Object	:	Tunnel under Martwa Wisla - Gdansk
Installation	:	
Project number	:	
Date	:	21.11.2025

1 Luminaire data

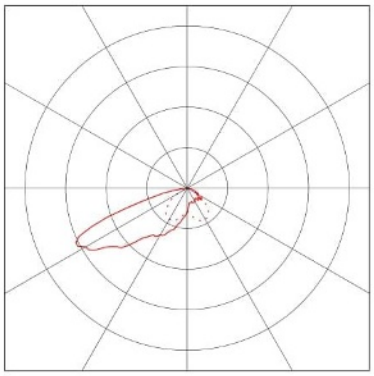
1.1

1.1.1 Data sheet

Manufacturer: **B-Tilt = 0.00**

Luminaire data		
Luminaire efficiency	:	85%
Luminaire efficacy	:	167.68 lm/W
Classification	:	A30 ↓100.0% ↑0.0%
CIE Flux Codes	:	31 71 97 100 85
UGR 4H 8H	:	24.7 / 28.5
Power	:	131.8 W
Luminous flux	:	22127.6 lm
Dimensions	:	518 mm x 435 mm x 81 mm

Equipped with		
Quantity	:	1
Designation	:	LED260/740
Colour	:	4000
Luminous flux	:	26000 lm
Colour reproduction	:	70



1 Luminaire data

1.2

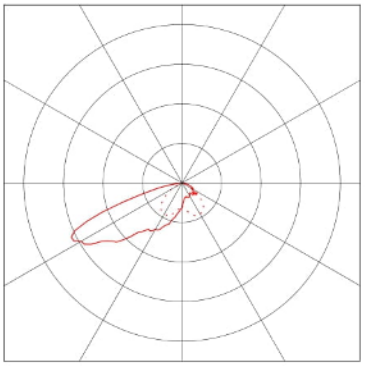
1.2.1 Data sheet

Manufacturer:

B-Tilt = 0.00

Luminaire data		
Luminaire efficiency	:	87%
Luminaire efficacy	:	168.6 lm/W
Classification	:	A30 ↓100.0% ↑0.0%
CIE Flux Codes	:	31 71 97 100 87
UGR 4H 8H	:	21.5 / 25.3
Power	:	51.6 W
Luminous flux	:	8667.9 lm
Dimensions	:	518 mm x 435 mm x 81 mm

Equipped with		
Quantity	:	1
Designation	:	LED100/740
Colour	:	4000
Luminous flux	:	10000 lm
Colour reproduction	:	70



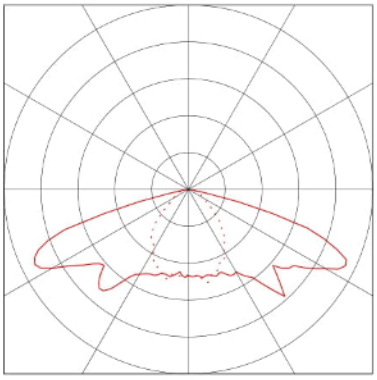
1 Luminaire data

1.3.1 Data sheet

Luminaire data

Luminaire efficiency	:	89%
Luminaire efficacy	:	178 lm/W
Classification	:	A30 ↓100.0% ↑0.0%
CIE Flux Codes	:	43 79 98 100 89
UGR 4H 8H	:	34.6 / 23.3
Power	:	75 W
Luminous flux	:	13291.9 lm

Dimensions : 518 mm x 435 mm x 81 mm



Equipped with

Quantity	:	1
Designation	:	LED150/740
Colour	:	4000
Luminous flux	:	15000 lm
Colour reproduction	:	70

1 Luminaire data

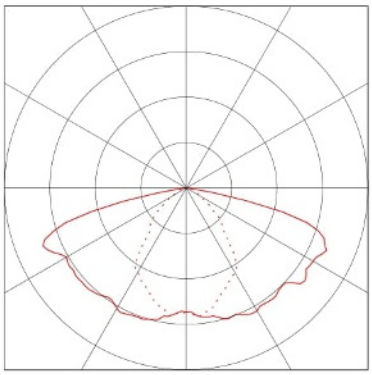
1.4.1 Data sheet

Manufacturer:

Luminaire data		
Luminaire efficiency	:	89%
Luminaire efficacy	:	172.48 lm/W
Classification	:	A30 ↓100.0% ↑0.0%
CIE Flux Codes	:	45 75 97 100 89
UGR 4H 8H	:	34.7 / 21.0
Power	:	51.6 W
Luminous flux	:	8928.2 lm

Equipped with		
Quantity	:	1
Designation	:	LED100/740
Colour	:	4000
Luminous flux	:	10000 lm
Colour reproduction	:	70

Dimensions : 518 mm x 435 mm x 81 mm



1 Luminaire data

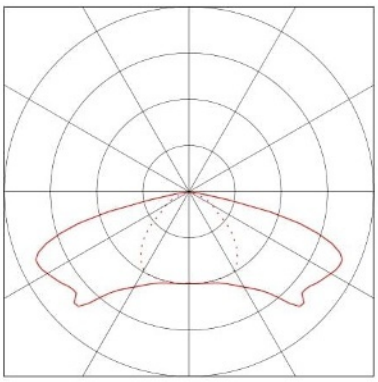
1.5

1.5.1 Data sheet

Luminaire data

Luminaire efficiency	:	89%
Luminaire efficacy	:	178 lm/W
Classification	:	A30 ↓100.0% ↑0.0%
CIE Flux Codes	:	38 75 98 100 89
UGR 4H 8H	:	36.1 / 24.9
Power	:	100 W
Luminous flux	:	17726.3 lm

Dimensions : 518 mm x 435 mm x 81 mm



Equipped with

Quantity	:	1
Designation	:	LED200/740
Colour	:	4000
Luminous flux	:	20000 lm
Colour reproduction	:	70

Object : Tunnel under Martwa Wisla - Gdansk
Installation :
Project number :
Date : 21.11.2025

