

Project

## Preface

Notes on planning:

The energy consumption quantities do not take into account light scenes and their dimming levels.

## Table of Contents

Cover .....	1
Preface .....	2
Table of Contents .....	3
Description .....	5
Luminaire list .....	6

## Product data sheets

Not yet a DIALux member - "START Panel 1200x300 HE 4100L m 840 LILO" /4000 (1x LED/4000) .....	7
SYLVANIA - RAIDEN IP66 8KLM 840 ASYM (1x 2824062 RAIDEN IP66 8KLM 840 ASYM) .....	8

Site 1

### Building 1

Luminaire list .....	9
----------------------	---

Site 1 - Building 1

### Kthina

Room list / Light scene 1 .....	10
Luminaire list .....	13
Calculation objects / Light scene 1 .....	14

Site 1 - Building 1 - Kthina

### Klasa

Summary / Light scene 1 .....	16
Luminaire layout plan .....	18
Luminaire list .....	20
Calculation objects / Light scene 1 .....	21
Working plane (Klasa) / Light scene 1 / Perpendicular illuminance (adaptive) .....	23

Site 1 - Building 1 - Kthina

### Koridori

Summary / Light scene 1 .....	24
Luminaire layout plan .....	26
Luminaire list .....	28
Calculation objects / Light scene 1 .....	29

## Table of Contents

Working plane (Koridori ) / Light scene 1 / Perpendicular illuminance (adaptive) .....	31
--	----

Site 1 - Building 1 - Kthina

### Kthina

Summary / Light scene 1 .....	32
Luminaire layout plan .....	34
Luminaire list .....	36
Calculation objects / Light scene 1 .....	37
Working plane (Kthina ) / Light scene 1 / Perpendicular illuminance (adaptive) .....	39

Site 1 - Building 1 - Kthina

### Kthina 2

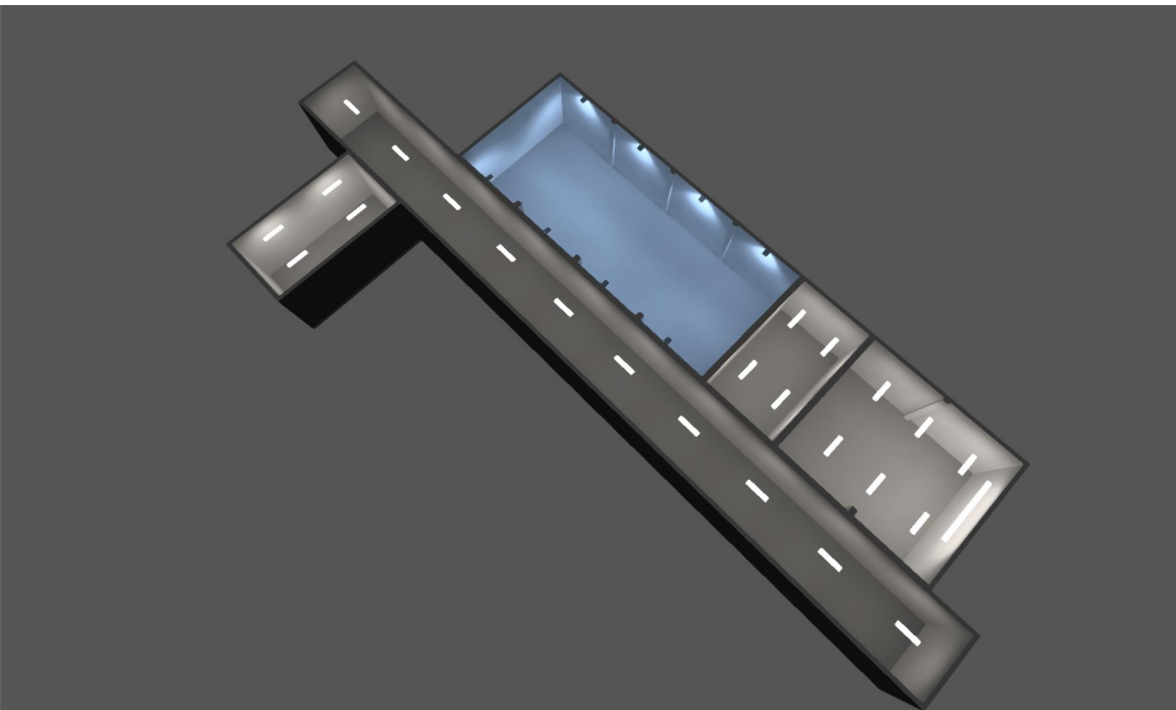
Summary / Light scene 1 .....	40
Luminaire layout plan .....	42
Luminaire list .....	44
Calculation objects / Light scene 1 .....	45
Working plane (Kthina 2) / Light scene 1 / Perpendicular illuminance (adaptive) .....	47

Site 1 - Building 1 - Kthina

### Salla

Summary / Light scene 1 .....	48
Luminaire layout plan .....	50
Luminaire list .....	52
Calculation objects / Light scene 1 .....	53
Working plane (Salla ) / Light scene 1 / Perpendicular illuminance (adaptive) .....	55

Glossary .....	56
----------------	----



## Description

## Luminaire list

 $\Phi_{\text{total}}$ 

175710 lm

 $P_{\text{total}}$ 

1454.0 W

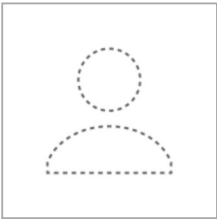
Luminous efficacy

120.8 lm/W

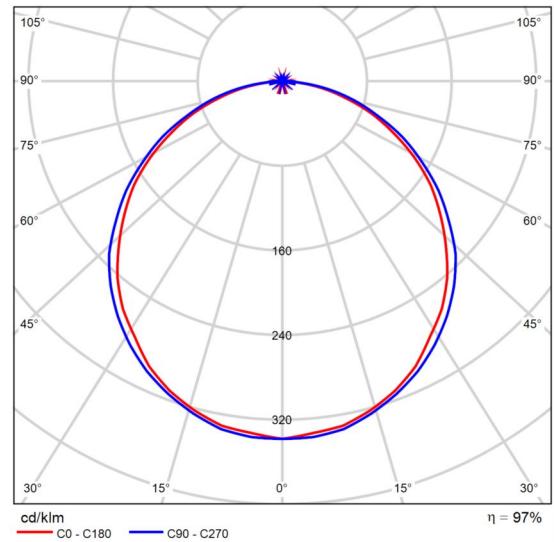
pcs.	Manufacturer	Article No.	Article name	P	$\Phi$	Luminous efficacy
27	Not yet a DIALux member		"START Panel 1200x300 HE 4100L m 840 LILO" /4000	34.0 W	3930 lm	115.6 lm/W
8	SYLVANIA	2824062	RAIDEN IP66 8KLM 840 ASYM	67.0 W	8700 lm	129.9 lm/W

Product data sheet

Not yet a DIALux member - "START Panel 1200x300 HE 4100L m 840 LILO" /4000



P	34.0 W
$\Phi_{\text{Lamp}}$	4053 lm
$\Phi_{\text{Luminaire}}$	3930 lm
$\eta$	96.96 %
Luminous efficacy	115.6 lm/W
CCT	3000 K
CRI	100



Polar LDC

Glare evaluation according to UGR												
p Ceiling	70	70	50	50	30	70	70	50	50	30	30	
p Walls	50	30	50	30	30	50	30	50	30	30	30	
p Floor	20	20	20	20	20	20	20	20	20	20	20	
Room size X Y		Viewing direction at right angles to lamp axis					Viewing direction parallel to lamp axis					
2H	2H	17.1	18.5	17.4	18.7	19.0	17.0	18.4	17.3	18.6	18.9	
	3H	18.6	19.8	18.9	20.1	20.4	18.5	19.7	18.8	20.0	20.3	
	4H	19.2	20.3	19.5	20.6	20.9	19.1	20.2	19.4	20.5	20.9	
	6H	19.6	20.7	19.9	21.0	21.3	19.5	20.6	19.9	20.9	21.2	
	8H	19.7	20.7	20.1	21.1	21.4	19.6	20.6	20.0	21.0	21.3	
	12H	19.7	20.7	20.1	21.1	21.4	19.6	20.6	20.0	21.0	21.3	
4H	2H	17.7	18.9	18.1	19.2	19.5	17.7	18.8	18.0	19.1	19.4	
	3H	19.4	20.4	19.8	20.7	21.1	19.3	20.3	19.7	20.7	21.0	
	4H	20.1	21.0	20.5	21.3	21.7	20.0	20.9	20.4	21.3	21.7	
	6H	20.6	21.4	21.0	21.8	22.2	20.5	21.3	21.0	21.7	22.1	
	8H	20.7	21.5	21.2	21.9	22.3	20.7	21.4	21.1	21.8	22.3	
	12H	20.8	21.5	21.3	21.9	22.4	20.8	21.4	21.2	21.9	22.3	
8H	4H	20.3	21.0	20.8	21.4	21.9	20.3	21.0	20.7	21.4	21.8	
	6H	20.9	21.5	21.4	22.0	22.4	20.9	21.5	21.4	21.9	22.4	
	8H	21.1	21.7	21.6	22.1	22.6	21.1	21.6	21.6	22.1	22.6	
	12H	21.3	21.7	21.8	22.2	22.7	21.2	21.7	21.8	22.2	22.7	
12H	4H	20.3	21.0	20.8	21.4	21.9	20.3	20.9	20.7	21.4	21.8	
	6H	21.0	21.5	21.5	22.0	22.5	20.9	21.5	21.4	21.9	22.4	
	8H	21.2	21.7	21.7	22.1	22.7	21.2	21.6	21.7	22.1	22.6	
Variation of the observer position for the luminaire distances S												
S = 1.0H		+0.1 / -0.1					+0.1 / -0.1					
S = 1.5H		+0.2 / -0.3					+0.2 / -0.4					
S = 2.0H		+0.5 / -0.6					+0.5 / -0.7					
Standard table		BK05					BK05					
Correction summand		3.6					3.6					
Corrected glare indices referring to 4053lm Total luminous flux												

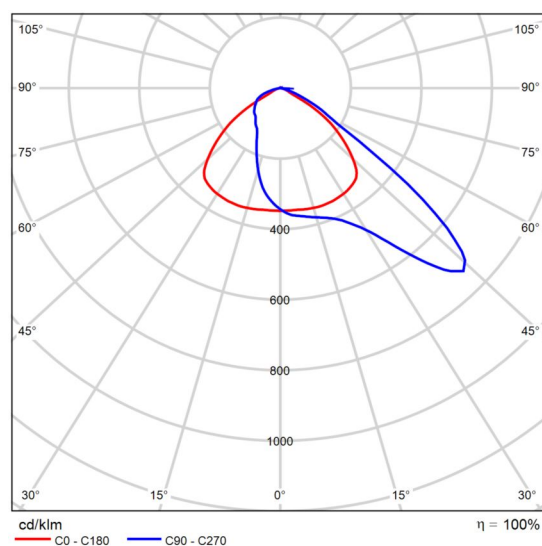
UGR diagram (SHR: 0.25)

## Product data sheet

SYLVANIA - RAIDEN IP66 8KLM 840 ASYM



Article No.	2824062
P	67.0 W
$\Phi_{\text{Lamp}}$	8700 lm
$\Phi_{\text{Luminaire}}$	8700 lm
$\eta$	100.00 %
Luminous efficacy	129.9 lm/W
CCT	4000 K
CRI	80



Polar LDC



Building 1

**Luminaire list** $\Phi_{\text{total}}$ 

175710 lm

 $P_{\text{total}}$ 

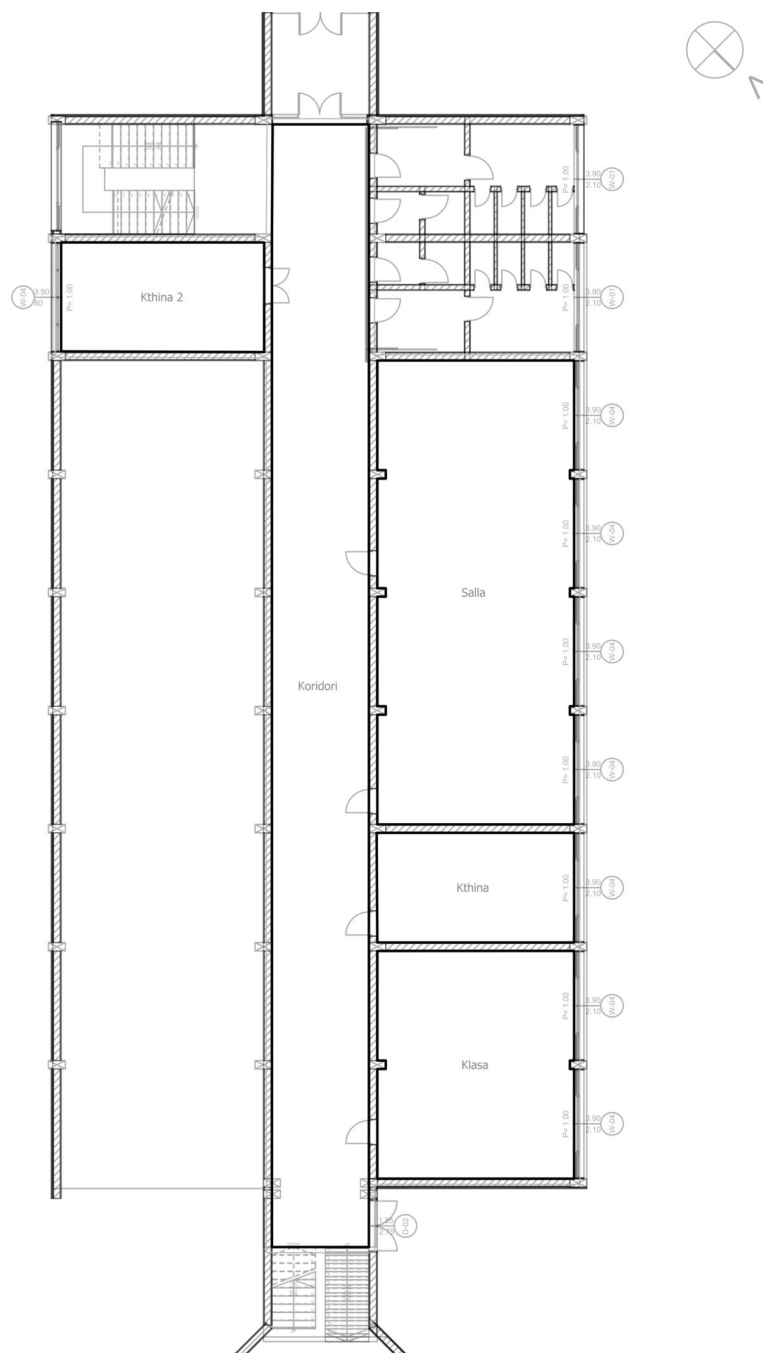
1454.0 W

Luminous efficacy

120.8 lm/W

pcs.	Manufacturer	Article No.	Article name	P	$\Phi$	Luminous efficacy
27	Not yet a DIALux member		"START Panel 1200x300 HE 4100L m 840 LILO" /4000	34.0 W	3930 lm	115.6 lm/W
8	SYLVANIA	2824062	RAIDEN IP66 8KLM 840 ASYM	67.0 W	8700 lm	129.9 lm/W

