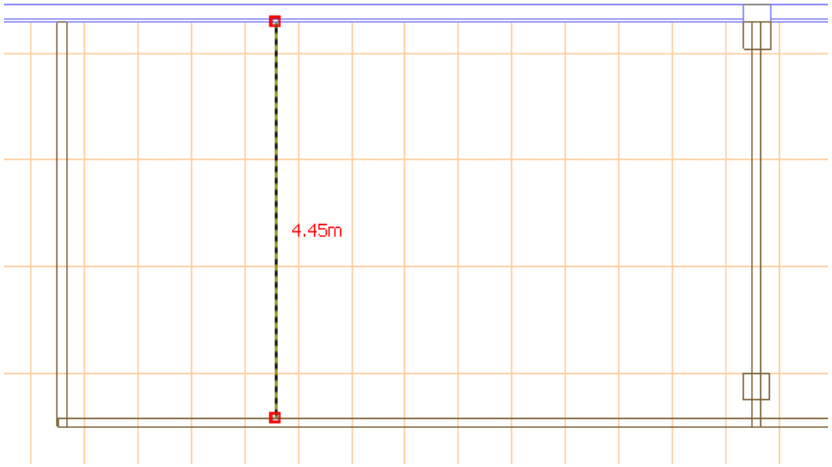


$$K = \frac{L \times W}{(L + W) \times H'}$$

$$K = \frac{7.8m \times 4.45m}{(7.8m + 4.45m) \times (2.7m - 0.7m)} = 1.41$$

H' – the vertical distance between the horizontal reference plane and the luminaire plane (AS/NZS1680.1.2006)





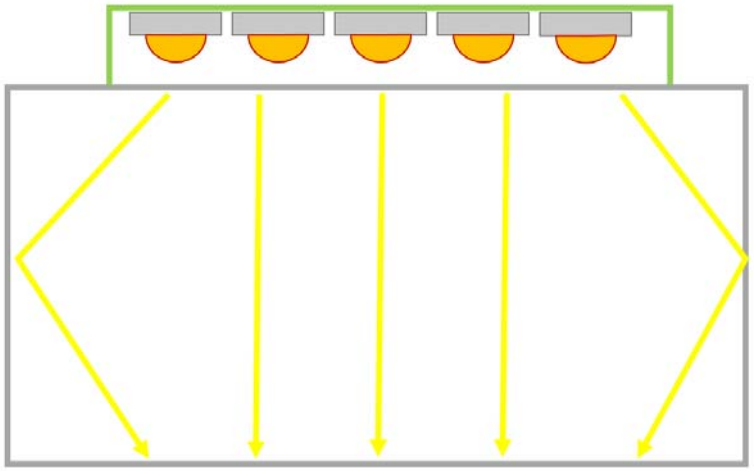
Room Surface Maintenance Factor (RSMF) – AS/NZS 1680.4 Table B3

	Cleaning surfaces Every year			Cleaning surfaces two years			Cleaning surfaces three years		
Room Index	Clean	Normal	Dirty	Clean	Normal	Dirty	Clean	Normal	Dirty
Small Room K = 0.7	0.97	0.94	0.93	0.95	0.93	0.9	0.94	0.92	0.88
Medium K=2.5	0.98	0.96	0.95	0.96	0.95	0.94	0.96	0.95	0.94
Large Room K=>5	0.98	0.96	0.95	0.96	0.95	0.94	0.96	0.95	0.94