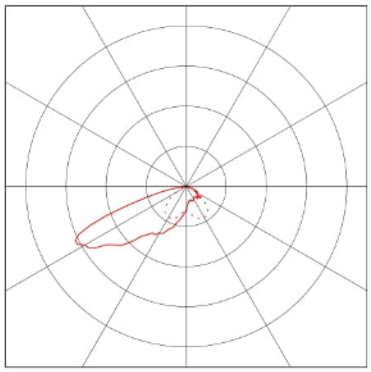
1 Luminaire data

1.6.1 Data sheet

Luminaire data

Luminaire efficiency	:	86%
Luminaire efficacy	:	167.97 lm/W
Classification	:	A30 ↓100.0% ↑0.0%
CIE Flux Codes	:	31 71 97 100 86
UGR 4H 8H	:	24.8 / 28.7
Power	:	230.4 W
Luminous flux	:	38533.7 lm

Dimensions : 518 mm x 676 mm x 81 mm



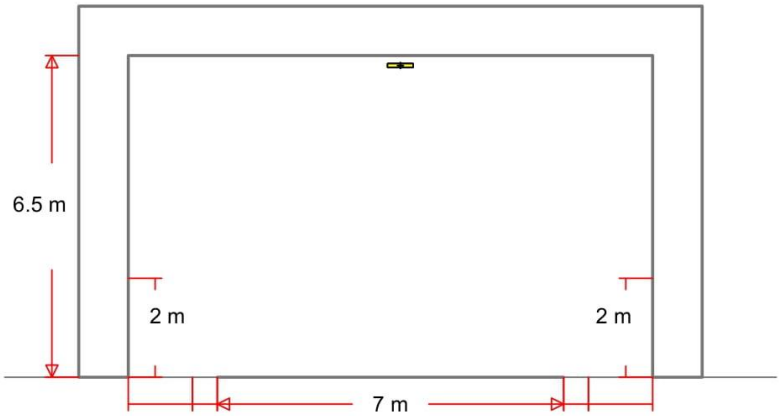
Equipped with

Quantity	:	1
Designation	:	LED450/740
Colour	:	4000
Luminous flux	:	45000 lm
Colour reproduction	:	70

2 T1 portal KU, driving direction towards MP

2.1 Description, T1 portal KU, driving direction towards MP

2.1.1 Project data



Geometry tunnel

Length of the tunnel	:	1378 m
Length of the tunnel (calculation model)	:	280 m
Height of the tunnel	:	6.5 m
Width of the carriageway	:	7 m
Number of lanes	:	2
Covering / material	:	R3, q0 = 0.07

Border area (y=7.00 m)	:	0.50 m	Border area (y=0.00 m)	:	0.50 m
Covering / material	:	diffus 22%	Covering / material	:	diffus 22%
Marginal strip left	:	1.3 m	Marginal strip right	:	1.3 m
Height of the wall (right)	:	2 m	Height of the wall (left)	:	2 m
Covering / material	:	diffus 47%	Covering / material	:	diffus 47%

Calculation specifications

Speed	:	70 km/h
Length of the threshold zone	:	90 m
Luminance threshold zone	:	207 cd/m²
Luminance interior zone	:	4.5 cd/m²

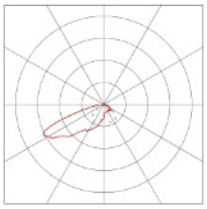
2 T1 portal KU, driving direction towards MP

2.1 Description, T1 portal KU, driving direction towards MP

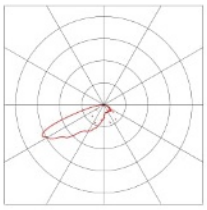
2.1.1 Project data

LDC in use

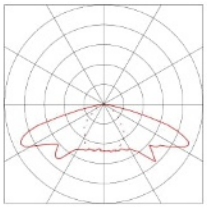
1
Order No. :
Luminaire name :
Equipment : 1 x LED260/740 131.8 W / 26000 lm
Maintenance factor: 0.70



2
Order No. :
Luminaire name :
Equipment : 1 x LED100/740 51.6 W / 10000 lm
Maintenance factor: 0.70



3
Order No. :
Luminaire name
Equipment : 1 x LED150/740 75 W / 15000 lm
Maintenance factor: 0.70



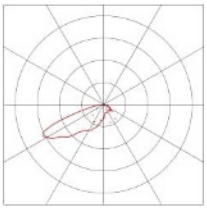
2 T1 portal KU, driving direction towards MP

2.1 Description, T1 portal KU, driving direction towards MP

2.1.1 Project data

6

Order No. :
Luminaire name :
Equipment : 1 x LED450/740 230.4 W / 45000 lm
Maintenance factor: 0.70

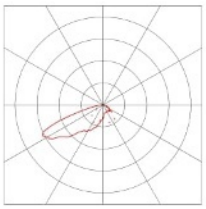


2.1 Description, T1 portal KU, driving direction towards MP

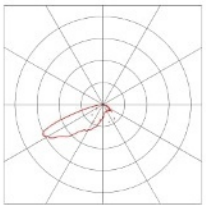
2.1.2 Luminaire list

Adaptation
LDC in use

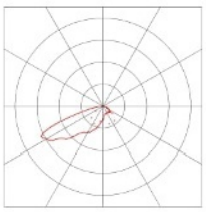
6 101 x Order No. :
Luminaire name :
Equipment : 1 x LED450/740 230.4 W / 45000 lm
Maintenance factor: 0.70



1 1 x Order No. :
Luminaire name :
Equipment : 1 x LED260/740 131.8 W / 26000 lm
Maintenance factor: 0.70



2 3 x Order No. :
Luminaire name :
Equipment : 1 x LED100/740 51.6 W / 10000 lm
Maintenance factor: 0.70



2.1 Description, T1 portal KU, driving direction towards MP

2.1.2 Luminaire list

Row of luminaires: Row 2.1
Number of luminaires: 105 System power (total): 23.6kW
Basic position: x=5.00m y=3.30m, z=6.30m -variable distances-
Rotation: z=0.0° C0=0.0° C90=0.0°