Building 1 · Kthina (Light scene 1)

**Room list**

Building 1 · Kthina (Light scene 1)

**Room list**

Klasa

<b>P<sub>total</sub></b> 306.0 W	<b>A<sub>Room</sub></b> 56.56 m <sup>2</sup>	<b>Lighting power density</b> 5.41 W/m <sup>2</sup> = 1.51 W/m <sup>2</sup> /100 lx (Room)	<b>E<sub>perpendicular</sub> (Working plane)</b> 359 lx
-------------------------------------	---	---	--

pcs.	Manufacturer	Article No.	Article name	P	Φ <sub>Luminaire</sub>
9	Not yet a DIALux member		"START Panel 1200x300 HE 4100L m 840 LILO" /4000	34.0 W	3930 lm

Koridori

<b>P<sub>total</sub></b> 340.0 W	<b>A<sub>Room</sub></b> 137.72 m <sup>2</sup>	<b>Lighting power density</b> 2.47 W/m <sup>2</sup> = 1.58 W/m <sup>2</sup> /100 lx (Room)	<b>E<sub>perpendicular</sub> (Working plane)</b> 157 lx
-------------------------------------	--	---	--

pcs.	Manufacturer	Article No.	Article name	P	Φ <sub>Luminaire</sub>
10	Not yet a DIALux member		"START Panel 1200x300 HE 4100L m 840 LILO" /4000	34.0 W	3930 lm

Kthina

<b>P<sub>total</sub></b> 136.0 W	<b>A<sub>Room</sub></b> 27.35 m <sup>2</sup>	<b>Lighting power density</b> 4.97 W/m <sup>2</sup> = 1.85 W/m <sup>2</sup> /100 lx (Room)	<b>E<sub>perpendicular</sub> (Working plane)</b> 269 lx
-------------------------------------	---	---	--

pcs.	Manufacturer	Article No.	Article name	P	Φ <sub>Luminaire</sub>
4	Not yet a DIALux member		"START Panel 1200x300 HE 4100L m 840 LILO" /4000	34.0 W	3930 lm

Building 1 · Kthina (Light scene 1)

**Room list**

Kthina 2

<b>P<sub>total</sub></b> 136.0 W	<b>A<sub>Room</sub></b> 28.09 m <sup>2</sup>	<b>Lighting power density</b> 4.84 W/m <sup>2</sup> = 1.83 W/m <sup>2</sup> /100 lx (Room)	<b>E<sub>perpendicular</sub> (Working plane)</b> 265 lx
-------------------------------------	---	---	--

pcs.	Manufacturer	Article No.	Article name	P	Φ <sub>Luminaire</sub>
4	Not yet a DIALux member		"START Panel 1200x300 HE 4100L m 840 LILO" /4000	34.0 W	3930 lm

Salla

<b>P<sub>total</sub></b> 536.0 W	<b>A<sub>Room</sub></b> 115.10 m <sup>2</sup>	<b>Lighting power density</b> 4.66 W/m <sup>2</sup> = 1.23 W/m <sup>2</sup> /100 lx (Room)	<b>E<sub>perpendicular</sub> (Working plane)</b> 378 lx
-------------------------------------	--	---	--

pcs.	Manufacturer	Article No.	Article name	P	Φ <sub>Luminaire</sub>
8	SYLVANIA	2824062	RAIDEN IP66 8KLM 840 ASYM	67.0 W	8700 lm

Building 1 · Kthina

**Luminaire list** $\Phi_{\text{total}}$ 

175710 lm

 $P_{\text{total}}$ 

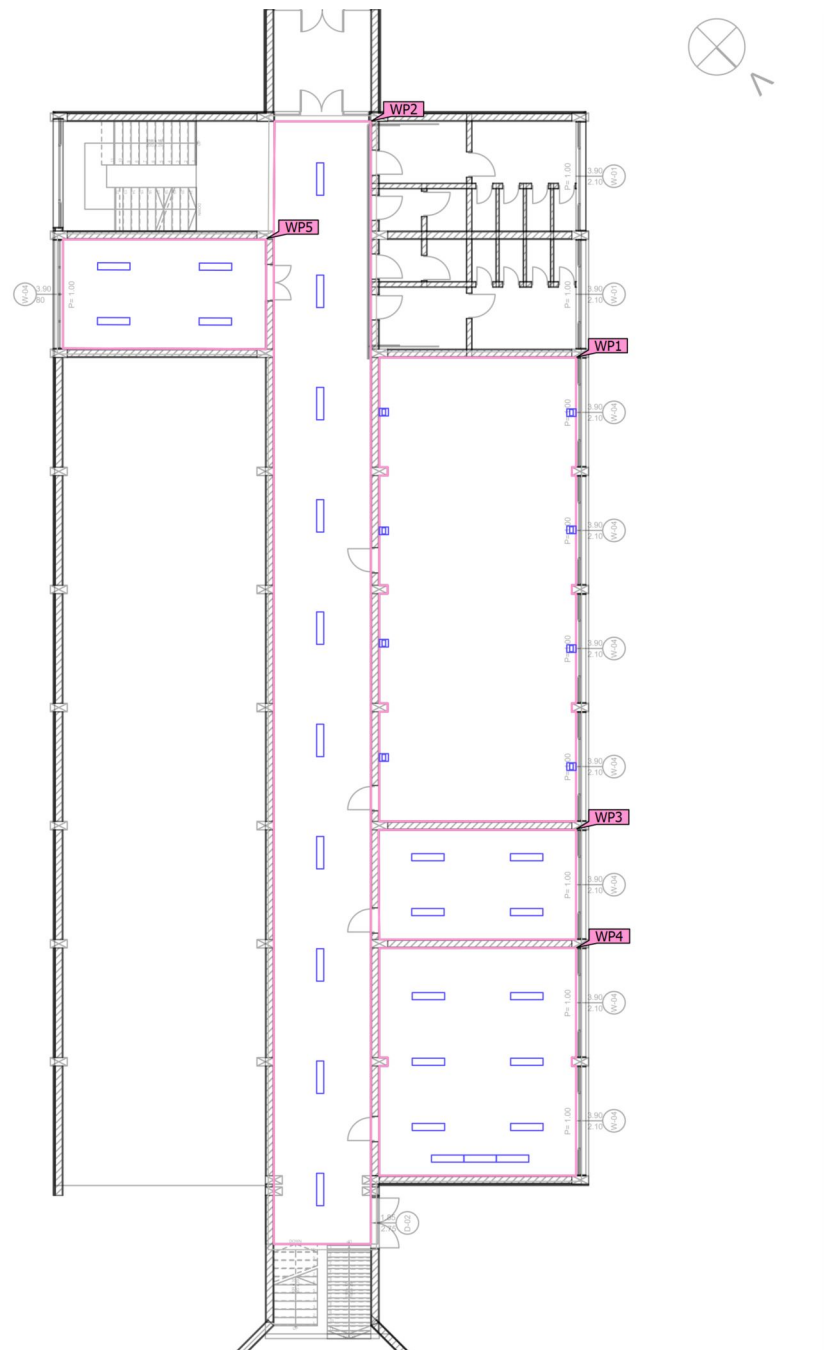
1454.0 W

Luminous efficacy

120.8 lm/W

pcs.	Manufacturer	Article No.	Article name	P	$\Phi$	Luminous efficacy
27	Not yet a DIALux member		"START Panel 1200x300 HE 4100L m 840 LILO" /4000	34.0 W	3930 lm	115.6 lm/W
8	SYLVANIA	2824062	RAIDEN IP66 8KLM 840 ASYM	67.0 W	8700 lm	129.9 lm/W

Building 1 · Kthina (Light scene 1)

**Calculation objects**

Building 1 · Kthina (Light scene 1)

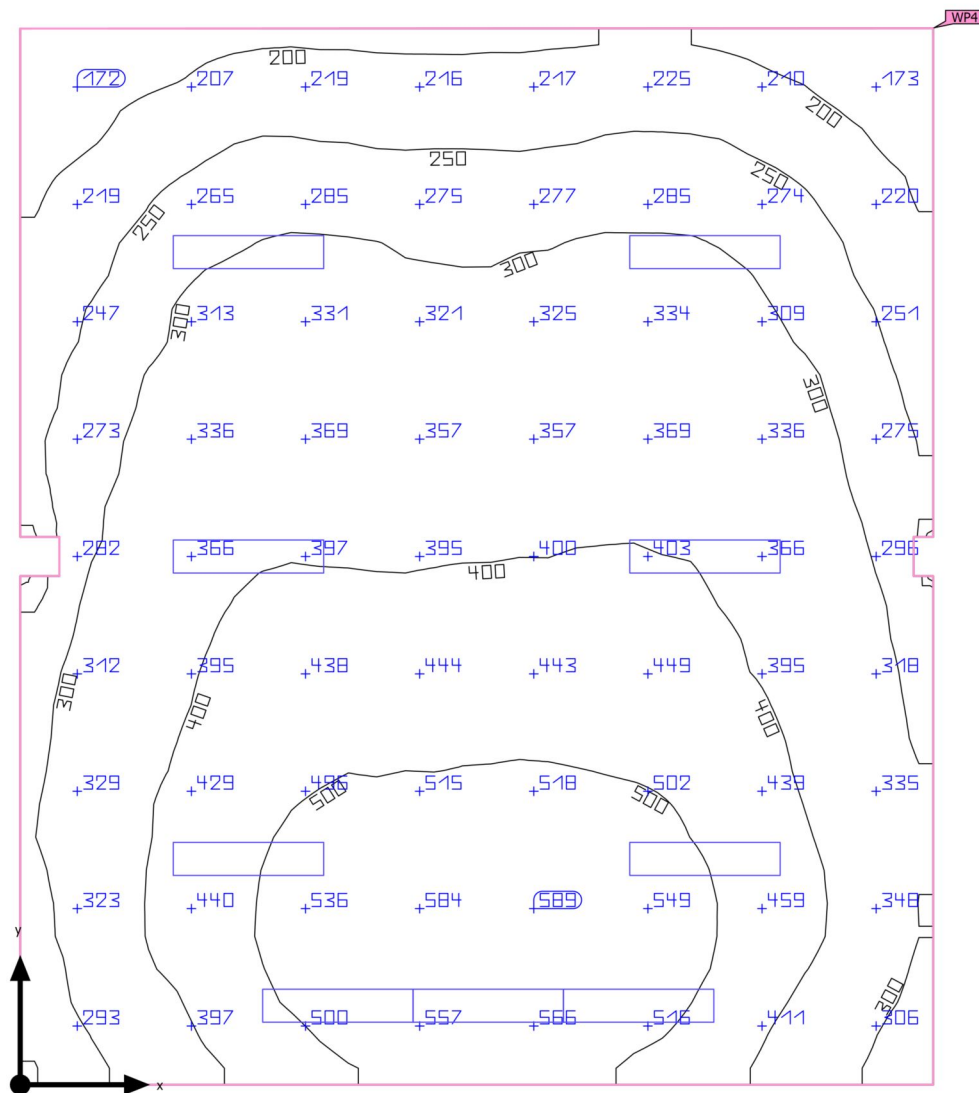
**Calculation objects**

## Working planes

Properties	$\bar{E}$ (Target)	$E_{min}$	$E_{max}$	$U_o (g_1)$ (Target)	$g_2$	Index
Working plane (Salla ) Perpendicular illuminance (adaptive) Height: 0.800 m, Wall zone: 0.000 m	378 lx ( $\geq 300$ lx) ✓	213 lx	480 lx	0.56 ( $\geq 0.40$ ) ✓	0.44	WP1
Working plane (Koridori ) Perpendicular illuminance (adaptive) Height: 0.800 m, Wall zone: 0.000 m	157 lx ( $\geq 100$ lx) ✓	83.1 lx	202 lx	0.53 ( $\geq 0.40$ ) ✓	0.41	WP2
Working plane (Kthina ) Perpendicular illuminance (adaptive) Height: 0.800 m, Wall zone: 0.000 m	269 lx ( $\geq 200$ lx) ✓	169 lx	326 lx	0.63 ( $\geq 0.60$ ) ✓	0.52	WP3
Working plane (Klasa) Perpendicular illuminance (adaptive) Height: 0.800 m, Wall zone: 0.000 m	359 lx ( $\geq 300$ lx) ✓	148 lx	598 lx	0.41 ( $\geq 0.40$ ) ✓	0.25	WP4
Working plane (Kthina 2) Perpendicular illuminance (adaptive) Height: 0.800 m, Wall zone: 0.000 m	265 lx ( $\geq 300$ lx) ✗	158 lx	321 lx	0.60 ( $\geq 0.60$ ) ✓	0.49	WP5

Building 1 · Kthina · Klasa (Light scene 1)

## Summary



Ground area	56.56 m <sup>2</sup>	Clearance height	3.700 m
Reflection factors	Ceiling: 70.0 %, Walls: 50.0 %, Floor: 20.0 %	Mounting height	3.700 m
Maintenance factor	0.80 (fixed)	Height <sub>Working plane</sub>	0.800 m
		Wall zone <sub>Working plane</sub>	0.000 m



Building 1 · Kthina · Klasa (Light scene 1)

## Summary

### Results

	Symbol	Calculated	Target	Check	Index
Working plane	$\bar{E}_{\text{perpendicular}}$	359 lx	$\geq 300 \text{ lx}$	✓	WP4
	$U_o (g_1)$	0.41	$\geq 0.40$	✓	WP4
Glare valuation <sup>(1)</sup>	$R_{UG, \text{max}}$	21	$\leq 19$	✗	
Energy estimation <sup>(2)</sup>	Consumption	407 kWh/a	max. 2000 kWh/a	✓	
Room	Lighting power density	5.41 W/m <sup>2</sup>	–		
		1.51 W/m <sup>2</sup> /100 lx	–		

(1) Based on a rectangular space of 8.100 m x 7.000 m and SHR of 0.25.