Calculating Light Loss Factor

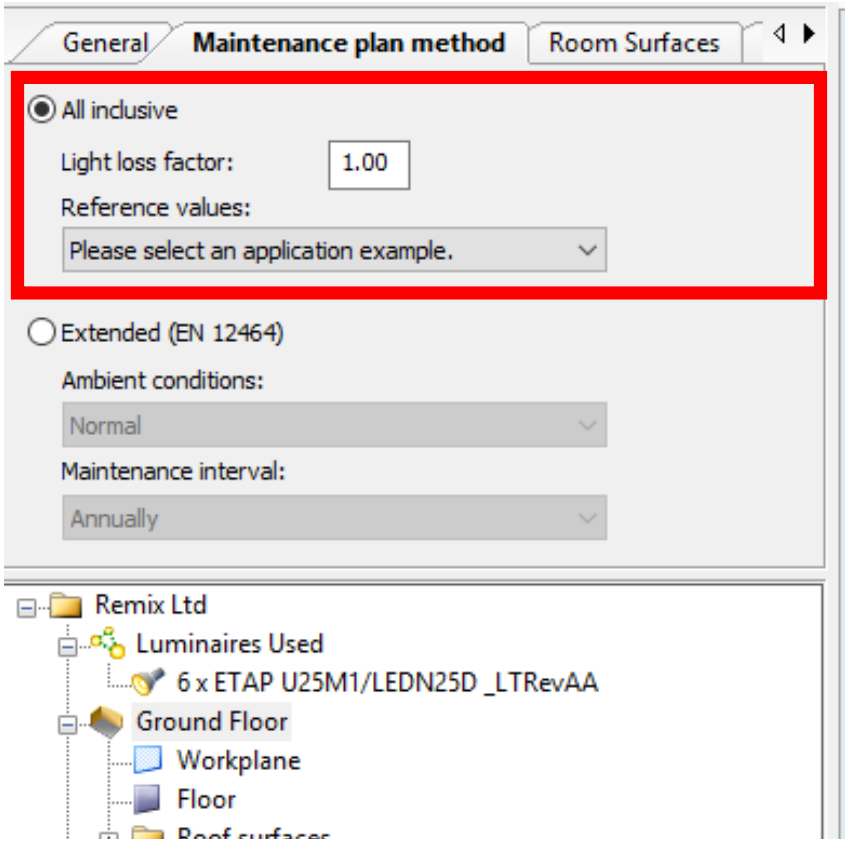
LLF = LLMF × LMF × LSF × RSMF

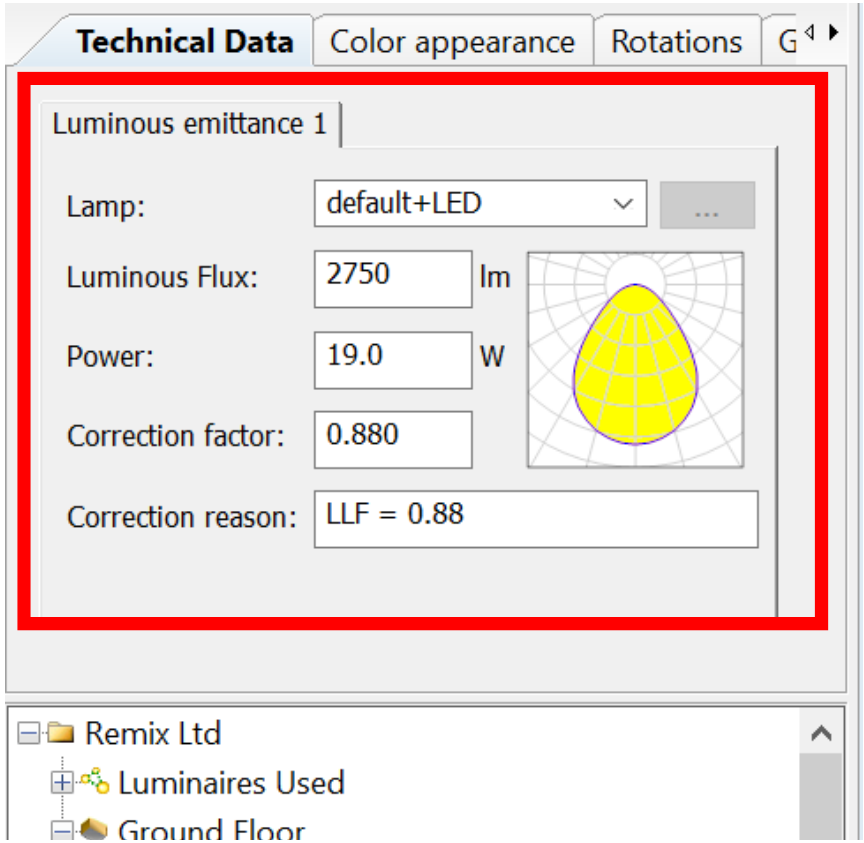
LLF = 0.99 × 0.95 × 1 × 0.94 = **0.88**



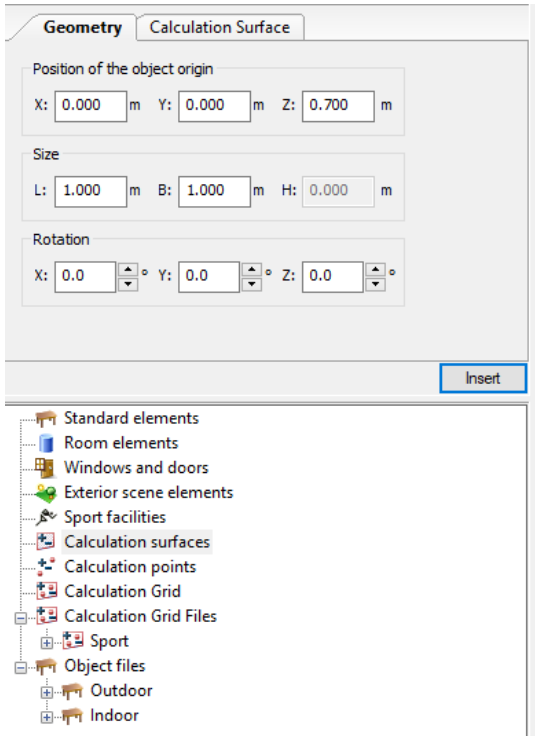
LLMF – Lamp lumen maintenance factor
LMF – Luminaire maintenance factor
LSF – Lamp survival factor
RSMF – Room surface maintenance factor