Nr.	Pos. X [m]	Power level	Control gr.	S1	Int.1	EMG
1	5.00	230.4W / 45klm	1	100%	0%	0%
2	5.91	230.4W / 45klm	1	100%	0%	0%
3	6.82	230.4W / 45klm	1	100%	0%	0%
4	7.73	230.4W / 45klm	1	100%	0%	0%
5	8.64	230.4W / 45klm	1	100%	0%	0%
6	9.55	230.4W / 45klm	1	100%	0%	0%
7	10.46	230.4W / 45klm	1	100%	0%	0%
8	11.37	230.4W / 45klm	1	100%	0%	0%
9	12.28	230.4W / 45klm	1	100%	0%	0%
10	13.19	230.4W / 45klm	1	100%	0%	0%
11	14.10	230.4W / 45klm	1	100%	0%	0%
12	15.90	230.4W / 45klm	1	100%	0%	0%
13	16.72	230.4W / 45klm	1	100%	0%	0%
14	17.55	230.4W / 45klm	1	100%	0%	0%
15	18.37	230.4W / 45klm	1	100%	0%	0%
16	19.19	230.4W / 45klm	1	100%	0%	0%
17	20.01	230.4W / 45klm	1	100%	0%	0%
18	20.84	230.4W / 45klm	1	100%	0%	0%
19	21.66	230.4W / 45klm	1	100%	0%	0%
20	22.48	230.4W / 45klm	1	100%	0%	0%
21	23.31	230.4W / 45klm	1	100%	0%	0%
22	24.13	230.4W / 45klm	1	100%	0%	0%
23	24.95	230.4W / 45klm	1	100%	0%	0%
24	25.78	230.4W / 45klm	1	100%	0%	0%
25	26.60	230.4W / 45klm	1	100%	0%	0%
26	28.40	230.4W / 45klm	1	100%	0%	0%
27	29.29	230.4W / 45klm	1	100%	0%	0%
28	30.18	230.4W / 45klm	1	100%	0%	0%
29	31.08	230.4W / 45klm	1	100%	0%	0%
30	31.97	230.4W / 45klm	1	100%	0%	0%
31	32.86	230.4W / 45klm	1	100%	0%	0%
32	33.75	230.4W / 45klm	1	100%	0%	0%
33	34.64	230.4W / 45klm	1	100%	0%	0%
34	35.53	230.4W / 45klm	1	100%	0%	0%
35	36.43	230.4W / 45klm	1	100%	0%	0%
36	37.32	230.4W / 45klm	1	100%	0%	0%
37	38.21	230.4W / 45klm	1	100%	0%	0%
38	39.10	230.4W / 45klm	1	100%	0%	0%
39	40.90	230.4W / 45klm	1	100%	0%	0%
40	41.73	230.4W / 45klm	1	100%	0%	0%
41	42.55	230.4W / 45klm	1	100%	0%	0%
42	43.37	230.4W / 45klm	1	100%	0%	0%
43	44.19	230.4W / 45klm	1	100%	0%	0%
44	45.02	230.4W / 45klm	1	100%	0%	0%

2.1 Description, T1 portal KU, driving direction towards MP

2.1.2 Luminaire list

45	45.84	230.4W / 45klm	1	100%	0%	0%
46	46.66	230.4W / 45klm	1	100%	0%	0%
47	47.49	230.4W / 45klm	1	100%	0%	0%
48	48.31	230.4W / 45klm	1	100%	0%	0%
49	49.13	230.4W / 45klm	1	100%	0%	0%
50	49.96	230.4W / 45klm	1	100%	0%	0%
51	50.78	230.4W / 45klm	1	100%	0%	0%
52	51.60	230.4W / 45klm	1	100%	0%	0%
53	53.40	230.4W / 45klm	1	100%	0%	0%
54	54.30	230.4W / 45klm	1	100%	0%	0%
55	55.20	230.4W / 45klm	1	100%	0%	0%
56	56.10	230.4W / 45klm	1	100%	0%	0%
57	57.00	230.4W / 45klm	1	100%	0%	0%
58	57.90	230.4W / 45klm	1	100%	0%	0%
59	58.80	230.4W / 45klm	1	100%	0%	0%
60	59.70	230.4W / 45klm	1	100%	0%	0%
61	60.63	230.4W / 45klm	1	100%	0%	0%
62	61.72	230.4W / 45klm	1	100%	0%	0%
63	62.81	230.4W / 45klm	1	100%	0%	0%
64	63.90	230.4W / 45klm	1	100%	0%	0%
65	65.90	230.4W / 45klm	1	100%	0%	0%
66	67.00	230.4W / 45klm	1	100%	0%	0%
67	68.10	230.4W / 45klm	1	100%	0%	0%
68	69.20	230.4W / 45klm	1	100%	0%	0%
69	70.37	230.4W / 45klm	1	100%	0%	0%
70	71.54	230.4W / 45klm	1	100%	0%	0%
71	72.71	230.4W / 45klm	1	100%	0%	0%
72	73.90	230.4W / 45klm	1	100%	0%	0%
73	75.10	230.4W / 45klm	1	100%	0%	0%
74	76.30	230.4W / 45klm	1	100%	0%	0%
75	78.40	230.4W / 45klm	1	100%	0%	0%
76	79.60	230.4W / 45klm	1	100%	0%	0%
77	80.80	230.4W / 45klm	1	100%	0%	0%
78	82.02	230.4W / 45klm	1	100%	0%	0%
79	83.25	230.4W / 45klm	1	100%	0%	0%
80	84.55	230.4W / 45klm	1	100%	0%	0%
81	85.85	230.4W / 45klm	1	100%	0%	0%
82	87.25	230.4W / 45klm	1	100%	0%	0%
83	88.65	230.4W / 45klm	1	100%	0%	0%
84	90.99	230.4W / 45klm	1	100%	0%	0%
85	92.69	230.4W / 45klm	1	100%	0%	0%
86	94.59	230.4W / 45klm	1	100%	0%	0%
87	96.59	230.4W / 45klm	1	100%	0%	0%
88	98.60	230.4W / 45klm	1	100%	0%	0%
89	101.00	230.4W / 45klm	1	100%	0%	0%
90	103.40	230.4W / 45klm	1	100%	0%	0%
91	105.80	230.4W / 45klm	1	100%	0%	0%
92	109.93	230.4W / 45klm	1	100%	0%	0%
93	114.10	230.4W / 45klm	1	100%	0%	0%
94	118.96	230.4W / 45klm	1	100%	0%	0%