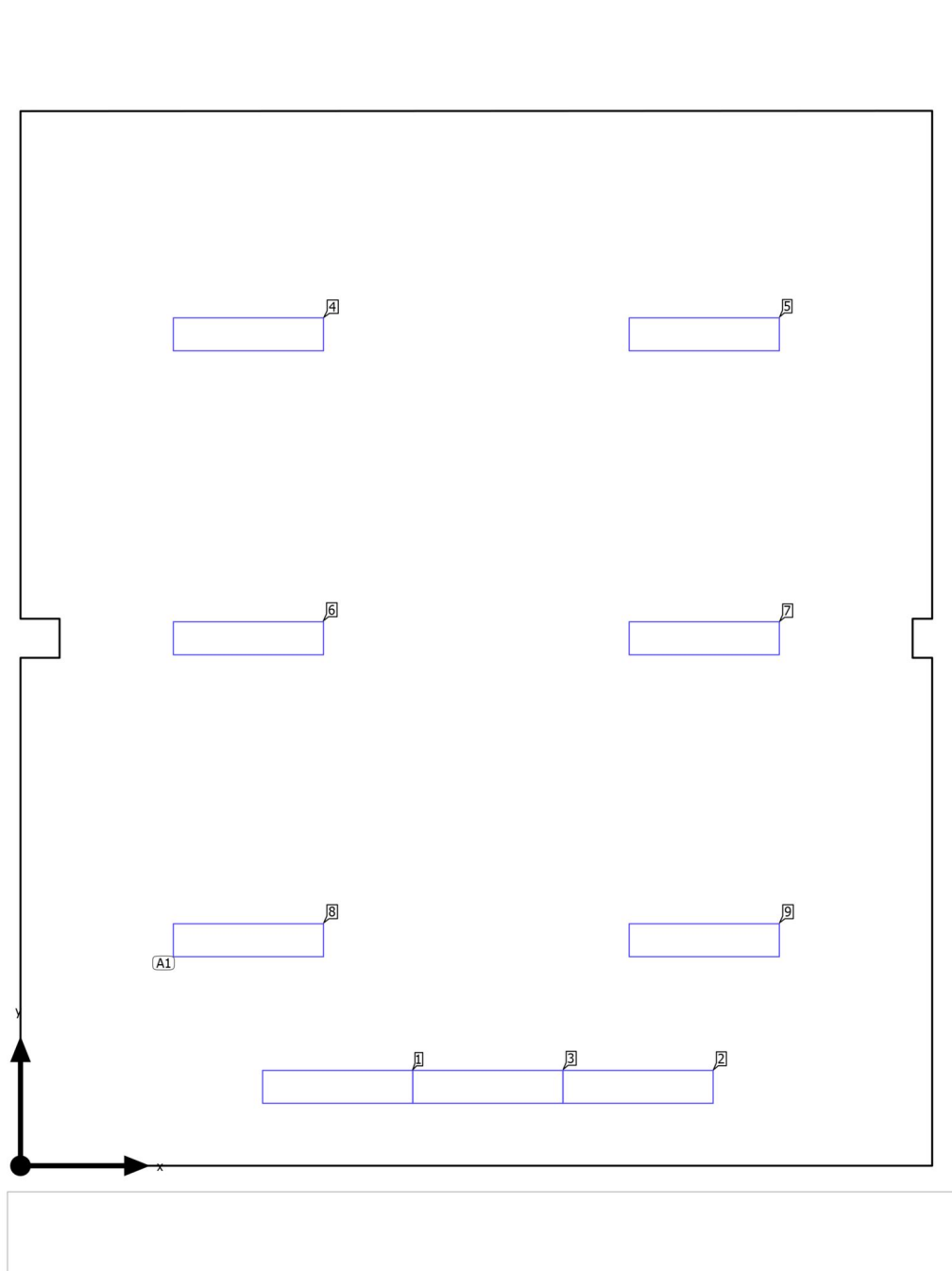
(2) Calculated using DIN:18599-4.

Utilisation profile: Educational premises - Educational buildings (5.36.1 Classrooms, tutorial rooms)

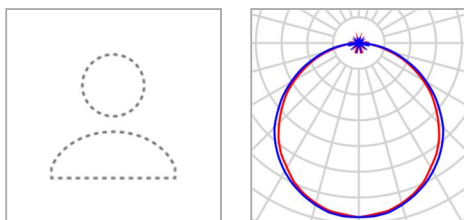
### Luminaire list

pcs.	Manufacturer	Article No.	Article name	$R_{UG}$	P	$\Phi$	Luminous efficacy
9	Not yet a DIALux member		"START Panel 1200x300 HE 4100L m 840 LILO" /4000	20	34.0 W	3930 lm	115.6 lm/W

Building 1 · Kthina · Klasa

**Luminaire layout plan**

Building 1 · Kthina · Klasa

**Luminaire layout plan**

Manufacturer	Not yet a DIALux member	P	34.0 W
Article name	"START Panel 1200x300 HE 4100L m 840 LILO" /4000	$\Phi_{\text{Luminaire}}$	3930 lm
Fitting	1x LED/4000		

6 x Not yet a DIALux member "START Panel 1200x300 HE 4100L m 840 LILO" /4000

Type	Field Arrangement	X	Y	Mounting height	Luminaire
1st luminaire (X/Y/Z)	1.750 m / 1.731 m / 3.700 m	1.750 m	6.384 m	3.700 m	4
X-direction	2 pcs., Centre - centre, Distances not equal	5.250 m	6.384 m	3.700 m	5
		1.750 m	4.050 m	3.700 m	6
Y-direction	3 pcs., Centre - centre, Distances not equal	5.250 m	4.050 m	3.700 m	7
		1.750 m	1.731 m	3.700 m	8
Arrangement	A1	5.250 m	1.731 m	3.700 m	9

## Individual luminaires

X	Y	Mounting height	Luminaire
2.435 m	0.606 m	3.700 m	1
4.741 m	0.606 m	3.700 m	2
3.588 m	0.606 m	3.700 m	3

Building 1 · Kthina · Klasa

**Luminaire list** $\Phi_{\text{total}}$ 

35370 lm

 $P_{\text{total}}$ 

306.0 W

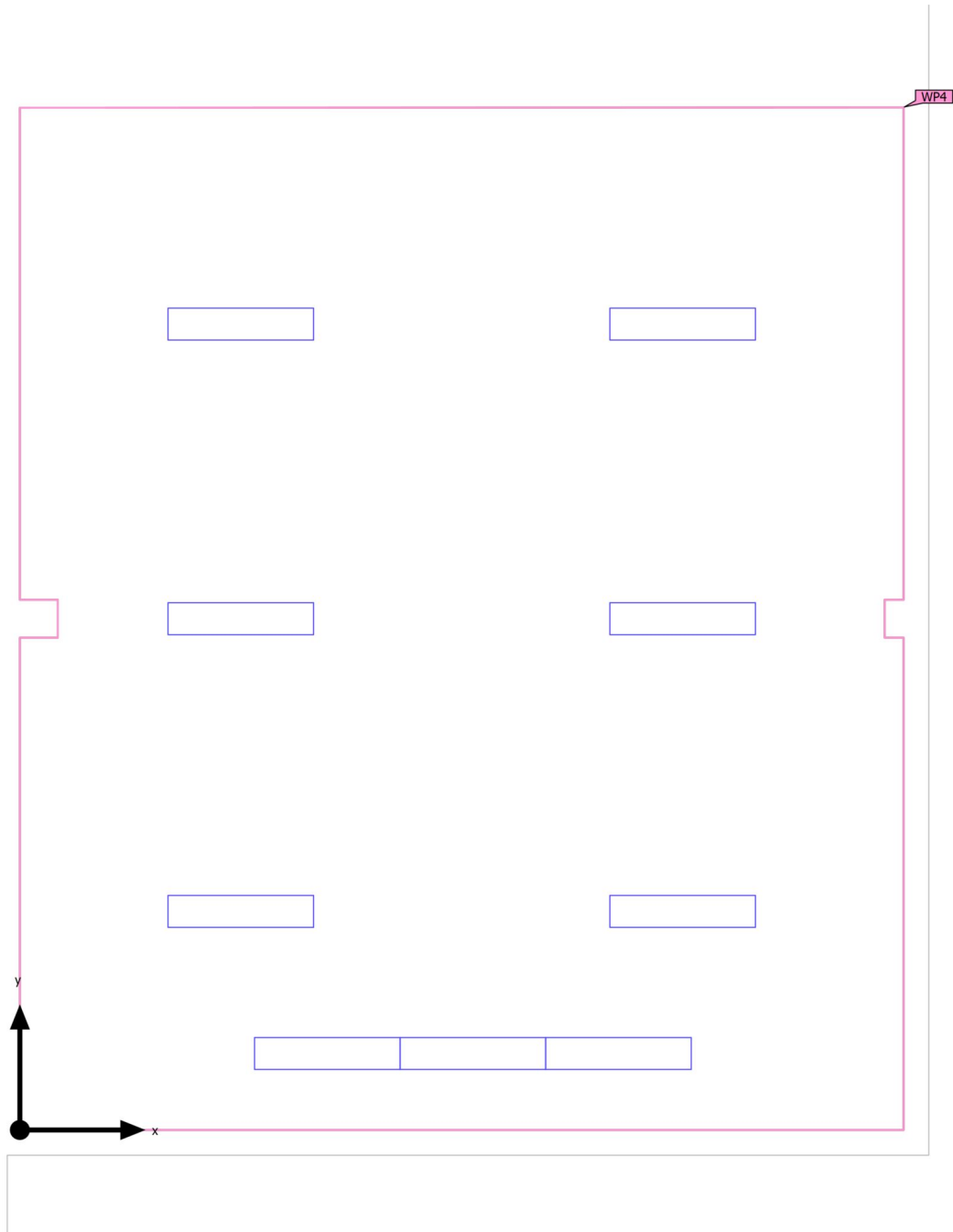
Luminous efficacy

115.6 lm/W

pcs.	Manufacturer	Article No.	Article name	P	$\Phi$	Luminous efficacy
9	Not yet a DIALux member		"START Panel 1200x300 HE 4100L m 840 LILO" /4000	34.0 W	3930 lm	115.6 lm/W

Building 1 · Kthina · Klasa (Light scene 1)

## Calculation objects



Building 1 · Kthina · Klasa (Light scene 1)

**Calculation objects**

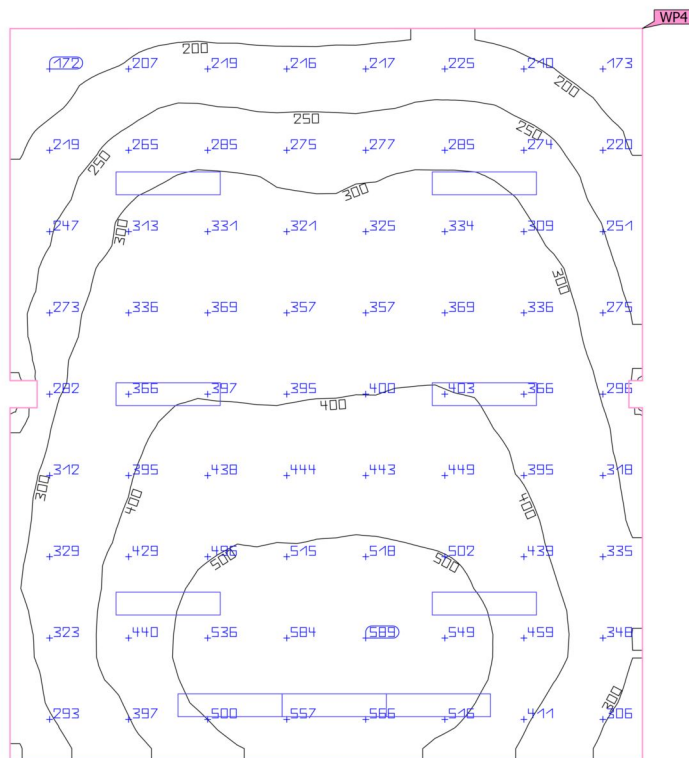
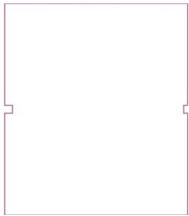
## Working planes

Properties	$\bar{E}$ (Target)	$E_{min}$	$E_{max}$	$U_o (g_1)$ (Target)	$g_2$	Index
Working plane (Klasa) Perpendicular illuminance (adaptive) Height: 0.800 m, Wall zone: 0.000 m	359 lx ( $\geq 300$ lx) ✓	148 lx	598 lx	0.41 ( $\geq 0.40$ ) ✓	0.25	WP4

(1) Based on a rectangular space of 8.100 m x 7.000 m and SHR of 0.25.