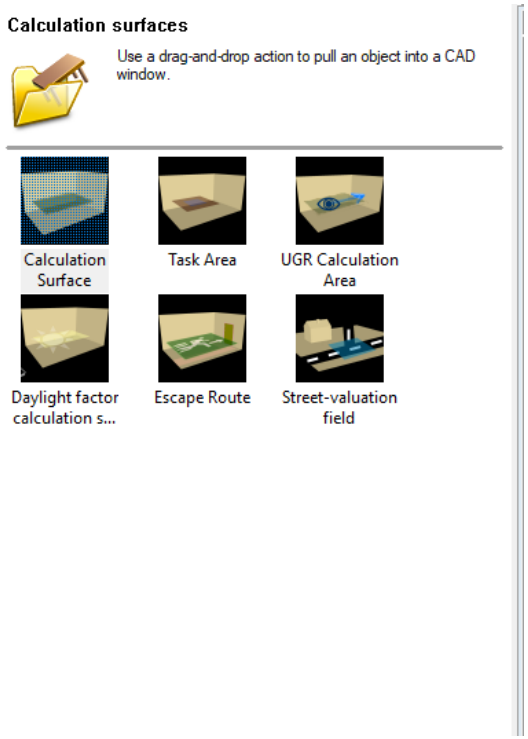
Setting Light Loss Factor in Dialux

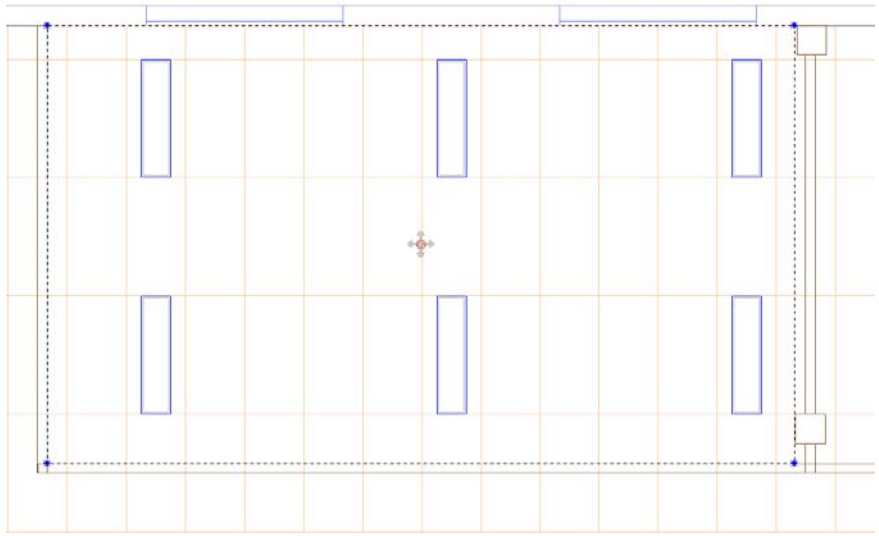




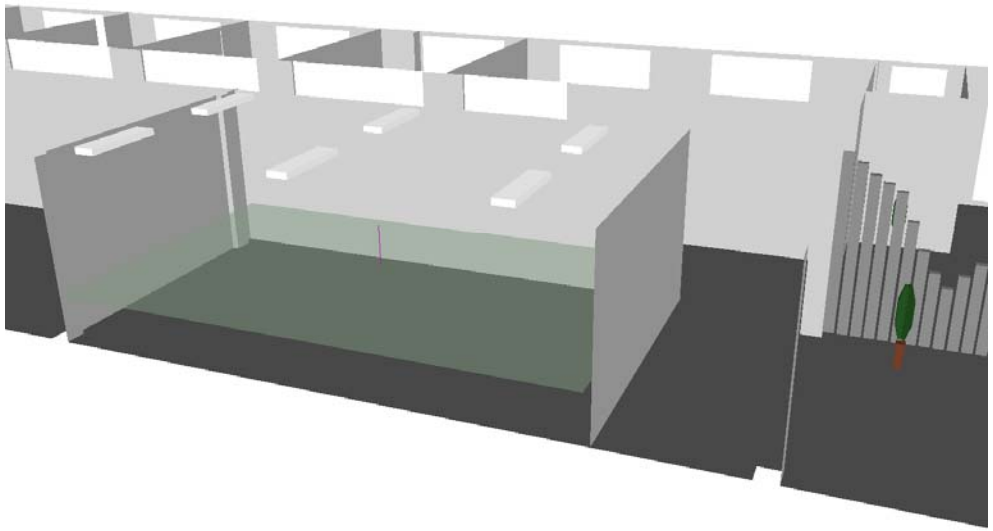
Setting Calculation Surface

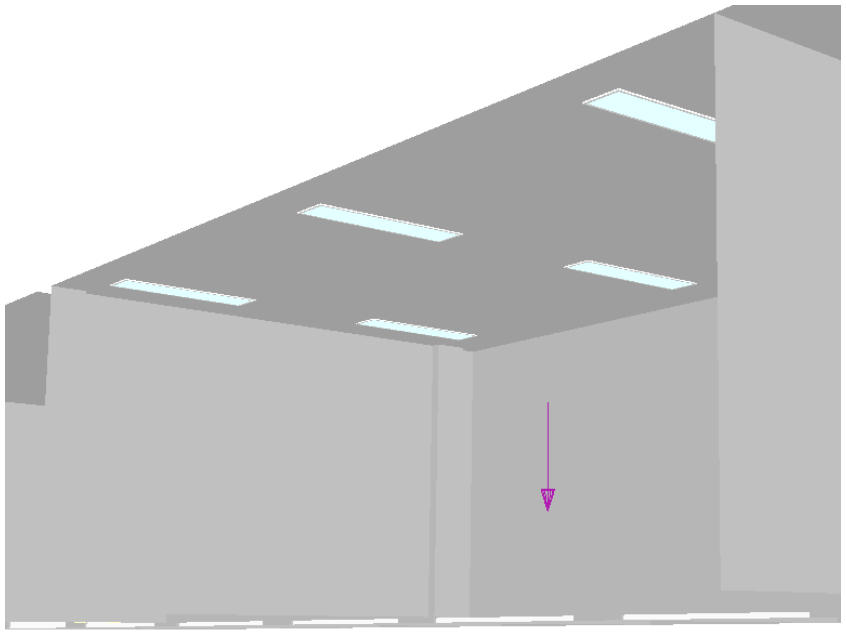




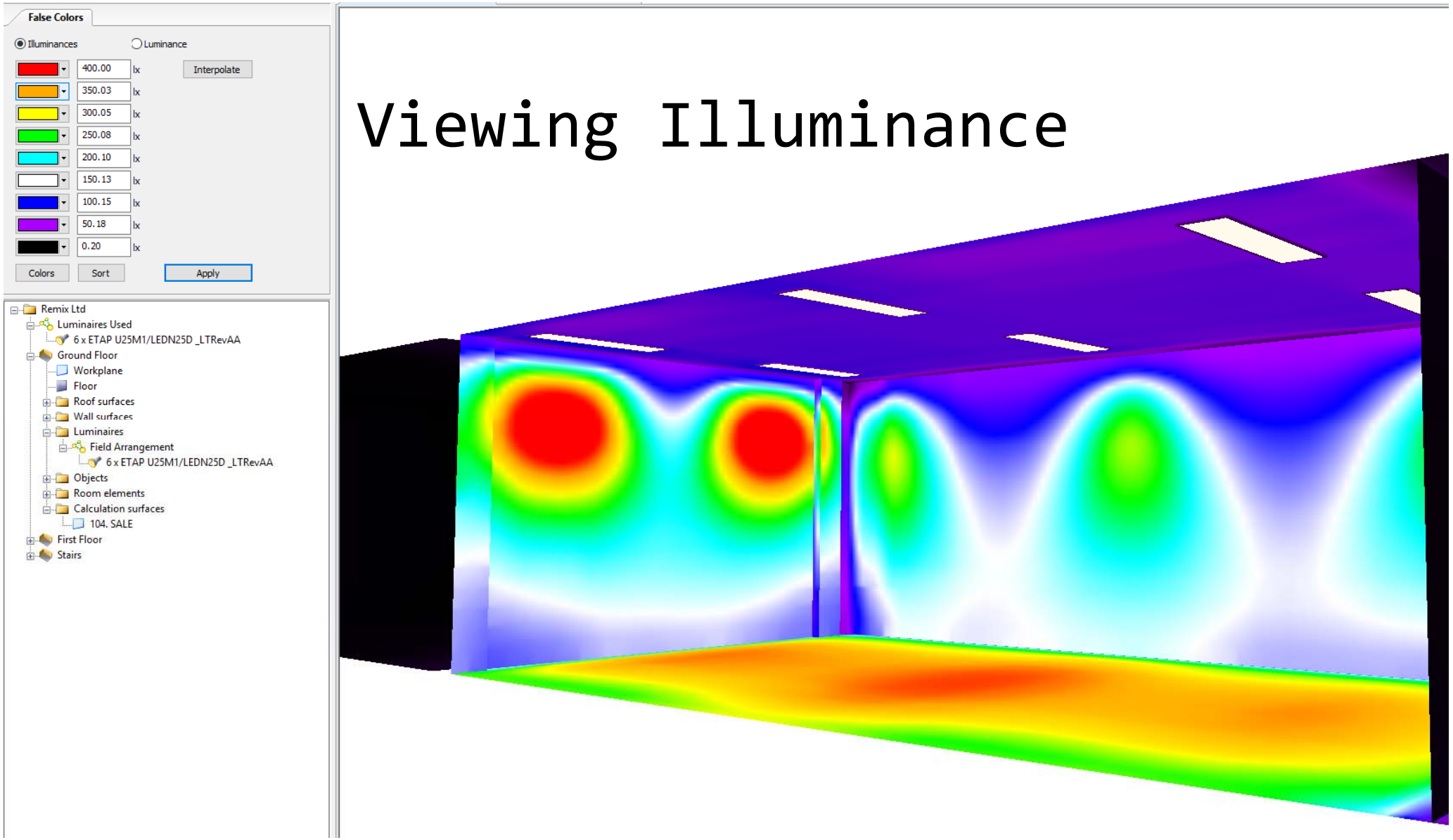


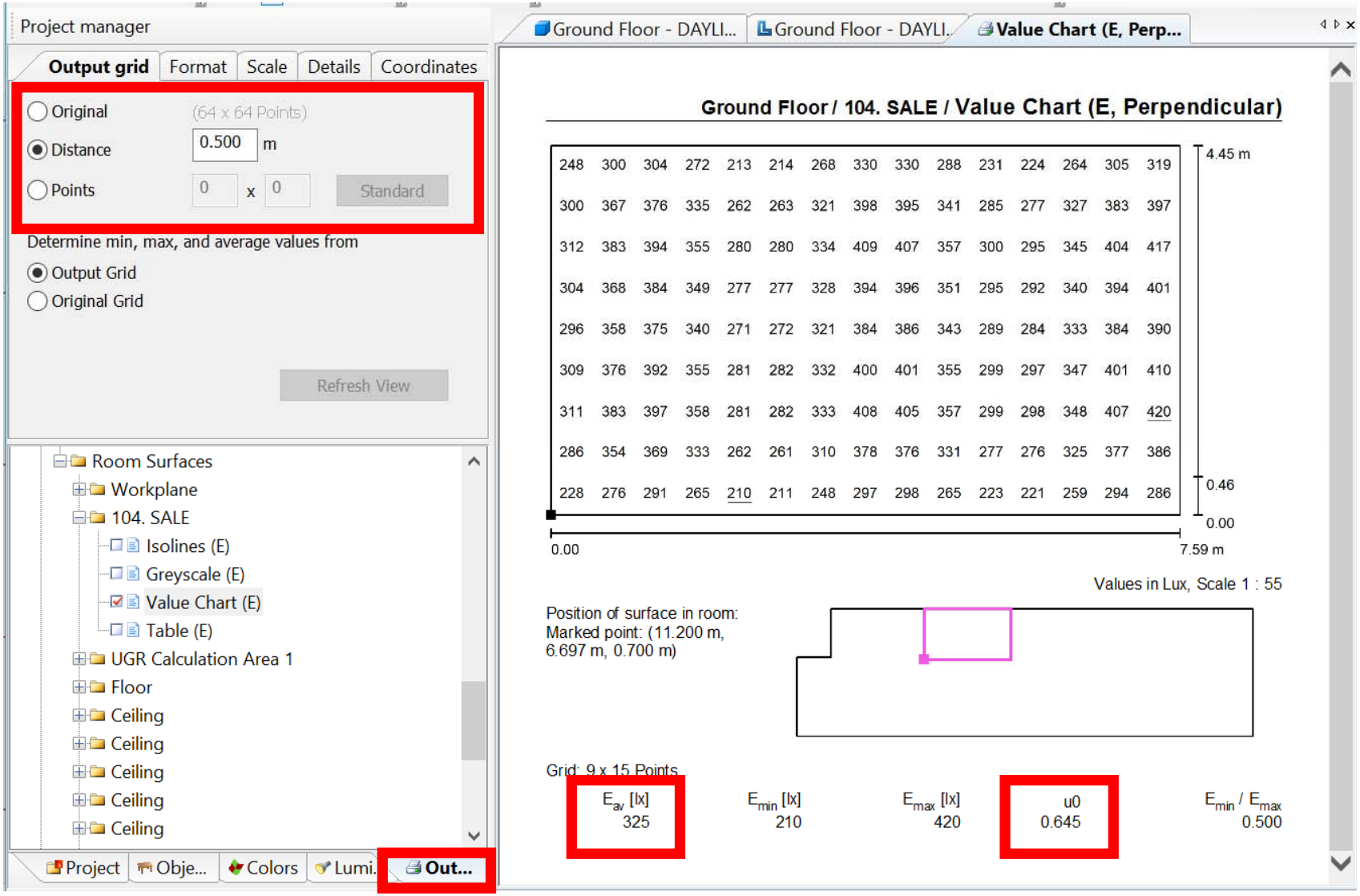
Room ready for calculation



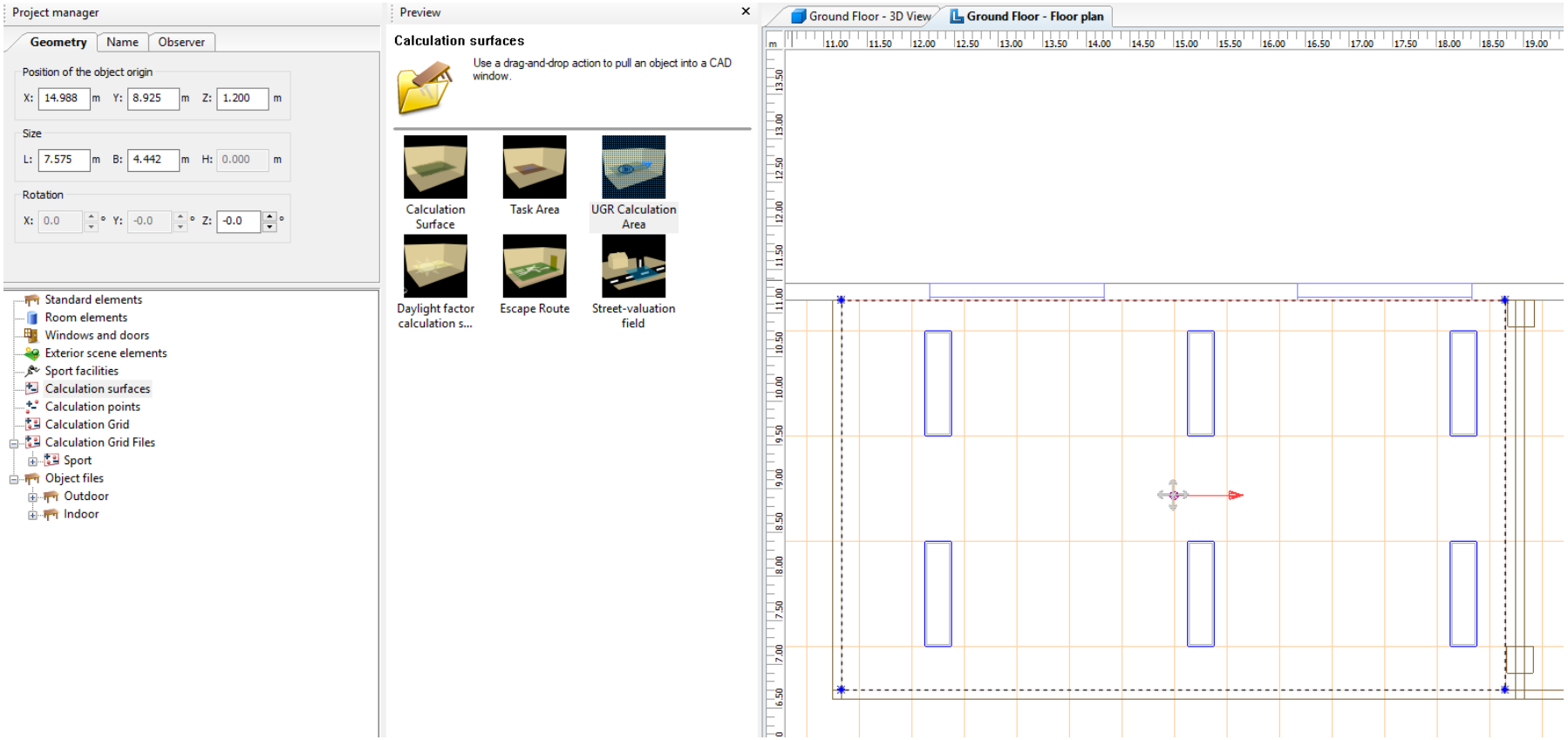


Viewing Illuminance



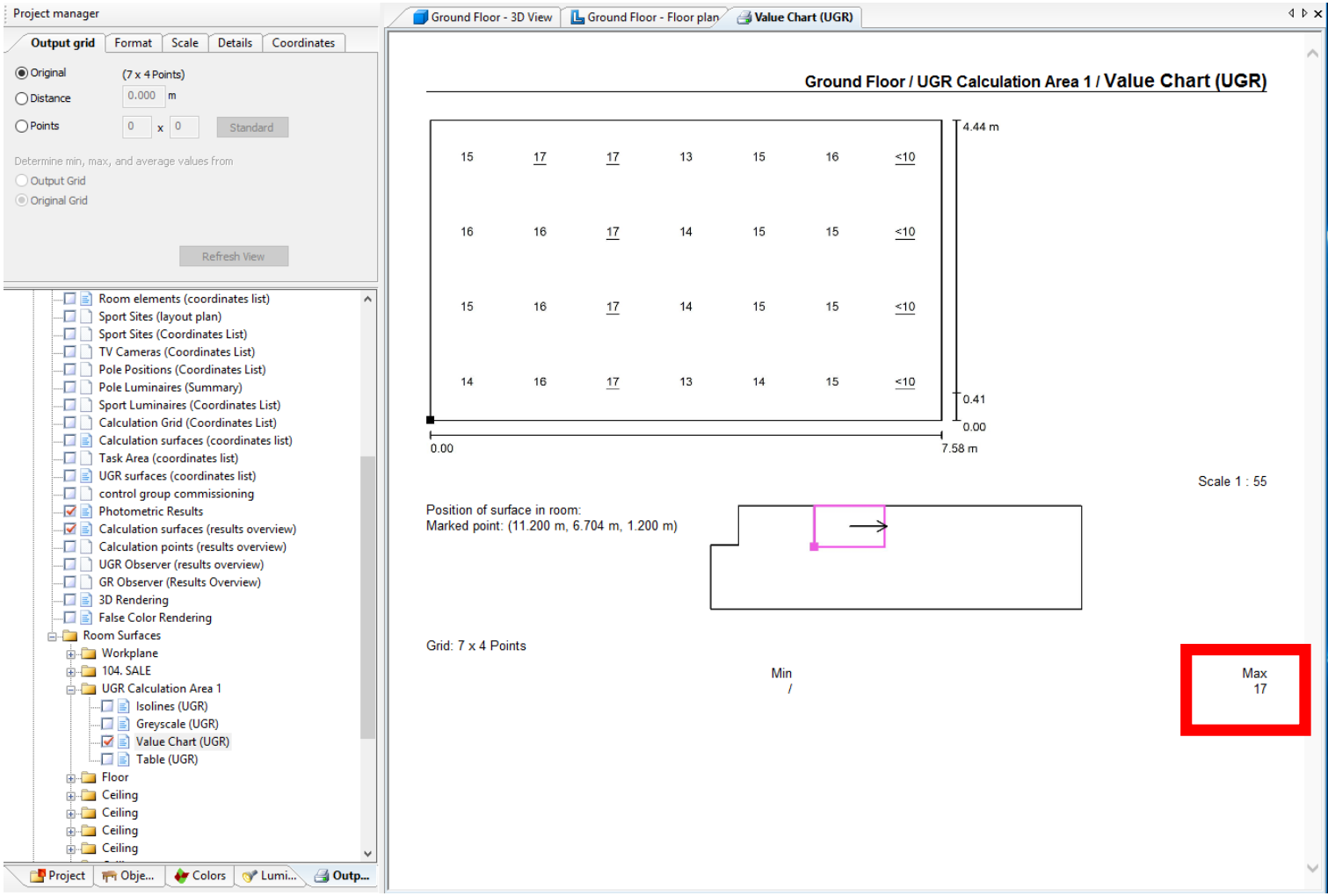

Project manager
Output grid
Format
Scale
Details
Coordinates
Original
(64 x 64 Points)
Distance
0.500
m
Points
0
x
0
Standard