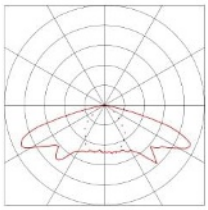
2.1 Description, T1 portal KU, driving direction towards MP

2.1.2 Luminaire list

95	123.12	230.4W / 45klm	1	100%	0%	0%
96	129.46	230.4W / 45klm	1	100%	0%	0%
97	135.79	230.4W / 45klm	1	100%	0%	0%
98	142.13	230.4W / 45klm	1	100%	0%	0%
99	150.90	230.4W / 45klm	1	100%	0%	0%
100	159.66	230.4W / 45klm	1	100%	0%	0%
101	171.43	230.4W / 45klm	1	100%	0%	0%
102	183.21	131.8W / 26klm	1	100%	0%	0%
103	188.41	51.6W / 10klm	1	100%	0%	0%
104	193.62	51.6W / 10klm	1	100%	0%	0%
105	198.82	51.6W / 10klm	1	100%	0%	0%

Interior
LDC in use

3
Order No. :
Luminaire name :
Equipment : 1 x LED150/740 75 W / 15000 lm
Maintenance factor: 0.70



Row of luminaires: Row 1.1
Number of luminaires: 111
Basic position: x=2.50m y=3.30m, z=6.30m
Rotation: z=0.0° C0=0.0° C90=0.0°
System power (total): 8.3kW (1.38 km)
Constant distance: 12.50m
Flicker frequency (v=70 km/h): 1.6 Hz

Nr.	Pos. X [m]	Power level	Control gr.	S1	Int.1	EMG
1	2.50	75W / 15klm	2	100%	100%	100%
2	15.00	75W / 15klm	3	100%	100%	0%
3	27.50	75W / 15klm	2	100%	100%	100%
4	40.00	75W / 15klm	3	100%	100%	0%
5	52.50	75W / 15klm	2	100%	100%	100%
6	65.00	75W / 15klm	3	100%	100%	0%
7	77.50	75W / 15klm	2	100%	100%	100%
8	90.00	75W / 15klm	3	100%	100%	0%
9	102.50	75W / 15klm	2	100%	100%	100%
10	115.00	75W / 15klm	3	100%	100%	0%
11	127.50	75W / 15klm	2	100%	100%	100%
12	140.00	75W / 15klm	3	100%	100%	0%
13	152.50	75W / 15klm	2	100%	100%	100%
14	165.00	75W / 15klm	3	100%	100%	0%
15	177.50	75W / 15klm	2	100%	100%	100%

2.1 Description, T1 portal KU, driving direction towards MP

2.1.2 Luminaire list

16	190.00	75W / 15klm	3	100%	100%	0%
17	202.50	75W / 15klm	2	100%	100%	100%
18	215.00	75W / 15klm	3	100%	100%	0%
19	227.50	75W / 15klm	2	100%	100%	100%
20	240.00	75W / 15klm	3	100%	100%	0%
21	252.50	75W / 15klm	2	100%	100%	100%
22	265.00	75W / 15klm	3	100%	100%	0%
23	277.50	75W / 15klm	2	100%	100%	100%
24	290.00	75W / 15klm	3	100%	100%	0%
25	302.50	75W / 15klm	2	100%	100%	100%
26	315.00	75W / 15klm	3	100%	100%	0%
27	327.50	75W / 15klm	2	100%	100%	100%
28	340.00	75W / 15klm	3	100%	100%	0%
29	352.50	75W / 15klm	2	100%	100%	100%
30	365.00	75W / 15klm	3	100%	100%	0%
31	377.50	75W / 15klm	2	100%	100%	100%
32	390.00	75W / 15klm	3	100%	100%	0%
33	402.50	75W / 15klm	2	100%	100%	100%
34	415.00	75W / 15klm	3	100%	100%	0%
35	427.50	75W / 15klm	2	100%	100%	100%
36	440.00	75W / 15klm	3	100%	100%	0%
37	452.50	75W / 15klm	2	100%	100%	100%
38	465.00	75W / 15klm	3	100%	100%	0%
39	477.50	75W / 15klm	2	100%	100%	100%
40	490.00	75W / 15klm	3	100%	100%	0%
41	502.50	75W / 15klm	2	100%	100%	100%
42	515.00	75W / 15klm	3	100%	100%	0%
43	527.50	75W / 15klm	2	100%	100%	100%
44	540.00	75W / 15klm	3	100%	100%	0%
45	552.50	75W / 15klm	2	100%	100%	100%
46	565.00	75W / 15klm	3	100%	100%	0%
47	577.50	75W / 15klm	2	100%	100%	100%
48	590.00	75W / 15klm	3	100%	100%	0%
49	602.50	75W / 15klm	2	100%	100%	100%
50	615.00	75W / 15klm	3	100%	100%	0%
51	627.50	75W / 15klm	2	100%	100%	100%
52	640.00	75W / 15klm	3	100%	100%	0%
53	652.50	75W / 15klm	2	100%	100%	100%
54	665.00	75W / 15klm	3	100%	100%	0%
55	677.50	75W / 15klm	2	100%	100%	100%
56	690.00	75W / 15klm	3	100%	100%	0%
57	702.50	75W / 15klm	2	100%	100%	100%
58	715.00	75W / 15klm	3	100%	100%	0%
59	727.50	75W / 15klm	2	100%	100%	100%
60	740.00	75W / 15klm	3	100%	100%	0%
61	752.50	75W / 15klm	2	100%	100%	100%
62	765.00	75W / 15klm	3	100%	100%	0%
63	777.50	75W / 15klm	2	100%	100%	100%
64	790.00	75W / 15klm	3	100%	100%	0%
65	802.50	75W / 15klm	2	100%	100%	100%