Utilisation profile: Educational premises - Educational buildings (5.36.1 Classrooms, tutorial rooms)

Building 1 · Kthina · Klasa (Light scene 1)

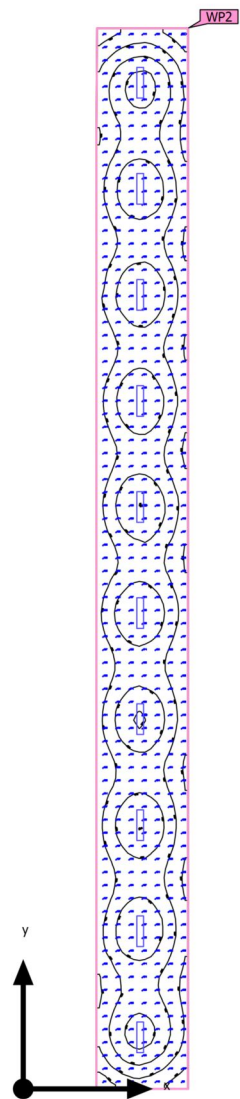
**Working plane (Klasa)**

Properties	$\bar{E}$ (Target)	$E_{min}$	$E_{max}$	$U_o (g_1)$ (Target)	$g_2$	Index
Working plane (Klasa)	359 lx	148 lx	598 lx	0.41	0.25	WP4
Perpendicular illuminance (adaptive)	( $\geq 300$ lx)			( $\geq 0.40$ )		
Height: 0.800 m, Wall zone: 0.000 m	✓			✓		

Utilisation profile: Educational premises - Educational buildings (5.36.1 Classrooms, tutorial rooms)

Building 1 · Kthina · Koridori (Light scene 1)

Summary



Ground area	137.72 m²
Reflection factors	Ceiling: 70.0 %, Walls: 50.0 %, Floor: 20.0 %
Maintenance factor	0.80 (fixed)

Clearance height	3.200 m
Mounting height	3.700 m
Height <sub>Working plane</sub>	0.800 m
Wall zone <sub>Working plane</sub>	0.000 m



Building 1 · Kthina · Koridori (Light scene 1)

## Summary

### Results

	Symbol	Calculated	Target	Check	Index
Working plane	$\bar{E}_{\text{perpendicular}}$	157 lx	$\geq 100 \text{ lx}$	✓	WP2
	$U_o (g_1)$	0.53	$\geq 0.40$	✓	WP2
Glare valuation <sup>(1)</sup>	$R_{UG, \text{max}}$	21	$\leq 22$	✓	
Energy estimation <sup>(2)</sup>	Consumption	655 kWh/a	max. 4850 kWh/a	✓	
Room	Lighting power density	2.47 W/m <sup>2</sup>	–		
		1.58 W/m <sup>2</sup> /100 lx	–		

(1) Based on a rectangular space of 3.450 m x 39.933 m and SHR of 0.25.

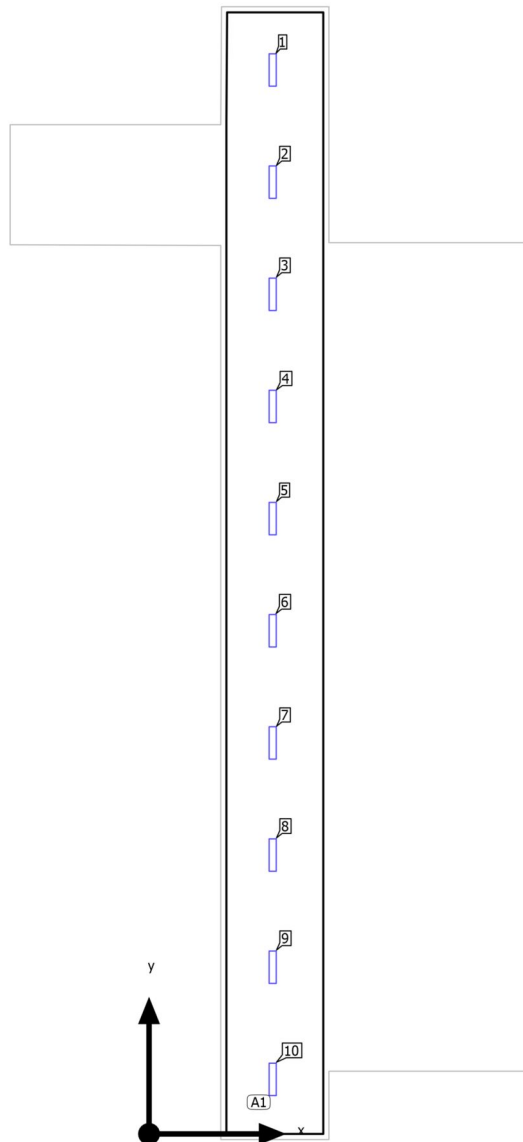
(2) Calculated using DIN:18599-4.

Utilisation profile: Places of public assembly - General areas (5.28.1 Entrance halls)

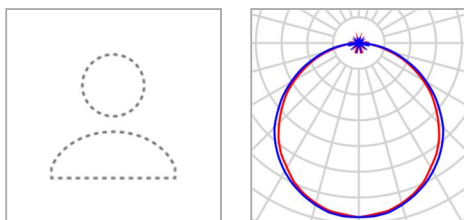
### Luminaire list

pcs.	Manufacturer	Article No.	Article name	$R_{UG}$	P	$\Phi$	Luminous efficacy
10	Not yet a DIALux member		"START Panel 1200x300 HE 4100L m 840 LILO" /4000	21	34.0 W	3930 lm	115.6 lm/W

Building 1 · Kthina · Koridori  
**Luminaire layout plan**



Building 1 · Kthina · Koridori

**Luminaire layout plan**

Manufacturer	Not yet a DIALux member	P	34.0 W
Article name	"START Panel 1200x300 HE 4100L m 840 LILO" /4000	$\Phi_{\text{Luminaire}}$	3930 lm
Fitting	1x LED/4000		

10 x Not yet a DIALux member "START Panel 1200x300 HE 4100L m 840 LILO" /4000

Type	Field Arrangement	X	Y	Mounting height	Luminaire
1st luminaire (X/Y/Z)	4.403 m / 1.942 m / 3.700 m	4.403 m	37.882 m	3.700 m	1
X-direction	1 pcs., Centre - centre, 6.205 m	4.403 m	33.888 m	3.700 m	2
Y-direction	10 pcs., Centre - centre, 3.993 m	4.403 m	29.895 m	3.700 m	3
		4.403 m	25.902 m	3.700 m	4
Arrangement	A1	4.403 m	21.908 m	3.700 m	5
		4.403 m	17.915 m	3.700 m	6
		4.403 m	13.922 m	3.700 m	7
		4.403 m	9.929 m	3.700 m	8
		4.403 m	5.935 m	3.700 m	9
		4.403 m	1.942 m	3.700 m	10

Building 1 · Kthina · Koridori

**Luminaire list** $\Phi_{\text{total}}$ 

39300 lm

 $P_{\text{total}}$ 

340.0 W

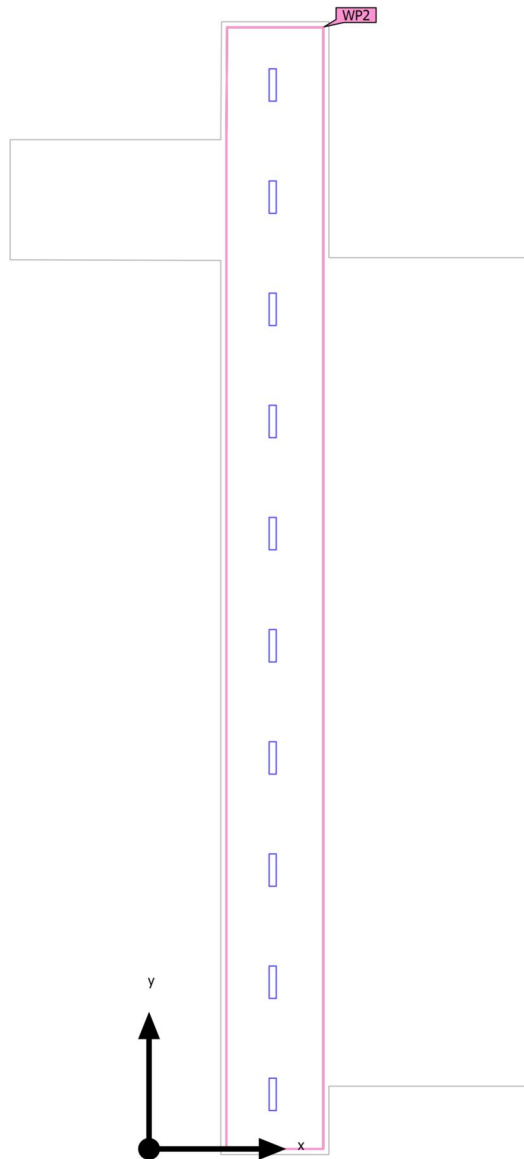
Luminous efficacy

115.6 lm/W

pcs.	Manufacturer	Article No.	Article name	P	$\Phi$	Luminous efficacy
10	Not yet a DIALux member		"START Panel 1200x300 HE 4100L m 840 LILO" /4000	34.0 W	3930 lm	115.6 lm/W

Building 1 · Kthina · Koridori (Light scene 1)

## Calculation objects



Building 1 · Kthina · Koridori (Light scene 1)

## Calculation objects

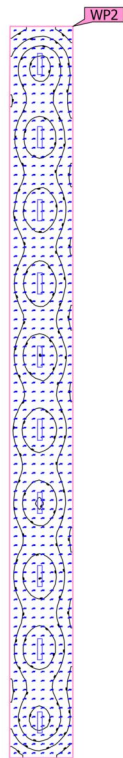
### Working planes

Properties	$\bar{E}$ (Target)	$E_{min}$	$E_{max}$	$U_o (g_1)$ (Target)	$g_2$	Index
Working plane (Koridori ) Perpendicular illuminance (adaptive) Height: 0.800 m, Wall zone: 0.000 m	157 lx ( $\geq 100$ lx) ✓	83.1 lx	202 lx	0.53 ( $\geq 0.40$ ) ✓	0.41	WP2

(1) Based on a rectangular space of 3.450 m x 39.933 m and SHR of 0.25.

Utilisation profile: Places of public assembly - General areas (5.28.1 Entrance halls)

Building 1 · Kthina · Koridori (Light scene 1)

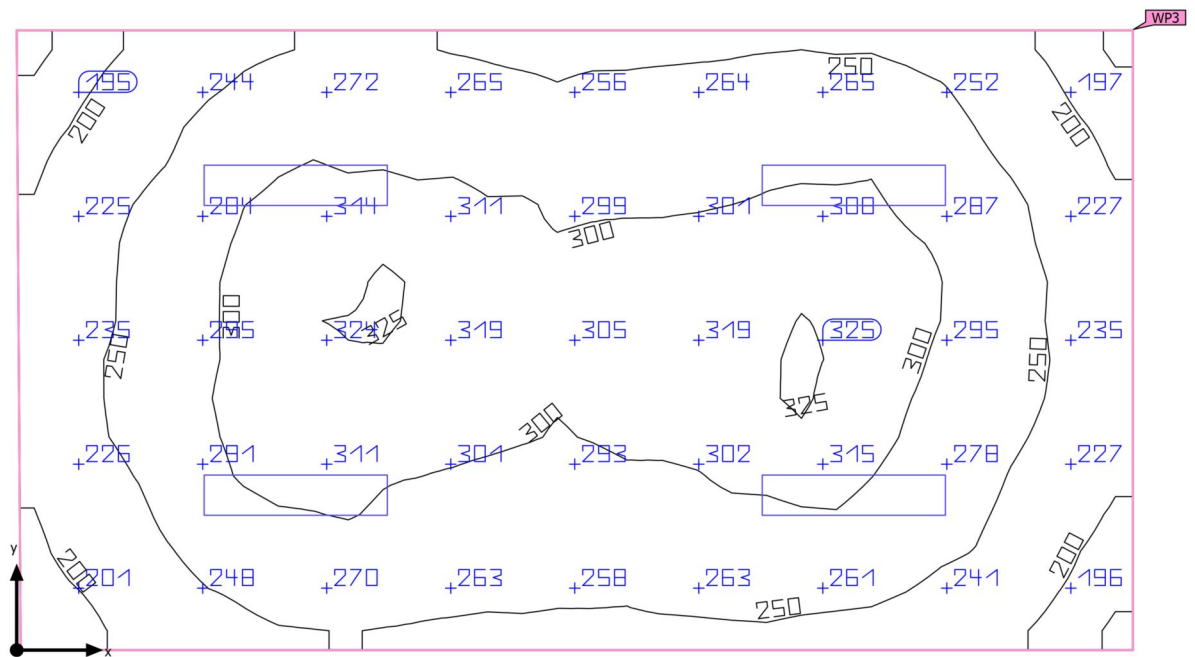
**Working plane (Koridori )**

Properties	$\bar{E}$ (Target)	$E_{min}$	$E_{max}$	$U_o (g_1)$ (Target)	$g_2$	Index
Working plane (Koridori ) Perpendicular illuminance (adaptive) Height: 0.800 m, Wall zone: 0.000 m	157 lx ( $\geq 100$ lx) ✓	83.1 lx	202 lx	0.53 ( $\geq 0.40$ ) ✓	0.41	WP2

Utilisation profile: Places of public assembly - General areas (5.28.1 Entrance halls)

Building 1 · Kthina · Kthina (Light scene 1)

## Summary



Ground area	27.35 m <sup>2</sup>	Clearance height	3.200 m
Reflection factors	Ceiling: 70.0 %, Walls: 50.0 %, Floor: 20.0 %	Mounting height	3.700 m
Maintenance factor	0.80 (fixed)	Height <sub>Working plane</sub>	0.800 m
		Wall zone <sub>Working plane</sub>	0.000 m



Building 1 · Kthina · Kthina (Light scene 1)

## Summary

### Results

	Symbol	Calculated	Target	Check	Index
Working plane	$\bar{E}_{\text{perpendicular}}$	269 lx	$\geq 200 \text{ lx}$	✓	WP3
	$U_o (g_1)$	0.63	$\geq 0.60$	✓	WP3
Glare valuation <sup>(1)</sup>	$R_{UG, \text{max}}$	20	$\leq 19$	✗	
Energy estimation <sup>(2)</sup>	Consumption	181 kWh/a	max. 1000 kWh/a	✓	
Room	Lighting power density	4.97 W/m <sup>2</sup>	–		
		1.85 W/m <sup>2</sup> /100 lx	–		

(1) Based on a rectangular space of 7.025 m x 3.900 m and SHR of 0.25.