Determine min, max, and average values from
Output Grid
Original Grid
Refresh View
Room Surfaces
Workplane
104. SALE
Isolines (E)
Greyscale (E)
Value Chart (E)
Table (E)
UGR Calculation Area 1
Floor
Ceiling
Ceiling
Ceiling
Ceiling
Ceiling
Project
Obje...
Colors
Lumi.
Out...
Ground Floor - DAYLI...
Ground Floor - DAYLI...
Value Chart (E, Perp...
Ground Floor / 104. SALE / Value Chart (E, Perpendicular)
248 300 304 272 213 214 268 330 330 288 231 224 264 305 319
300 367 376 335 262 263 321 398 395 341 285 277 327 383 397
312 383 394 355 280 280 334 409 407 357 300 295 345 404 417
304 368 384 349 277 277 328 394 396 351 295 292 340 394 401
296 358 375 340 271 272 321 384 386 343 289 284 333 384 390
309 376 392 355 281 282 332 400 401 355 299 297 347 401 410
311 383 397 358 281 282 333 408 405 357 299 298 348 407 420
286 354 369 333 262 261 310 378 376 331 277 276 325 377 386
228 276 291 265 210 211 248 297 298 265 223 221 259 294 286
4.45 m
0.46
0.00
0.00
7.59 m
Values in Lux, Scale 1 : 55
Position of surface in room:
Marked point: (11.200 m,
6.697 m, 0.700 m)
Grid: 9 x 15 Points
Eav [lx]
325
Emin [lx]
210
Emax [lx]
420
u0
0.645
Emin / Emax
0.500