2.1 Description, T1 portal KU, driving direction towards MP

2.1.2 Luminaire list

66	815.00	75W / 15klm	3	100%	100%	0%
67	827.50	75W / 15klm	2	100%	100%	100%
68	840.00	75W / 15klm	3	100%	100%	0%
69	852.50	75W / 15klm	2	100%	100%	100%
70	865.00	75W / 15klm	3	100%	100%	0%
71	877.50	75W / 15klm	2	100%	100%	100%
72	890.00	75W / 15klm	3	100%	100%	0%
73	902.50	75W / 15klm	2	100%	100%	100%
74	915.00	75W / 15klm	3	100%	100%	0%
75	927.50	75W / 15klm	2	100%	100%	100%
76	940.00	75W / 15klm	3	100%	100%	0%
77	952.50	75W / 15klm	2	100%	100%	100%
78	965.00	75W / 15klm	3	100%	100%	0%
79	977.50	75W / 15klm	2	100%	100%	100%
80	990.00	75W / 15klm	3	100%	100%	0%
81	1002.50	75W / 15klm	2	100%	100%	100%
82	1015.00	75W / 15klm	3	100%	100%	0%
83	1027.50	75W / 15klm	2	100%	100%	100%
84	1040.00	75W / 15klm	3	100%	100%	0%
85	1052.50	75W / 15klm	2	100%	100%	100%
86	1065.00	75W / 15klm	3	100%	100%	0%
87	1077.50	75W / 15klm	2	100%	100%	100%
88	1090.00	75W / 15klm	3	100%	100%	0%
89	1102.50	75W / 15klm	2	100%	100%	100%
90	1115.00	75W / 15klm	3	100%	100%	0%
91	1127.50	75W / 15klm	2	100%	100%	100%
92	1140.00	75W / 15klm	3	100%	100%	0%
93	1152.50	75W / 15klm	2	100%	100%	100%
94	1165.00	75W / 15klm	3	100%	100%	0%
95	1177.50	75W / 15klm	2	100%	100%	100%
96	1190.00	75W / 15klm	3	100%	100%	0%
97	1202.50	75W / 15klm	2	100%	100%	100%
98	1215.00	75W / 15klm	3	100%	100%	0%
99	1227.50	75W / 15klm	2	100%	100%	100%
100	1240.00	75W / 15klm	3	100%	100%	0%
101	1252.50	75W / 15klm	2	100%	100%	100%
102	1265.00	75W / 15klm	3	100%	100%	0%
103	1277.50	75W / 15klm	2	100%	100%	100%
104	1290.00	75W / 15klm	3	100%	100%	0%
105	1302.50	75W / 15klm	2	100%	100%	100%
106	1315.00	75W / 15klm	3	100%	100%	0%
107	1327.50	75W / 15klm	2	100%	100%	100%
108	1340.00	75W / 15klm	3	100%	100%	0%
109	1352.50	75W / 15klm	2	100%	100%	100%
110	1365.00	75W / 15klm	3	100%	100%	0%
:	:	:	:			
107	1327.50	75W / 15klm	2	100%	100%	100%
108	1340.00	75W / 15klm	3	100%	100%	0%
109	1352.50	75W / 15klm	2	100%	100%	100%
110	1365.00	75W / 15klm	3	100%	100%	0%

2.1 Description, T1 portal KU, driving direction towards MP

2.1.2 Luminaire list

111	1377.50	75W / 15klm	2	100% 100% 100%

2 T1 portal KU, driving direction towards MP

2.2 Calculation results, T1 portal KU, driving direction towards MP

2.2.1 Result overview, S1: 100%

Regulating step: S1: 100%
Adaptation
1: 100%
Interior
2: 100%
3: 100%

Entrance, Threshold zone (constant)
Measuring range: 13.19 m - 33.21 m Points: nx = 10, ny = 6, nz = 3
Observer (starting point coordinate) : x = -46.81 m; z = 1.50 m dx = 61.00 m (fix)

			y =1.75 m	y =5.25 m	
Roadway (R3, q0 = 0.07)					
$\bar{L}_m$		:	215.71 cd/m²	216.78 cd/m²	
U_o	$L_{min}/\bar{L}_m$	:	0.67	0.72	0.4
U_l	$L_{l,min}/L_{l,max}$	:	0.97	0.97	0.6
$f_{TI,max}$	Max.	:	5 %	5 %	

Wall left (diffus 47%)

$\bar{L}_m$		:	218.80 cd/m²
U_o	$L_{min}/\bar{L}_m$	:	0.94
Lwall/L		:	1.01

Wall right (diffus 47%)

$\bar{L}_m$		:	234.46 cd/m²
U_o	$L_{min}/\bar{L}_m$	:	0.90
Lwall/L		:	1.09

Illuminance
Roadway

$\bar{E}_m$			2132.60 lx
U_o	$E_{min}/\bar{E}_m$	:	0.94

Border area (y = 7.00 m, |0.50 m|)				Border area (y = 0.00 m, |0.50 m|)			
$\bar{E}_m$			2065.27 lx	$\bar{E}_m$			2163.37 lx
U_o	$E_{min}/\bar{E}_m$	:	0.95	U_o	$E_{min}/\bar{E}_m$	:	0.96

Wall left				Wall right			
$\bar{E}_m$			1462.19 lx	$\bar{E}_m$			1566.90 lx
U_o	$E_{min}/\bar{E}_m$	:	0.94	U_o	$E_{min}/\bar{E}_m$	:	0.90

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2 T1 portal KU, driving direction towards MP