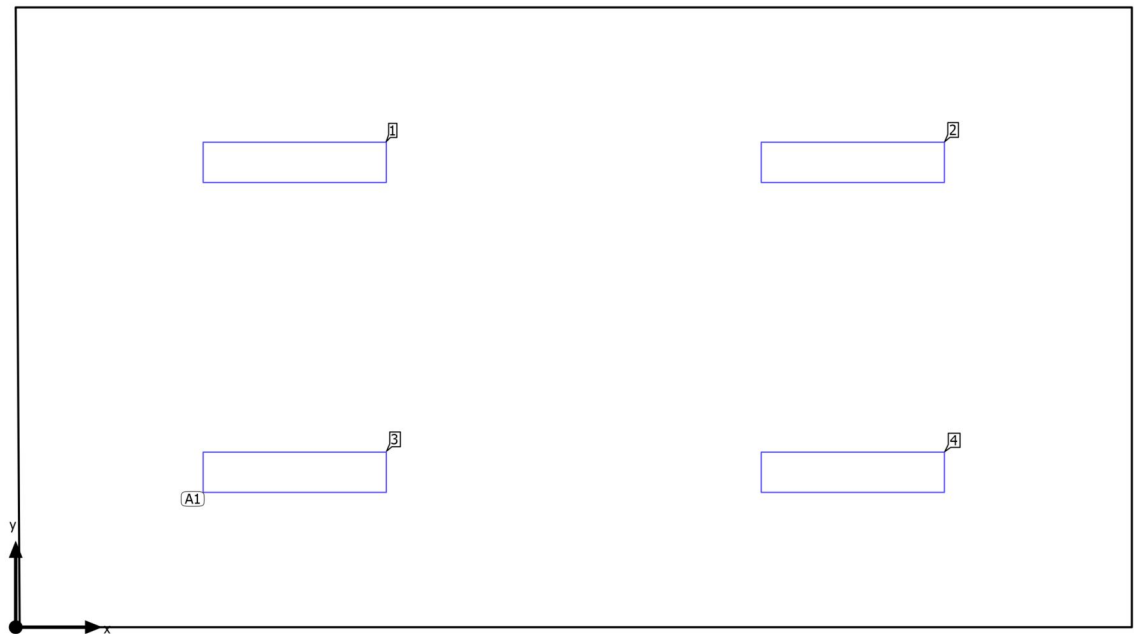
(2) Calculated using DIN:18599-4.

Utilisation profile: Educational premises - Educational buildings (5.36.1 Classrooms, tutorial rooms)

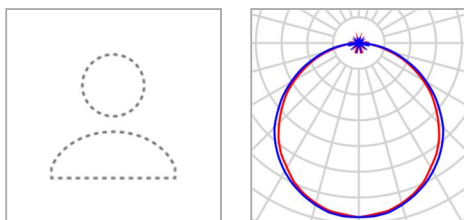
### Luminaire list

pcs.	Manufacturer	Article No.	Article name	$R_{UG}$	P	$\Phi$	Luminous efficacy
4	Not yet a DIALux member		"START Panel 1200x300 HE 4100L m 840 LILO" /4000	20	34.0 W	3930 lm	115.6 lm/W

Building 1 · Kthina · Kthina

**Luminaire layout plan**

Building 1 · Kthina · Kthina

**Luminaire layout plan**

Manufacturer	Not yet a DIALux member	P	34.0 W
Article name	"START Panel 1200x300 HE 4100L m 840 LILO" /4000	$\Phi_{\text{Luminaire}}$	3930 lm
Fitting	1x LED/4000		

4 x Not yet a DIALux member "START Panel 1200x300 HE 4100L m 840 LILO" /4000

Type	Field Arrangement	X	Y	Mounting height	Luminaire
1st luminaire (X/Y/Z)	1.756 m / 0.975 m / 3.700 m	1.756 m	2.925 m	3.700 m	1
X-direction	2 pcs., Centre - centre, 3.513 m	5.269 m	2.925 m	3.700 m	2
Y-direction	2 pcs., Centre - centre, 1.950 m	1.756 m	0.975 m	3.700 m	3
		5.269 m	0.975 m	3.700 m	4
Arrangement	A1				

Building 1 · Kthina · Kthina

**Luminaire list** $\Phi_{\text{total}}$ 

15720 lm

 $P_{\text{total}}$ 

136.0 W

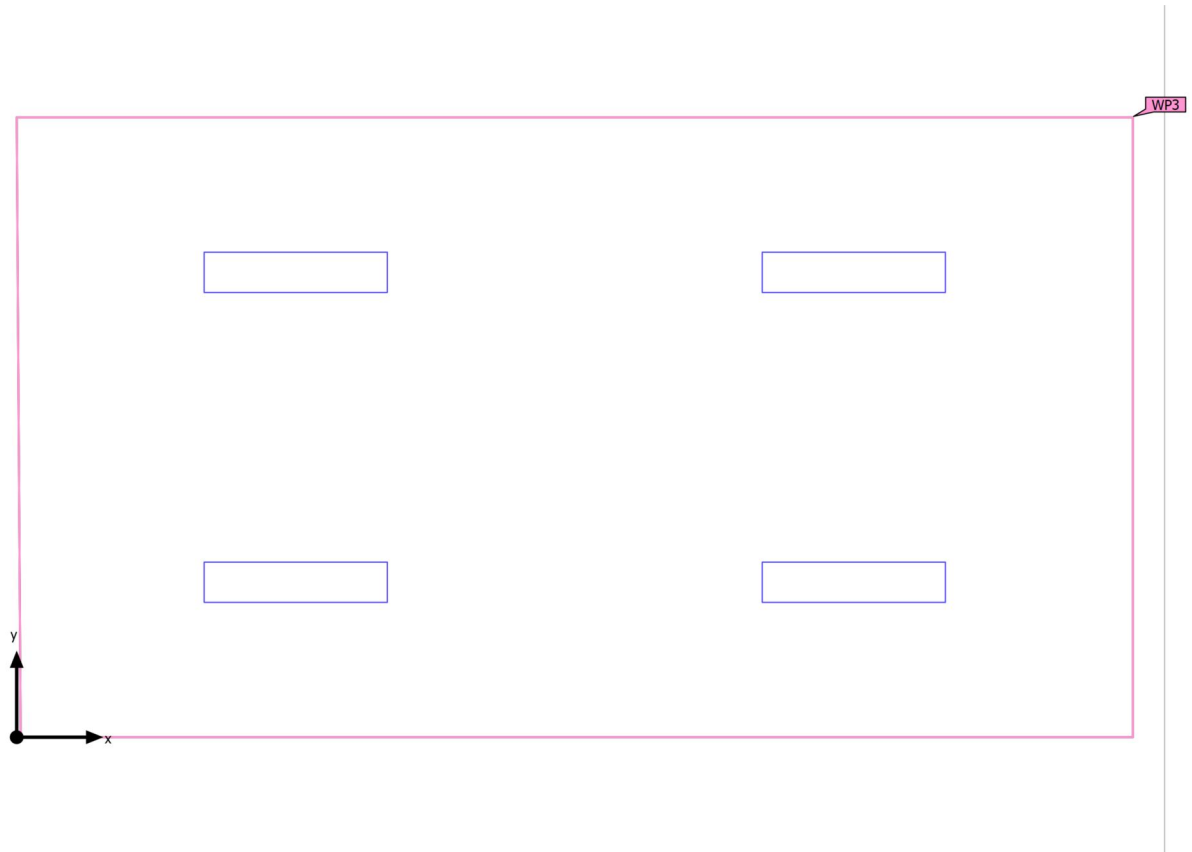
Luminous efficacy

115.6 lm/W

pcs.	Manufacturer	Article No.	Article name	P	$\Phi$	Luminous efficacy
4	Not yet a DIALux member		"START Panel 1200x300 HE 4100L m 840 LILO" /4000	34.0 W	3930 lm	115.6 lm/W

Building 1 · Kthina · Kthina (Light scene 1)

## Calculation objects



Building 1 · Kthina · Kthina (Light scene 1)

## Calculation objects

### Working planes

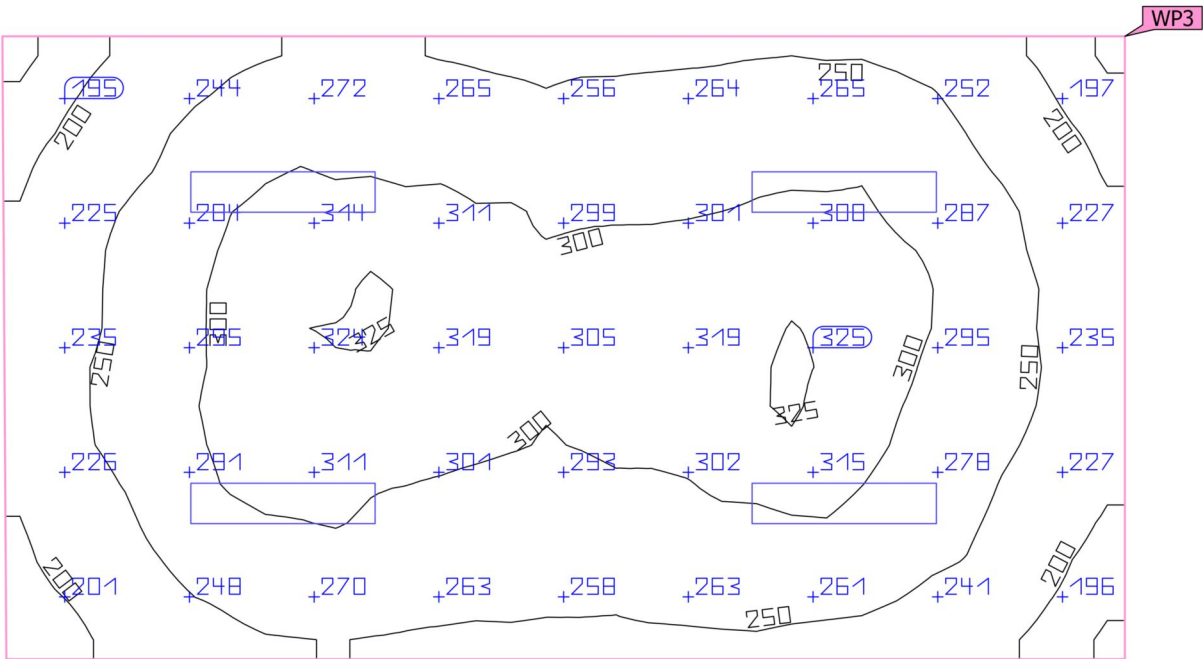
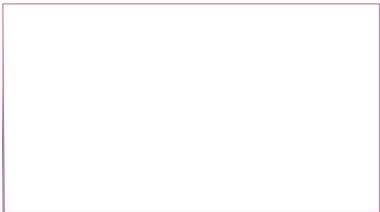
Properties	$\bar{E}$ (Target)	$E_{min}$	$E_{max}$	$U_o (g_1)$ (Target)	$g_2$	Index
Working plane (Kthina ) Perpendicular illuminance (adaptive) Height: 0.800 m, Wall zone: 0.000 m	269 lx ( $\geq 200$ lx) ✓	169 lx	326 lx	0.63 ( $\geq 0.60$ ) ✓	0.52	WP3

(1) Based on a rectangular space of 7.025 m x 3.900 m and SHR of 0.25.