Setting UGR Calculation

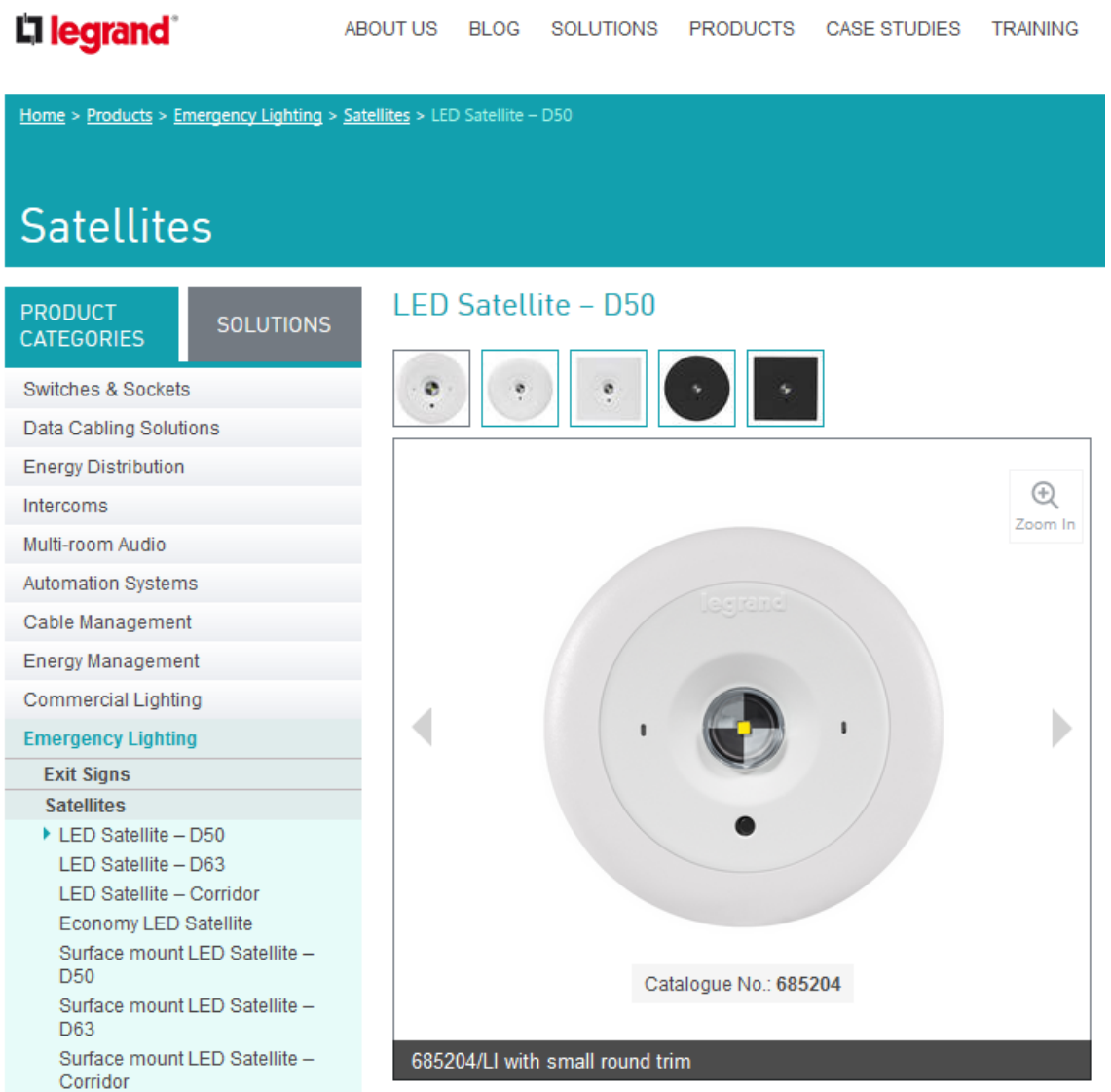


Viewing UGR values

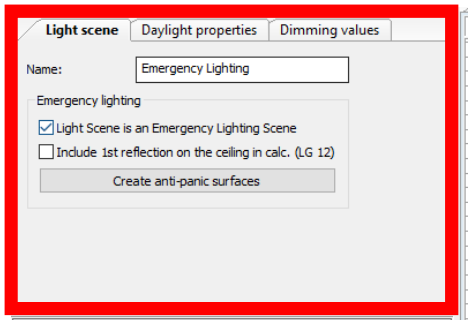
- Maximum UGR: 17

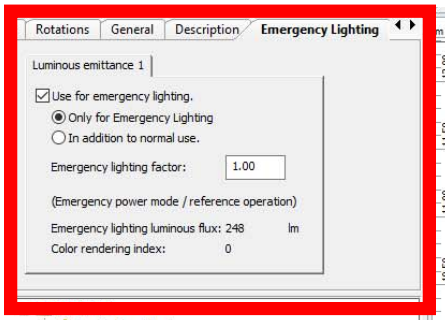


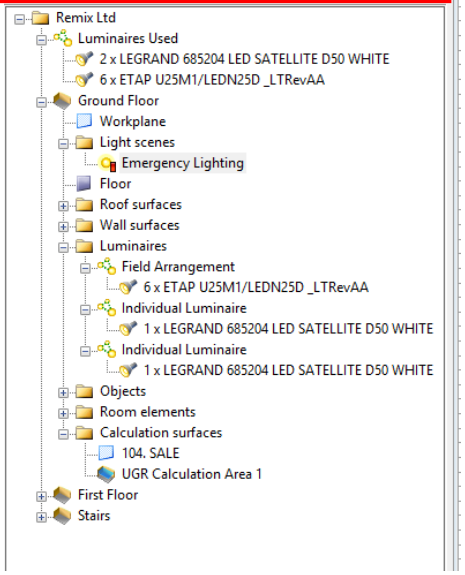
Designing emergency lighting

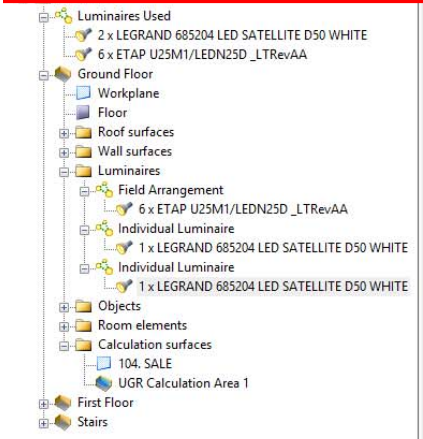


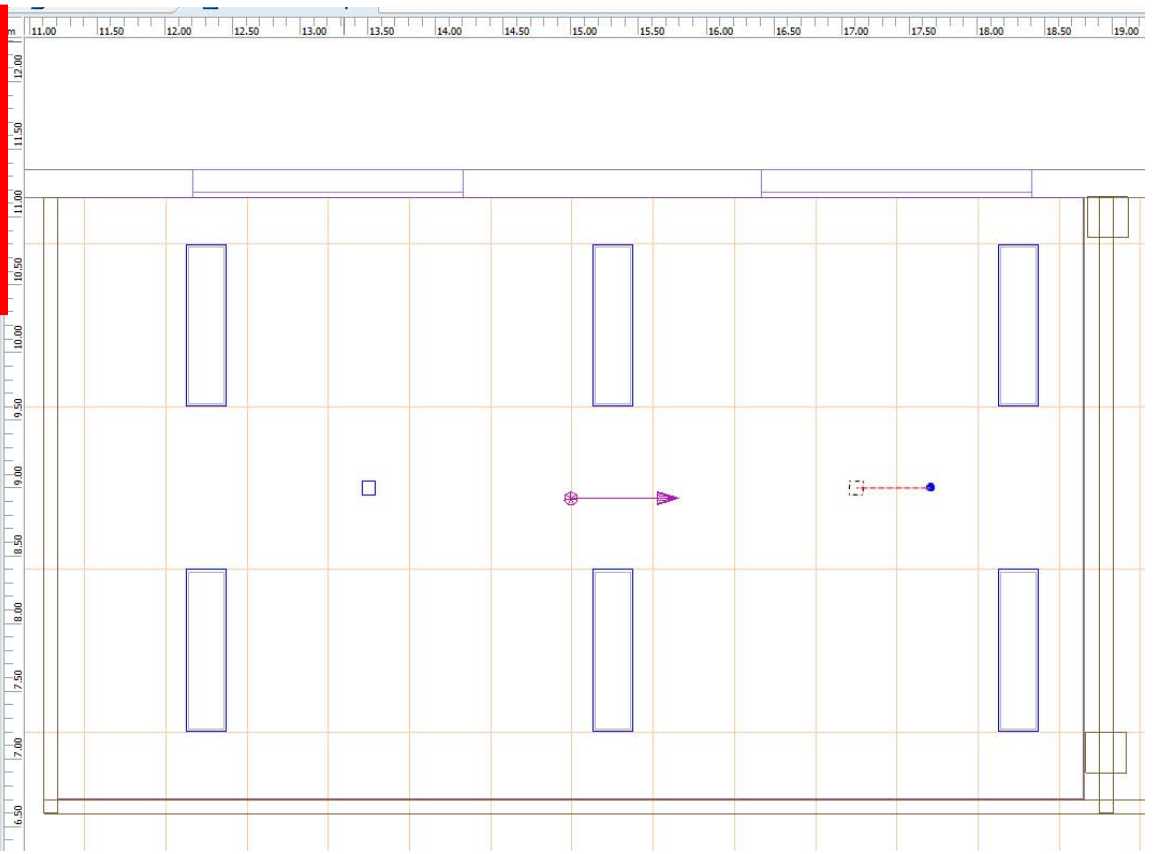
Using emergency luminaires



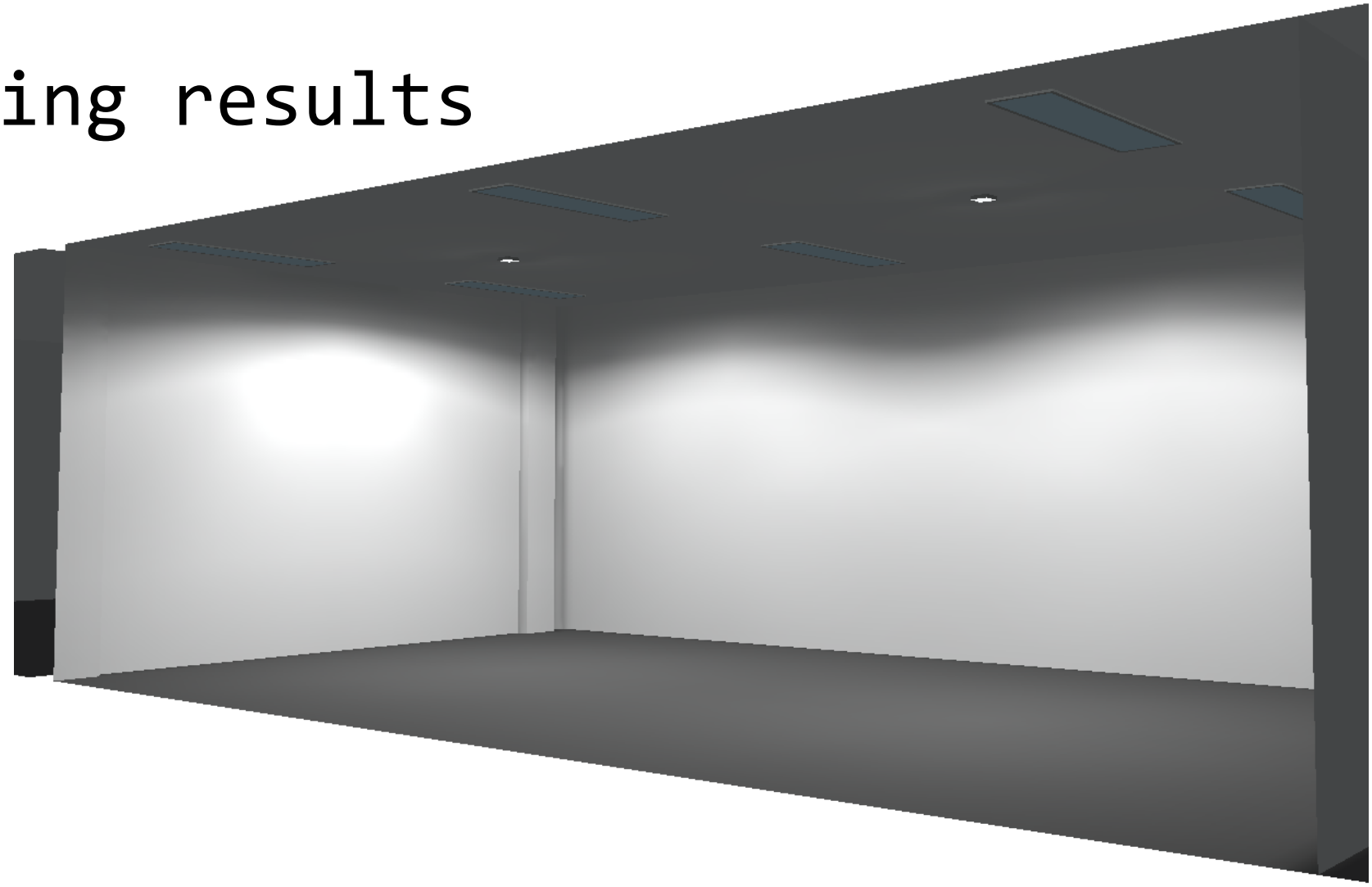








Viewing results



Output grid | Format | Scale | Details | Coordinates

- ○ Original (64 x 64 Points)
- ◉ Distance 0.500 m
- ○ Points 0 x 0 Standard

Determine min, max, and average values from

- ◉ Output Grid
- ○ Original Grid

Refresh View

- Sport Luminaires (Coordinates List)
- Calculation Grid (Coordinates List)
- Calculation surfaces (coordinates list)
- Task Area (coordinates list)
- UGR surfaces (coordinates list)
- control group commissioning
- Light scenes
  - Emergency Lighting
    - Summary
    - Sport Luminaires (Coordinates List)
    - Photometric Results
    - Calculation surfaces (results overview)
    - Calculation points (results overview)