2.2 Calculation results, T1 portal KU, driving direction towards MP

2.2.1 Result overview, S1: 100%

Interior, Interior zone
Measuring range: 190.00 m - 215.00 m Points: nx = 10, ny = 6, nz = 3
Observer (starting point coordinate) : x = 130.00 m; z = 1.50 m dx = 61.25 m (fix)

			y =1.75 m	y =5.25 m	
Roadway (R3, q0 = 0.07)					
$\overline{L}_m$		:	4.81 cd/m²	4.83 cd/m²	
U_o	$L_{min}/\overline{L}_m$	:	0.58	0.63	0.4
U_l	$L_{l,min}/L_{l,max}$	:	0.97	0.95	0.6
$f_{TI,max}$	Max.	:	7 %	6 %	

Wall left (diffus 47%)

$\overline{L}_m$		:	3.08 cd/m²
U_o	$L_{min}/\overline{L}_m$	:	0.65
Lwall/L		:	0.64

Wall right (diffus 47%)

$\overline{L}_m$		:	3.74 cd/m²
U_o	$L_{min}/\overline{L}_m$	:	0.72
Lwall/L		:	0.78

Illuminance
Roadway

$\overline{E}_m$		:	70.10 lx
U_o	$E_{min}/\overline{E}_m$	:	0.80

Border area (y = 7.00 m, |0.50 m|)				Border area (y = 0.00 m, |0.50 m|)			
$\overline{E}_m$		:	46.85 lx	$\overline{E}_m$		:	51.98 lx
U_o	$E_{min}/\overline{E}_m$	:	0.94	U_o	$E_{min}/\overline{E}_m$	:	0.95

Wall left				Wall right			
$\overline{E}_m$		:	20.58 lx	$\overline{E}_m$		:	25.04 lx
U_o	$E_{min}/\overline{E}_m$	:	0.65	U_o	$E_{min}/\overline{E}_m$	:	0.72

2 T1 portal KU, driving direction towards MP

2.2 Calculation results, T1 portal KU, driving direction towards MP

2.2.1 Result overview, S1: 100%

Adaptation, Threshold and transition zone
Measuring range: -0.82 m - 275.45 m Points: nx = 138, ny = 6, nz = 3
Observer (starting point coordinate) : x = -85.76 m; z = 1.50 m dx = 85.93 m (moving)
y =1.75 m y =5.25 m
Roadway (R3, q0 = 0.07)

Wall left (diffus 47%)

Wall right (diffus 47%)

Object : Tunnel under Martwa Wisla - Gdansk
Installation :
Project number :
Date : 21.11.2025

2.2 Calculation results, T1 portal KU, driving direction towards MP

2.2.2 Result overview, EMG

Regulating step: EMG
Adaptation
1: 0%
Interior
2: 100%
3: 0%

Interior, Interior zone
Measuring range: 190.00 m - 215.00 m Points: nx = 10, ny = 6, nz = 3
Observer (starting point coordinate) : x = 130.00 m; z = 1.50 m dx = 61.25 m (fix)

			y =1.75 m	y =5.25 m	
Roadway (R3, q0 = 0.07)					
$\bar{L}_m$		:	2.41 cd/m²	2.42 cd/m²	
U_o	$L_{min}/\bar{L}_m$	:	0.53	0.58	0.4
U_l	$L_{l,min}/L_{l,max}$	:	0.67	0.70	0.6
$f_{TI,max}$	Max.	:	12 %	11 %	

Wall left (diffus 47%)
$\bar{L}_m$: 1.54 cd/m²
U_o $L_{min}/\bar{L}_m$: 0.58
Lwall/L : 0.64

Wall right (diffus 47%)
$\bar{L}_m$: 1.87 cd/m²
U_o $L_{min}/\bar{L}_m$: 0.54
Lwall/L : 0.78

Illuminance
Roadway
$\bar{E}_m$: 35.05 lx
U_o $E_{min}/\bar{E}_m$: 0.50

Border area (y = 7.00 m, |0.50 m|)				Border area (y = 0.00 m, |0.50 m|)			
$\bar{E}_m$		:	23.43 lx	$\bar{E}_m$		:	25.99 lx
U_o	$E_{min}/\bar{E}_m$	:	0.65	U_o	$E_{min}/\bar{E}_m$	:	0.61

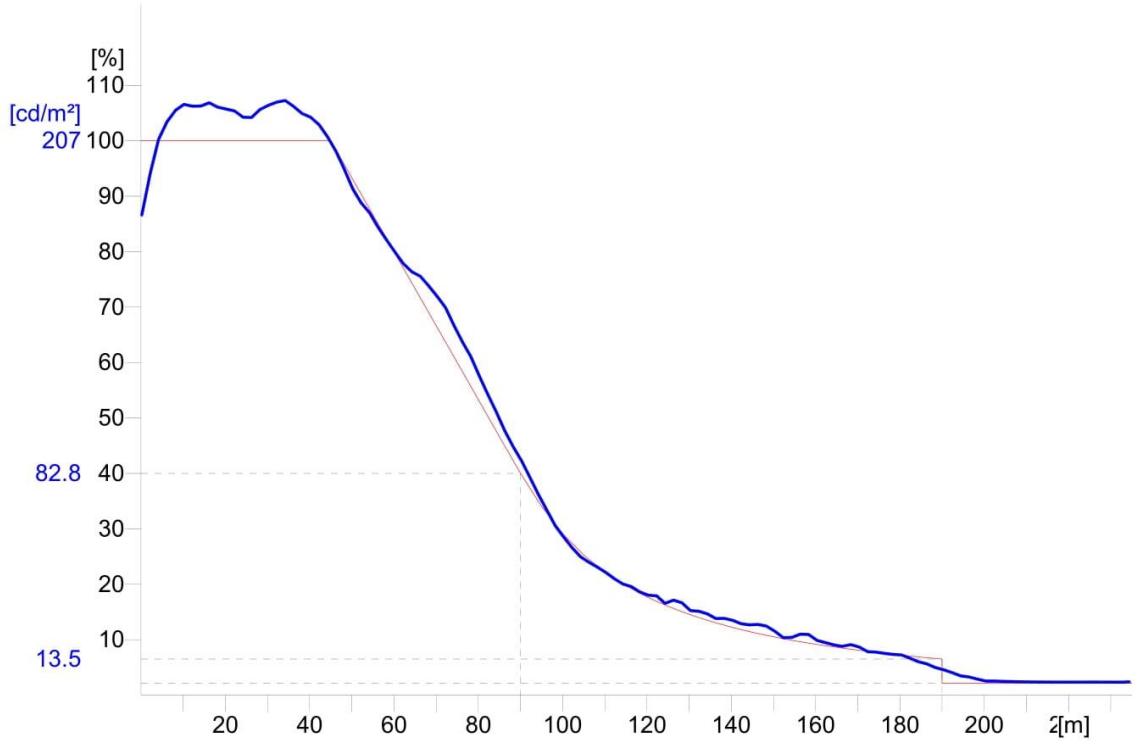
Wall left				Wall right			
$\bar{E}_m$		:	10.28 lx	$\bar{E}_m$		:	12.51 lx
U_o	$E_{min}/\bar{E}_m$	:	0.58	U_o	$E_{min}/\bar{E}_m$	:	0.54