Utilisation profile: Educational premises - Educational buildings (5.36.1 Classrooms, tutorial rooms)

Building 1 · Kthina · Kthina (Light scene 1)

Working plane (Kthina )

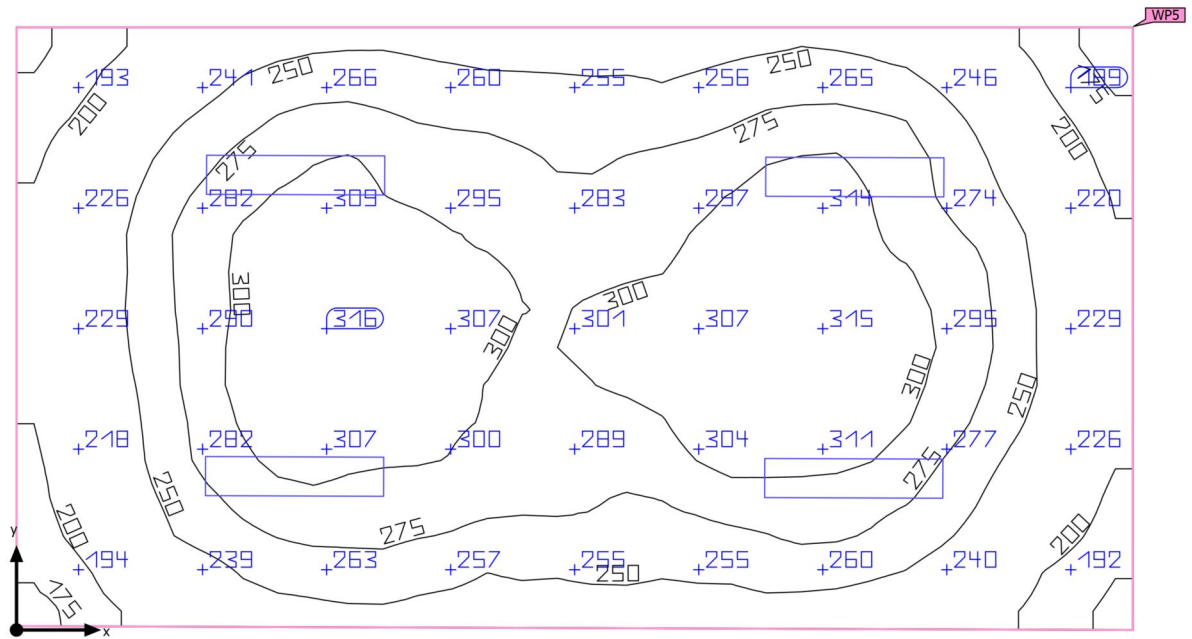


Properties	$\bar{E}$ (Target)	$E_{min}$	$E_{max}$	$U_o (g_1)$ (Target)	$g_2$	Index
Working plane (Kthina )	269 lx	169 lx	326 lx	0.63	0.52	WP3
Perpendicular illuminance (adaptive)	(≥ 200 lx)			(≥ 0.60)		
Height: 0.800 m, Wall zone: 0.000 m	✓			✓		

Utilisation profile: Educational premises - Educational buildings (5.36.1 Classrooms, tutorial rooms)

Building 1 · Kthina · Kthina 2 (Light scene 1)

## Summary



Ground area	28.09 m²	Clearance height	3.200 m
Reflection factors	Ceiling: 70.0 %, Walls: 50.0 %, Floor: 20.0 %	Mounting height	3.700 m
Maintenance factor	0.80 (fixed)	Height <sub>working plane</sub>	0.800 m
		Wall zone <sub>Working plane</sub>	0.000 m



Building 1 · Kthina · Kthina 2 (Light scene 1)

## Summary

### Results

	Symbol	Calculated	Target	Check	Index
Working plane	$\bar{E}_{\text{perpendicular}}$	265 lx	$\geq 300 \text{ lx}$	✗	WP5
	$U_o (g_1)$	0.60	$\geq 0.60$	✓	WP5
Glare valuation <sup>(1)</sup>	$R_{UG, \text{max}}$	20	$\leq 19$	✗	
Energy estimation <sup>(2)</sup>	Consumption	181 kWh/a	max. 1000 kWh/a	✓	
Room	Lighting power density	4.84 W/m <sup>2</sup>	–		
		1.83 W/m <sup>2</sup> /100 lx	–		

(1) Based on a rectangular space of 3.900 m x 7.225 m and SHR of 0.25.

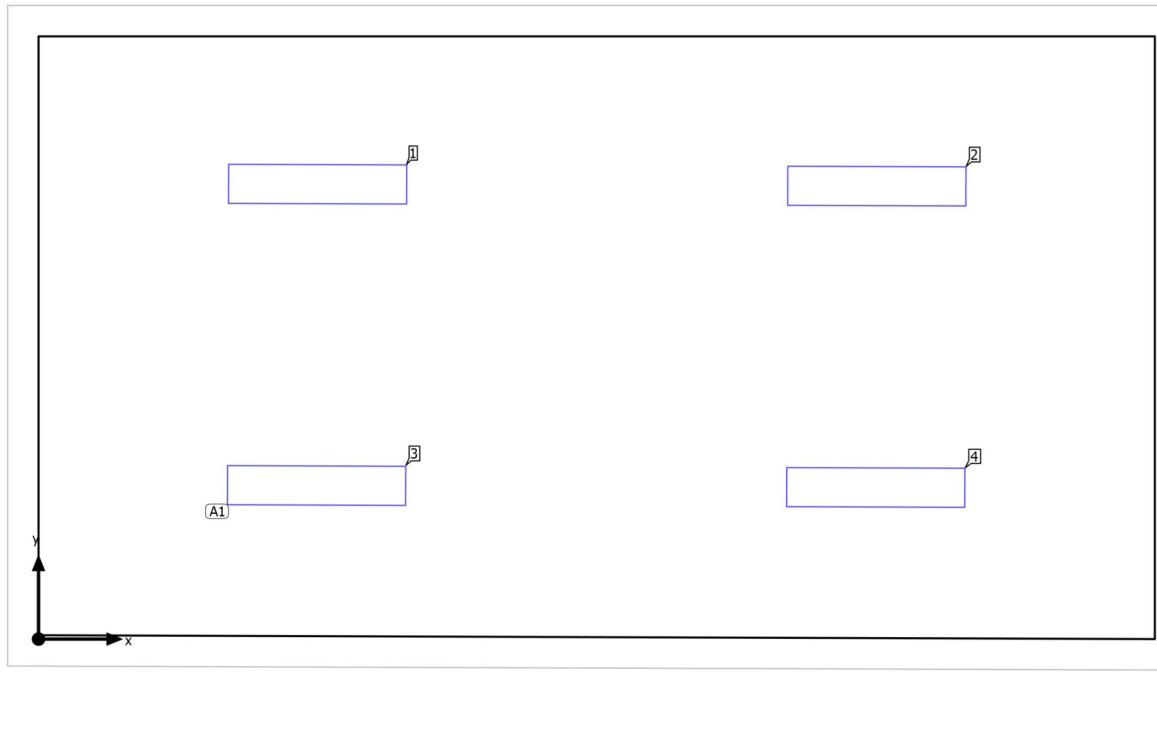
(2) Calculated using DIN:18599-4.

Utilisation profile: Educational premises - Educational buildings (5.36.1 Classrooms, tutorial rooms)

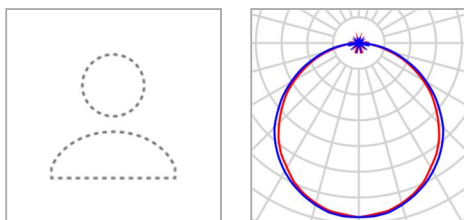
### Luminaire list

pcs.	Manufacturer	Article No.	Article name	$R_{UG}$	P	$\Phi$	Luminous efficacy
4	Not yet a DIALux member		"START Panel 1200x300 HE 4100L m 840 LILO" /4000	20	34.0 W	3930 lm	115.6 lm/W

Building 1 · Kthina · Kthina 2

**Luminaire layout plan**

Building 1 · Kthina · Kthina 2

**Luminaire layout plan**

Manufacturer	Not yet a DIALux member	P	34.0 W
Article name	"START Panel 1200x300 HE 4100L m 840 LILO" /4000	$\Phi_{\text{Luminaire}}$	3930 lm
Fitting	1x LED/4000		

4 x Not yet a DIALux member "START Panel 1200x300 HE 4100L m 840 LILO" /4000

Type	Field Arrangement	X	Y	Mounting height	Luminaire
1st luminaire (X/Y/Z)	1.800 m / 0.994 m / 3.700 m	1.806 m	2.944 m	3.700 m	1
X-direction	2 pcs., Centre - centre, 3.619 m	5.426 m	2.931 m	3.700 m	2
Y-direction	2 pcs., Centre - centre, 1.950 m	1.800 m	0.994 m	3.700 m	3
		5.419 m	0.981 m	3.700 m	4
Arrangement	A1				

Building 1 · Kthina · Kthina 2

**Luminaire list** $\Phi_{\text{total}}$ 

15720 lm

 $P_{\text{total}}$ 

136.0 W

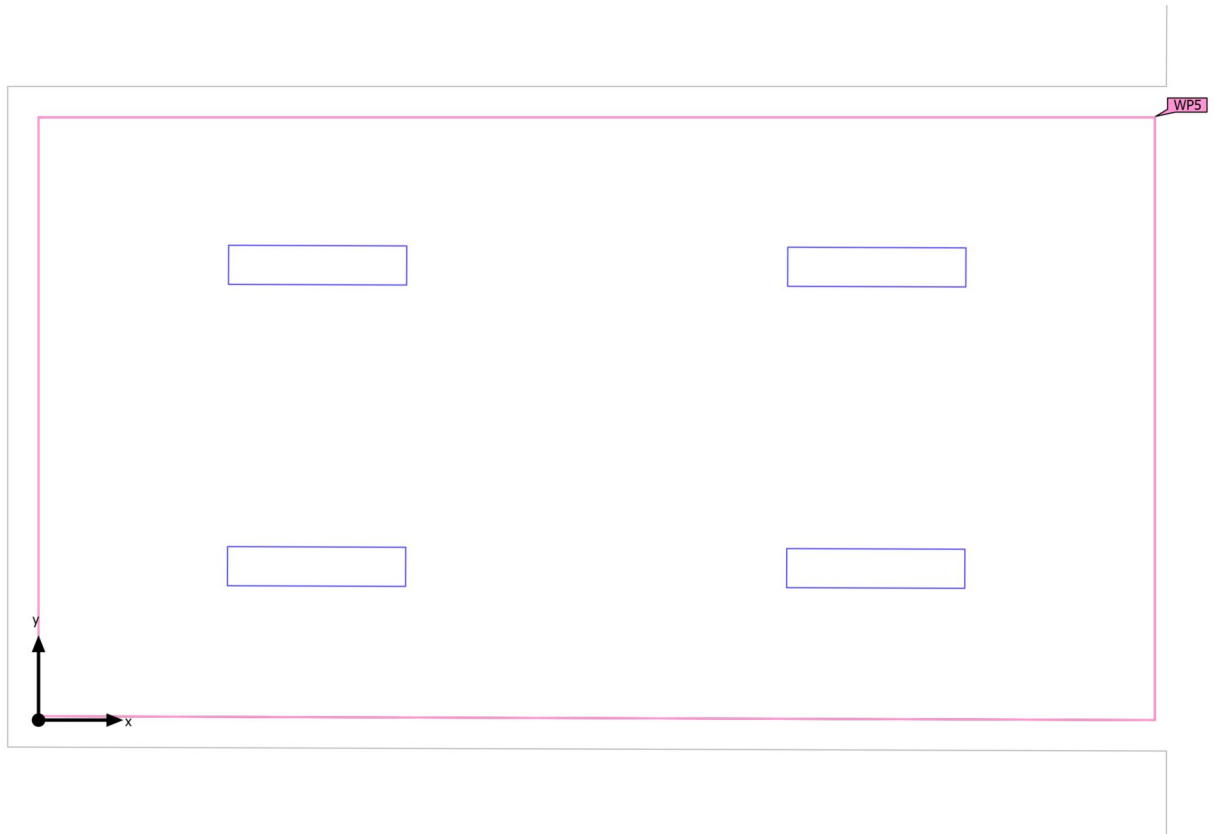
Luminous efficacy

115.6 lm/W

pcs.	Manufacturer	Article No.	Article name	P	$\Phi$	Luminous efficacy
4	Not yet a DIALux member		"START Panel 1200x300 HE 4100L m 840 LILO" /4000	34.0 W	3930 lm	115.6 lm/W

Building 1 · Kthina · Kthina 2 (Light scene 1)

## Calculation objects



Building 1 · Kthina · Kthina 2 (Light scene 1)

**Calculation objects**

## Working planes

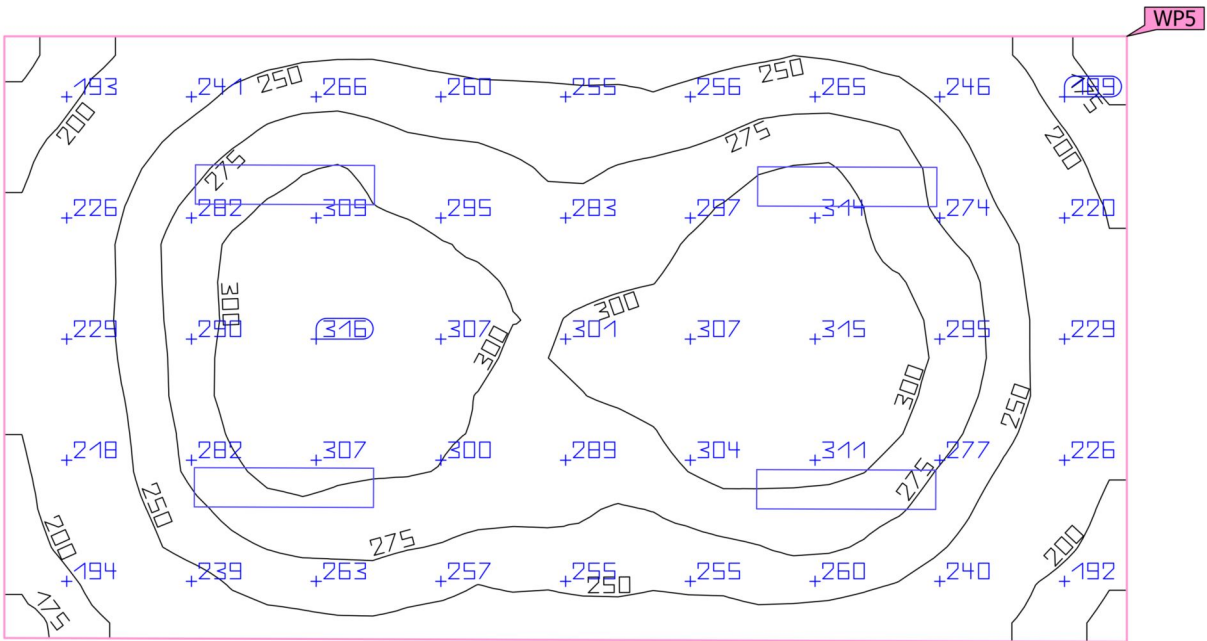
Properties	$\bar{E}$ (Target)	$E_{min}$	$E_{max}$	$U_o (g_1)$ (Target)	$g_2$	Index
Working plane (Kthina 2) Perpendicular illuminance (adaptive) Height: 0.800 m, Wall zone: 0.000 m	265 lx ( $\geq 300$ lx) ✗	158 lx	321 lx	0.60 ( $\geq 0.60$ ) ✓	0.49	WP5

(1) Based on a rectangular space of 3.900 m x 7.225 m and SHR of 0.25.