    - Escape Routes (Coordinates List)
    - Escape Routes (Results Overview)
    - UGR Observer (results overview)
    - GR Observer (Results Overview)
    - 3D Rendering
    - False Color Rendering
  - Room Surfaces
    - Workplane
    - 104. SALE
      - Isolines (E)
      - Greyscale (E)
      - Value Chart (E)
      - Table (E)

Ground Floor / Emergency Lighting / 104. SALE / Value Chart (E, Perpendicular)

2.92	3.56	4.15	4.64	4.96	5.20	5.25	5.26	5.26	5.25	5.22	4.97	4.74	4.31	3.74
3.47	4.32	5.13	5.87	6.32	6.56	6.47	6.41	6.41	6.45	6.54	6.34	6.05	5.36	4.57
3.86	4.94	6.10	7.17	7.83	7.98	7.67	7.36	7.35	7.58	7.91	7.84	7.43	6.43	5.28
4.11	5.46	6.85	7.98	8.90	8.89	8.55	8.10	8.08	8.46	8.81	8.91	8.27	7.21	5.88
4.13	5.49	6.95	8.22	9.52	9.19	8.72	8.18	8.17	8.59	9.05	9.53	8.58	7.34	5.93
4.05	5.31	6.66	7.77	8.59	8.64	8.32	7.89	7.88	8.22	8.58	8.60	8.04	7.01	5.72
3.75	4.74	5.79	6.80	7.36	7.55	7.30	7.07	7.07	7.22	7.50	7.37	7.02	6.11	5.06
3.30	4.09	4.79	5.45	5.85	6.10	6.06	6.07	6.07	6.05	6.10	5.86	5.60	4.99	4.30
2.73	3.31	3.85	4.28	4.57	4.80	4.87	4.87	4.87	4.86	4.84	4.58	4.37	3.99	3.47