2.2 Calculation results, T1 portal KU, driving direction towards MP

2.2.2 Result overview, EMG

2.2 Calculation results, T1 portal KU, driving direction towards MP

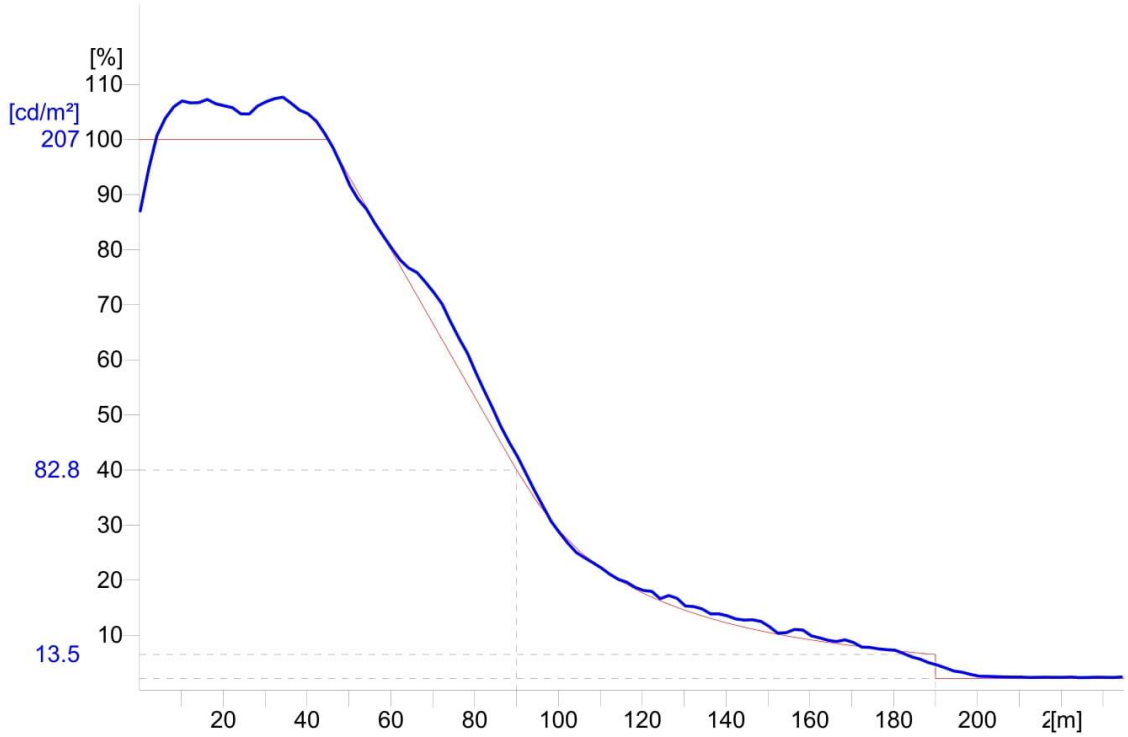
2.2.3 Evolution, Adaptation (L), S1: 100%, Obs. 1



Observer location 1 : x = -85.8, y = 1.75, z = 1.5 (dx = 85.93)
Evaluation of L on whole width of road

2.2 Calculation results, T1 portal KU, driving direction towards MP

2.2.4 Evolution, Adaptation (L), S1: 100%, Obs. 2



Observer location 2 : x = -85.8, y = 5.25, z = 1.5 (dx = 85.93)
Evaluation of L on whole width of road

2 T1 portal KU, driving direction towards MP

2.3 Calculation results, T1 portal KU, driving direction towards MP

2.3.1 Table, Interior (E), EMG

[m]	191.25	193.75	196.25	198.75	201.25	203.75	206.25	208.75	211.25	213.75
6.42	17.9	20.7	28.1	36.9	41.2	42.5	36.5	28.3	20.9	**(17.6)**
5.25	20.8	24.3	33.8	44.6	55.1	56.3	45.4	35.1	25	20.6
4.08	22.4	25.9	35.9	49.3	57.6	60.1	47.8	36.6	25.9	22.2
2.92	22	24.1	36.3	47.3	60.3	**[61.5]**	47.9	35.9	24.4	22.2
1.75	20.9	24.5	34.4	46.3	57.7	59.4	46.6	35.1	24.8	21.3
0.58	18.7	21.8	29.4	39.4	47.2	46.4	40.1	30.9	22.2	18.5