Utilisation profile: Educational premises - Educational buildings (5.36.1 Classrooms, tutorial rooms)

Building 1 · Kthina · Kthina 2 (Light scene 1)

Working plane (Kthina 2)

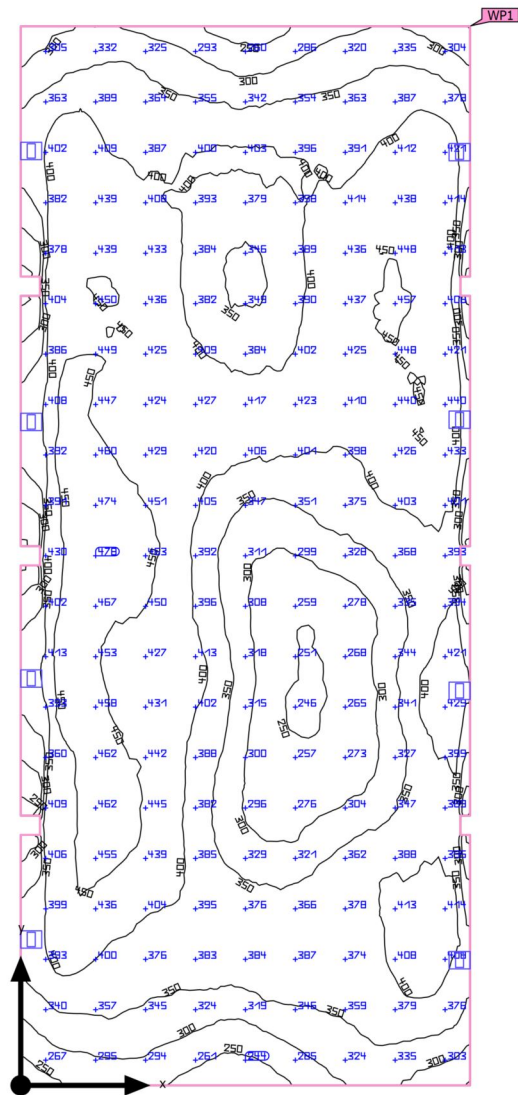


Properties	$\bar{E}$ (Target)	$E_{min}$	$E_{max}$	$U_o (g_1)$ (Target)	$g_2$	Index
Working plane (Kthina 2)	265 lx	158 lx	321 lx	0.60	0.49	WP5
Perpendicular illuminance (adaptive)	(≥ 300 lx)			(≥ 0.60)		
Height: 0.800 m, Wall zone: 0.000 m	✗			✓		

Utilisation profile: Educational premises - Educational buildings (5.36.1 Classrooms, tutorial rooms)

Building 1 · Kthina · Salla (Light scene 1)

Summary



Ground area	115.10 m <sup>2</sup>	Clearance height	3.200 m
Reflection factors	Ceiling: 70.0 %, Walls: 50.0 %, Floor: 20.0 %	Mounting height	3.700 m
Maintenance factor	0.80 (fixed)	Height <sub>Working plane</sub>	0.800 m
		Wall zone <sub>Working plane</sub>	0.000 m



Building 1 · Kthina · Salla (Light scene 1)

## Summary

### Results

	Symbol	Calculated	Target	Check	Index
Working plane	$\bar{E}_{\text{perpendicular}}$	378 lx	$\geq 300$ lx	✓	WP1
	$U_o (g_1)$	0.56	$\geq 0.40$	✓	WP1
Energy estimation <sup>(2)</sup>	Consumption	713 kWh/a	max. 4050 kWh/a	✓	
Room	Lighting power density	4.66 W/m <sup>2</sup>	–		
		1.23 W/m <sup>2</sup> /100 lx	–		

(1) Based on a rectangular space of 16.500 m x 7.000 m and SHR of 0.25.

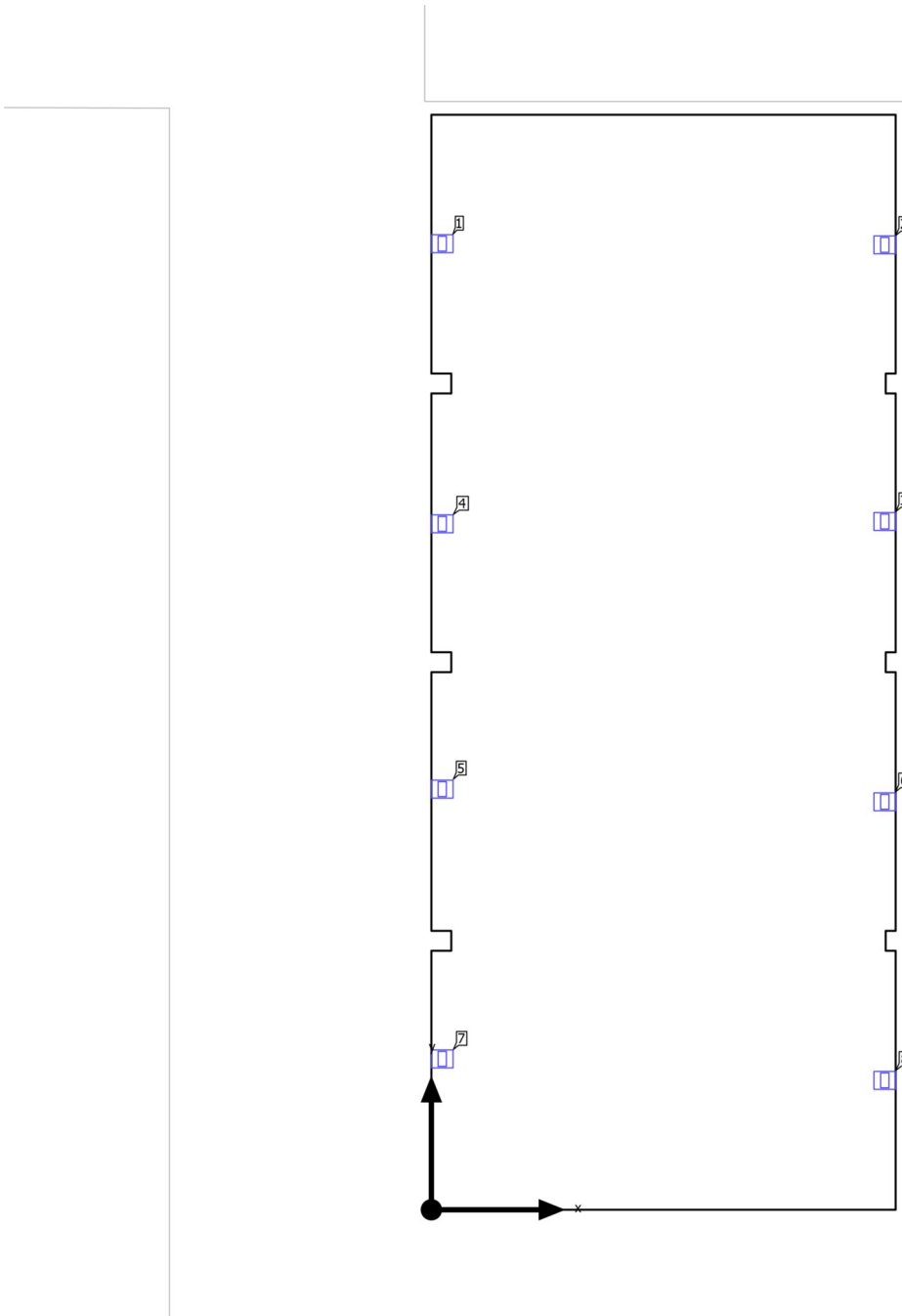
(2) Calculated using DIN:18599-4.

Utilisation profile: Educational premises - Nursery school, play school (5.35.1 Play rooms)

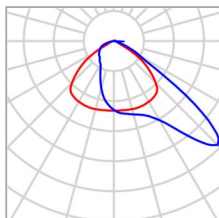
### Luminaire list

pcs.	Manufacturer	Article No.	Article name	R <sub>UG</sub>	P	Φ	Luminous efficacy
8	SYLVANIA	2824062	RAIDEN IP66 8KLM 840 ASYM	–	67.0 W	8700 lm	129.9 lm/W

Building 1 · Kthina · Salla

**Luminaire layout plan**

Building 1 · Kthina · Salla

**Luminaire layout plan**

Manufacturer	SYLVANIA	P	67.0 W
Article No.	2824062	$\Phi_{\text{Luminaire}}$	8700 lm
Article name	RAIDEN IP66 8KLM 840 ASYM		
Fitting	1x 2824062 RAIDEN IP66 8KLM 840 ASYM		

## Individual luminaires

X	Y	Mounting height	Luminaire
0.163 m	14.558 m	3.700 m	1
6.836 m	14.539 m	3.700 m	2
6.836 m	10.371 m	3.700 m	3
0.163 m	10.336 m	3.700 m	4
0.163 m	6.338 m	3.700 m	5
6.836 m	6.147 m	3.700 m	6
0.163 m	2.273 m	3.700 m	7
6.836 m	1.950 m	3.700 m	8

Building 1 · Kthina · Salla

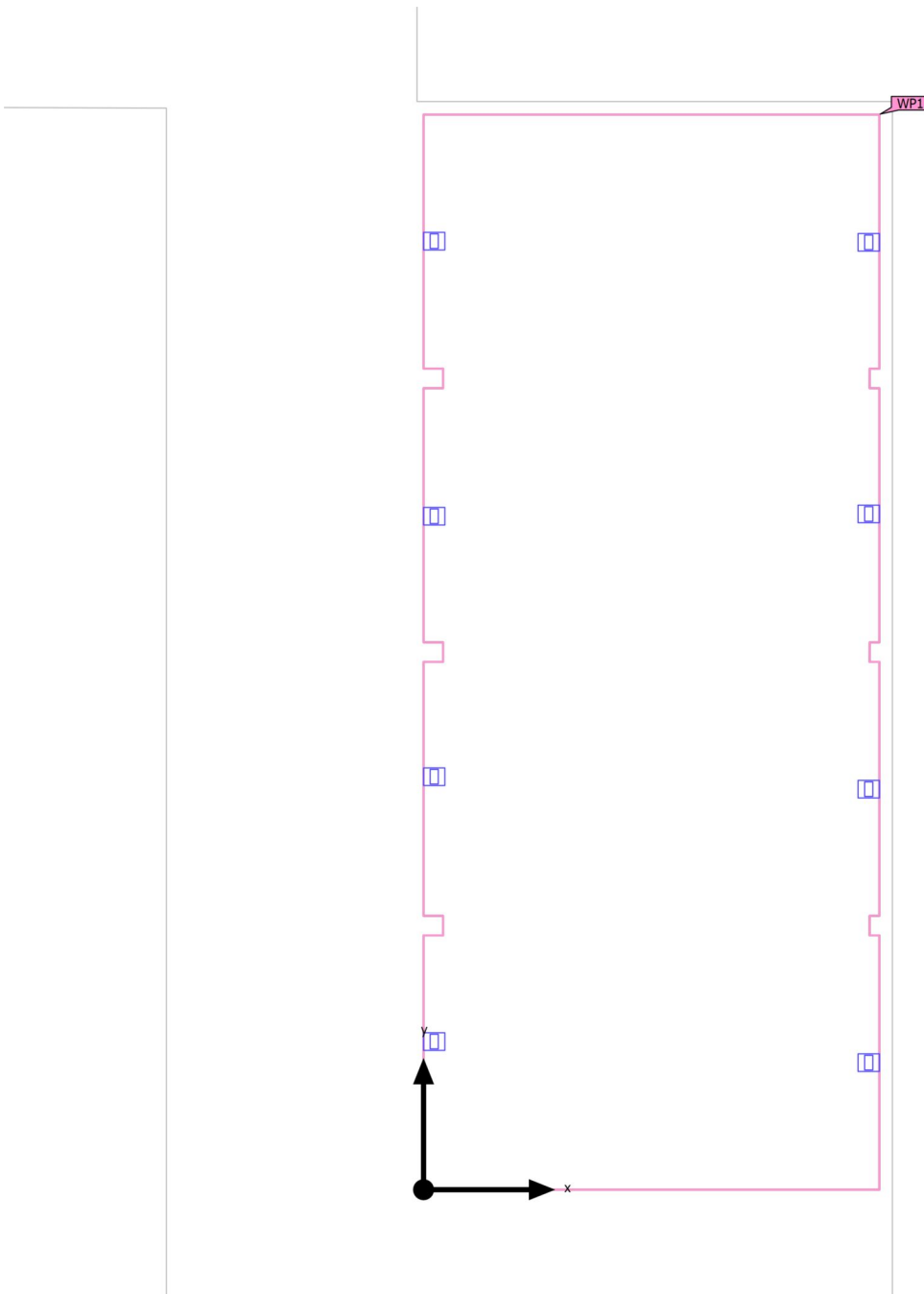
Luminaire list

$\Phi_{total}$ 69600 lm	$P_{total}$ 536.0 W	Luminous efficacy 129.9 lm/W
----------------------------	------------------------	---------------------------------

pcs.	Manufacturer	Article No.	Article name	P	$\Phi$	Luminous efficacy
8	SYLVANIA	2824062	RAIDEN IP66 8KLM 840 ASYM	67.0 W	8700 lm	129.9 lm/W