4.45 m
0.46
0.00
0.00
7.59 m

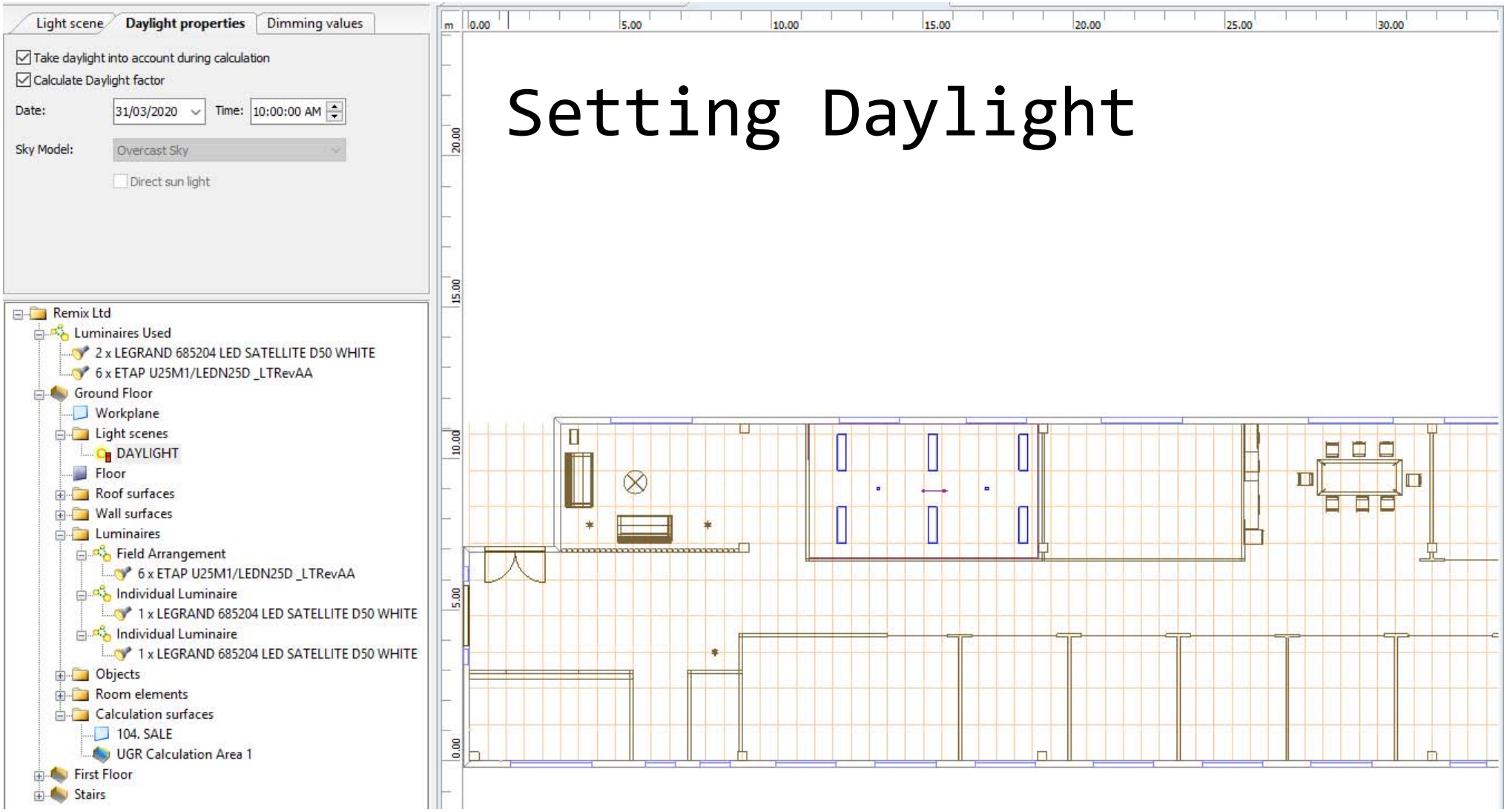
Values in Lux, Scale 1 : 55

Position of surface in room:
Marked point: (11.200 m, 6.697 m, 0.000 m)

Grid: 9 x 15 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
6.25	2.73	9.53	0.436	0.286

Setting Daylight

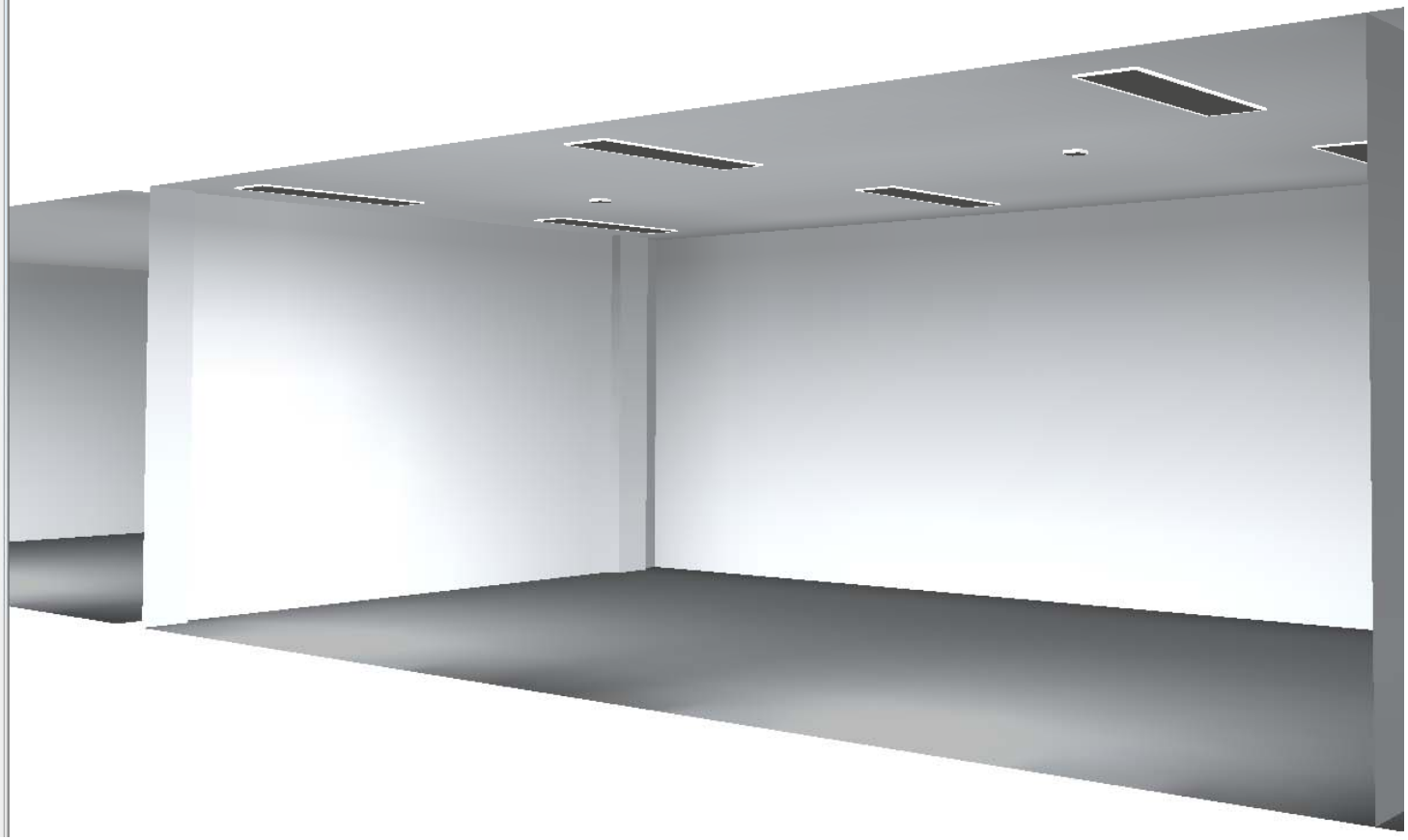


Viewing Daylight

Note

No information available

- Remix Ltd
  - Luminaires Used
    - 2 x LEGRAND 685204 LED SATELLITE D50 WHITE
    - 6 x ETAP U25M1/LEDN25D _LTRevAA
  - Ground Floor
    - Workplane
    - Light scenes
      - DAYLIGHT
    - Floor
    - Roof surfaces
    - Wall surfaces
    - Luminaires
      - Field Arrangement
        - 6 x ETAP U25M1/LEDN25D _LTRevAA
      - Individual Luminaire
        - 1 x LEGRAND 685204 LED SATELLITE D50 WHITE
      - Individual Luminaire
        - 1 x LEGRAND 685204 LED SATELLITE D50 WHITE
    - Objects
    - Room elements
    - Calculation surfaces
      - 104. SALE
      - UGR Calculation Area 1
  - First Floor
  - Stairs



Identifying luminaires affected by daylight