Building 1 · Kthina · Salla (Light scene 1)

## Calculation objects



Building 1 · Kthina · Salla (Light scene 1)

**Calculation objects**

## Working planes

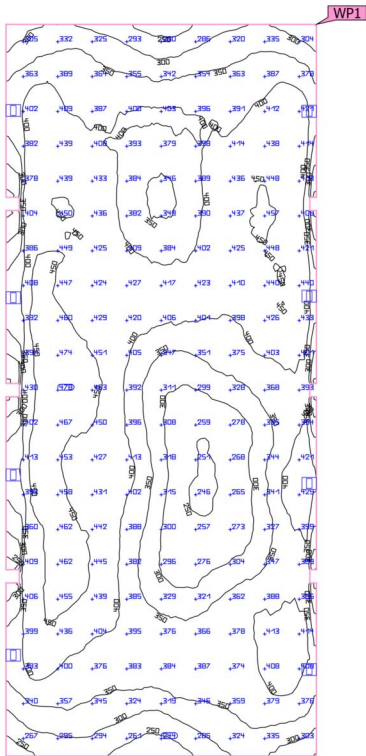
Properties	$\bar{E}$ (Target)	$E_{min}$	$E_{max}$	$U_o (g_1)$ (Target)	$g_2$	Index
Working plane (Salla ) Perpendicular illuminance (adaptive) Height: 0.800 m, Wall zone: 0.000 m	378 lx ( $\geq 300$ lx) ✓	213 lx	480 lx	0.56 ( $\geq 0.40$ ) ✓	0.44	WP1

(1) Based on a rectangular space of 16.500 m x 7.000 m and SHR of 0.25.

Utilisation profile: Educational premises - Nursery school, play school (5.35.1 Play rooms)

Building 1 · Kthina · Salla (Light scene 1)

Working plane (Salla )



Properties	$\bar{E}$ (Target)	$E_{min}$	$E_{max}$	$U_o (g_1)$ (Target)	$g_2$	Index
Working plane (Salla )	378 lx	213 lx	480 lx	0.56	0.44	WP1
Perpendicular illuminance (adaptive)	(≥ 300 lx)			(≥ 0.40)		
Height: 0.800 m, Wall zone: 0.000 m	✓			✓		

Utilisation profile: Educational premises - Nursery school, play school (5.35.1 Play rooms)

## Glossary

### A

A	Formula symbol for a surface in the geometry
---	--

### B

Background area	The background area borders the direct ambient area according to DIN EN 12464-1 and reaches up to the borders of the room. In larger rooms, the background area is at least 3 m wide. It is located horizontally at floor level.
-----------------	--

### C

CCT	<p>(Engl. correlated colour temperature)</p> <p>Body temperature of a thermal radiator which serves to describe its light colour. Unit: Kelvin [K]. The lesser the numerical value the redder; the greater the numerical value the bluer the light colour. The colour temperature of gas-discharge lamps and semi-conductors are termed "correlated colour temperature" in contrast to the colour temperature of thermal radiators.</p> <p>Allocation of the light colours to the colour temperature ranges acc. to EN 12464-1:</p> <p>Light colour - colour temperature [K]  warm white (ww) &lt; 3,300 K  neutral white (nw) ≥ 3,300 – 5,300 K  daylight white (dw) &gt; 5,300 K</p>
-----	--

Clearance height	The designation for the distance between upper edge of the floor and bottom edge of the ceiling (in the completely furnished status of room).
------------------	---

Control group	A group of luminaires that are dimmed and controlled together. For each lighting scene, a control group provides its own dimming value. All luminaires within a control group share this dimming value. The control groups with their luminaires are automatically determined by DIALux on the basis of the created light scenes and their luminaire groups.
---------------	--

CRI	<p>(Engl. colour rendering index)</p> <p>Designation for the colour rendering index of a luminaire or a lamp acc. to DIN 6169: 1976 or CIE 13.3: 1995.</p> <p>The general colour rendering index Ra (or CRI) is a dimensionless figure that describes the quality of a white light source in regards to its similarity with the remission spectra of defined 8 test colours (see DIN 6169 or CIE 1974) to a reference light source.</p>
-----	---



## Glossary

### D

Daylight autonomy	Describes what percentage of the daily working time the required illuminance is met by daylight. The nominal illuminance is used from the room profile, unlike described in EN 17037. The calculation is not done in the centre of the room but at the placed sensor measuring point. A room is considered sufficiently supplied with daylight if it achieves at least 50% daylight autonomy.
Daylight factor	Ratio of the illuminance achieved solely by daylight incidence at a point in the inside to the horizontal illuminance in the outer area under an unobstructed sky.  Formula symbol: D (Engl. daylight factor) Unit: %
Daylight quotient effective area	A calculation surface within which the daylight quotient is calculated.

### E

Energy evaluation	<p>Based on an hourly calculation procedure for daylight in indoor spaces, considering the project geometry and any existing daylight control systems. Orientation and location of the project are also considered. The calculation uses the specified system power of the luminaires to determine the energy demand. A linear relationship between power and luminous flux in the dimmed state is assumed for daylight-controlled luminaires. Times of use and nominal illuminance are determined from the usage profiles of the spaces. Switched-on luminaires that are explicitly excluded from control also consider the specified times-of-use. The daylight control systems use a simplified control logic that closes them at an outdoor horizontal illuminance of 27,500lx.</p> <p>The calendar year 2022 is used as a reference only. It is not a simulation of this year. The reference year is only used to assign the days of the week to the calculated results. The changeover to summer time is not considered. The reference sky type used is the average sky described in CIE 110 without direct sunlight.</p> <p>The method was developed together with the Fraunhofer Institute for Building Physics and is available for review by the Joint Working Group 1 ISO TC 274 as an extension of the previous annual regression-based method.</p>
Eta ( $\eta$ )	<p>(light output ratio)</p> <p>The light output ratio describes what percentage of the luminous flux of a free radiating lamp (or LED module) is emitted by the luminaire when installed.</p> <p>Unit: %</p>

## Glossary

### G

$g_1$	Often also $U_o$ (Engl. overall uniformity) Designates the overall uniformity of the illuminance on a surface. It is the quotient from $E_{min}$ to $\bar{E}$ and is required, for instance, in standards for illumination of workstations.
$g_2$	Actually it designates the "non-uniformity" of the illuminance on a surface. It is the quotient of $E_{min}$ to $E_{max}$ and is generally only relevant for certifying the emergency lighting acc. to EN 1838.

### I

<b>Illuminance</b>	Describes the ratio of the luminous flux that strikes a certain surface to the size of this surface ( $lm/m^2 = lx$ ). The illuminance is not tied to an object surface. It can be determined anywhere in space (inside or outside). The illuminance is not a product feature because it is a recipient value. Luxometers are used for measuring.  Unit: Lux Abbreviation: lx Formula symbol: E
<b>Illuminance, adaptive</b>	For the determining of the middle adaptive illuminance on a surface, this is rastered "adaptively". In the area of large illuminance differences within the surface, the raster is subdivided finer; within lesser differences, a rougher classification is made.
<b>Illuminance, horizontal</b>	Illuminance that is calculated or measured on a horizontal (level) surface (this can be for example a table top or the floor). The horizontal illuminance is usually identified by the formula letter $E_h$ .
<b>Illuminance, perpendicular</b>	Illuminance that is calculated or measured plumb-vertical to a surface. This needs to be taken into account for tilted surfaces. If the surface is horizontal or vertical, then there is no difference between the perpendicular and the horizontal or vertical illuminance.
<b>Illuminance, vertical</b>	Illuminance that is calculated or measured on a vertical surface (this can be for example the front of some shelves). The vertical illuminance is usually identified by the formula letter $E_v$ .

### L

<b>LENI</b>	(Engl. lighting energy numeric indicator) Lighting energy numeric indicator acc. to EN 15193  Unit: $kWh/(m^2 \cdot a)$
-------------	--

## Glossary

LLMF	<p>(Engl. lamp lumen maintenance factor)/acc. to CIE 97: 2005 Lamp flux maintenance factor that takes the luminous flux reduction into account of a luminaire or an LED module in the course of the operating time. The lamp flux maintenance factor is specified as a decimal digit and can have a maximum value of 1 (no luminous flux reduction existing).</p>
LMF	<p>(Engl. luminaire maintenance factor)/acc. to CIE 97: 2005 Luminaire maintenance factor that takes the soiling into account of the luminaire in the course of the operating time. The luminaire maintenance factor is specified as a decimal digit and can have a maximum value of 1 (no soiling existing).</p>
LSF	<p>(Engl. lamp survival factor)/acc. to CIE 97: 2005 Lamp survival factor that takes the total failure into account of a luminaire in the course of the operating time. The lamp survival factor is specified as a decimal digit and can have a maximum value of 1 (no failures existing within the time concerned or prompt replacement after the failure).</p>
Luminance	<p>Dimension for the "brightness impression" that the human eye has of a surface. The surface itself can emit light thereby or light striking it can be reflected (emitter value). It is the only photometric value that the human eye can perceive.</p> <p>Unit: Candela per square metre Abbreviation: cd/m<sup>2</sup> Formula symbol: L</p>
Luminous efficacy	<p>Ratio of the emitted luminous flux <math>\Phi</math> [lm] to the absorbed electrical power P [W] Unit: lm/W.</p> <p>This ratio can be formed for the lamp or LED module (lamp or module light output), the lamp or module with control gear (system light output) and the complete luminaire (luminaire light output).</p>
Luminous flux	<p>Dimension for the total light output that is emitted from one light source in all directions. It is thus an "emitter value" that specifies the entire emitting output. The luminous flux of a light source can only be determined in a laboratory. A difference is made between the lamp or LED module luminous flux and the luminaire luminous flux.</p> <p>Unit: Lumen Abbreviation: lm Formula symbol: <math>\Phi</math></p>
Luminous intensity	<p>Describes the intensity of the light in a certain direction (emitter value). The luminous intensity is a matter of the luminous flux <math>\Phi</math> that is emitted in a certain spherical angle <math>\Omega</math>. The radiation characteristics of a light source are presented graphically in a light distribution curve (LDC). The luminous intensity is an SI base unit.</p> <p>Unit: Candela Abbreviation: cd Formula symbol: I</p>

## Glossary

### M

Maintenance factor	See MF
MF	<p>(Engl. maintenance factor)/acc. to CIE 97: 2005</p> <p>Maintenance factor as decimal number between 0 and 1 that describes the ratio of the new value of a photometric planning parameter (e.g. of the illuminance) to a maintenance value after a certain time. The maintenance factor takes into account the soiling of luminaires and rooms as well as the luminous flux reduction and the failure of light sources.</p> <p>The maintenance factor is taken into account either overall or determined in detail acc. to CIE 97: 2005 by the formula <math>RMF \times LMF \times LLMF \times LSF</math>.</p>

### P

P	<p>(Engl. power)</p> <p>Electric power consumption</p> <p>Unit: watt</p> <p>Abbreviation: W</p>
---	---

### R

$R_{(UG)} \max$	<p>Measure of the psychological glare in indoor spaces.</p> <p>In addition to the luminance of luminaires, the level of the <math>R_{(UG)}</math> value also depends on the observer position, the viewing direction and the ambient luminance. The calculation is made according to the table method, see CIE 117. Among other things, EN 12464-1:2021 specifies maximum permissible <math>R_{(UG)}</math>- values <math>R_{(UGL)}</math> for various indoor workplaces.</p>
Reflection factor	The reflection factor of a surface describes how much of the striking light is reflected back. The reflection factor is defined by the colour of the surface.
RMF	<p>(Engl. room maintenance factor)/acc. to CIE 97: 2005</p> <p>Room maintenance factor that takes the soiling into account of the space encompassing surfaces in the course of the operating time. The room maintenance factor is specified as a decimal digit and can have a maximum value of 1 (no soiling existing).</p>

### S

Surrounding area	The ambient area directly borders the area of the visual task and should be planned with a width of at least 0.5 m according to DIN EN 12464-1. It is at the same height as the area of the visual task.
------------------	--

## Glossary

### U

UGR (max)	(unified glare rating) Measure for the psychological glare effect in interiors. In addition to luminaire luminance, the UGR value also depends on the position of the observer, the viewing direction and the ambient luminance. Among other things, EN 12464-1 specifies maximum permissible UGR values for various indoor workplaces.
-----------	---

UGR observer	Calculation point in the room, for the DIALux the UGR value is determined. The location and height of the calculation point should correspond to the typical observer position (position and eye level of the user).
--------------	--

### V

Visual task area	The area that is needed for carrying out the visual task in accordance with DIN EN 12464 -1. The height corresponds with the height at which the visual task is executed.
------------------	---

### W

Wall zone	Circumferential area between working plane and walls which is not taken into account for the calculation.
-----------	---

Working plane	Virtual measuring or calculation surface at the height of the visual task that generally follows the room geometry. The working plane may also feature a wall zone.
---------------	---