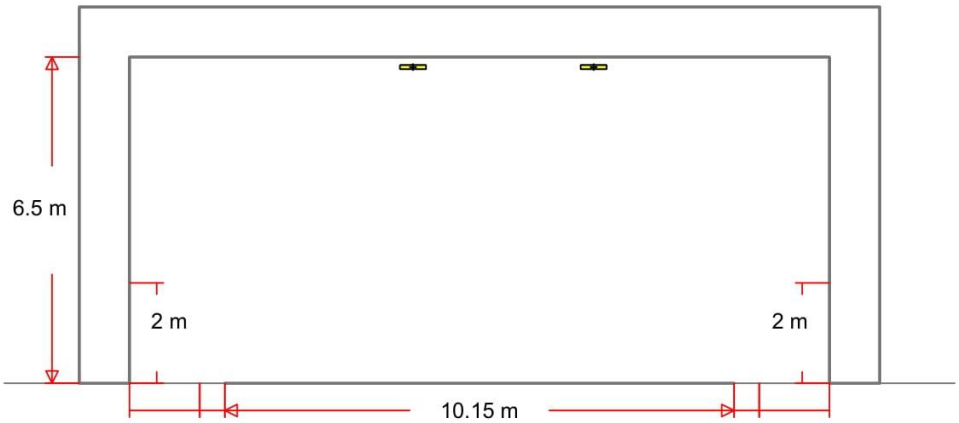
Illuminance [lx]

Height reference plane		: 0.00 m
Average illuminance	$\bar{E}_m$	: 35 lx
Minimum illuminance	E_{min}	: 17.6 lx
Maximum illuminance	E_{max}	: 61.5 lx
Uniformity U_o	$E_{min}/\bar{E}_m$	: 1 : 1.99 (0.5)
Diversity U_d	E_{min}/E_{max}	: 1 : 3.49 (0.29)

3 T2 portal MP, driving direction towards KU

3.1 Description, T2 portal MP, driving direction towards KU

3.1.1 Project data



Geometry tunnel

Length of the tunnel	:	1378 m
Length of the tunnel (calculation model)	:	290 m
Height of the tunnel	:	6.5 m
Width of the carriageway	:	10.15 m
Number of lanes	:	3
Covering / material	:	R3, q0 = 0.07

Border area (y=10.15 m)	:	0.50 m	Border area (y=0.00 m)	:	0.50 m
Covering / material	:	diffus 22%	Covering / material	:	diffus 22%
Marginal strip left	:	1.4 m	Marginal strip right	:	1.4 m
Height of the wall (right)	:	2 m	Height of the wall (left)	:	2 m
Covering / material	:	diffus 47%	Covering / material	:	diffus 47%

Calculation specifications

Speed	:	70 km/h
Length of the threshold zone	:	90 m
Luminance threshold zone	:	226 cd/m²
Luminance interior zone	:	4.5 cd/m²

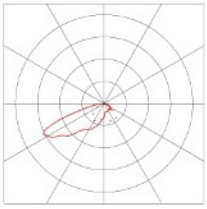
3 T2 portal MP, driving direction towards KU

3.1 Description, T2 portal MP, driving direction towards KU

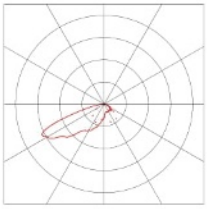
3.1.1 Project data

LDC in use

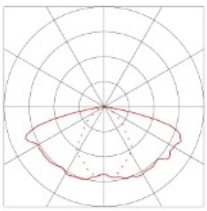
1
Order No. :
Luminaire name : .
Equipment : 1 x LED260/740 131.8 W / 26000 lm
Maintenance factor: 0.70



2
Order No. :
Luminaire name :
Equipment : 1 x LED100/740 51.6 W / 10000 lm
Maintenance factor: 0.70



4
Order No. :
Luminaire name .
Equipment : 1 x LED100/740 51.6 W / 10000 lm
Maintenance factor: 0.70



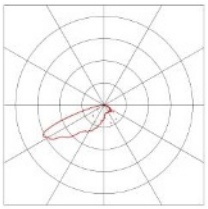
3 T2 portal MP, driving direction towards KU

3.1 Description, T2 portal MP, driving direction towards KU

3.1.1 Project data

6

Order No. :
Luminaire name
Equipment : 1 x LED450/740 230.4 W / 45000 lm
Maintenance factor: 0.70

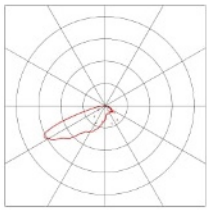


3.1 Description, T2 portal MP, driving direction towards KU

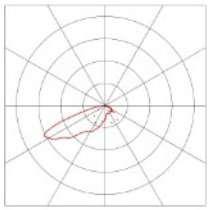
3.1.2 Luminaire list

Adaptation
LDC in use

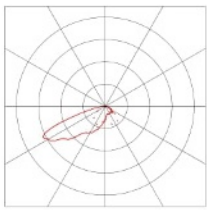
6 118 x Order No. :
Luminaire name :
Equipment : 1 x LED450/740 230.4 W / 45000 lm
Maintenance factor: 0.70



1 4 x Order No. :
Luminaire name :
Equipment : 1 x LED260/740 131.8 W / 26000 lm
Maintenance factor: 0.70



2 4 x Order No. :
Luminaire name :
Equipment : 1 x LED100/740 51.6 W / 10000 lm
Maintenance factor: 0.70



3.1 Description, T2 portal MP, driving direction towards KU

3.1.2 Luminaire list

Row of luminaires: Row 2.1
Number of luminaires: 94 System power (total): 20.5kW
Basic position: x=5.00m y=6.40m, z=6.30m -variable distances-
Rotation: z=0.0° C0=0.0° C90=0.0°

Nr.	Pos. X [m]	Power level	Control gr.	S1	Int.1	EMG
1	5.00	230.4W / 45klm	1	100%	0%	0%
2	6.01	230.4W / 45klm	1	100%	0%	0%
3	7.02	230.4W / 45klm	1	100%	0%	0%
4	8.03	230.4W / 45klm	1	100%	0%	0%
5	9.04	230.4W / 45klm	1	100%	0%	0%
6	10.05	230.4W / 45klm	1	100%	0%	0%
7	11.06	230.4W / 45klm	1	100%	0%	0%
8	12.07	230.4W / 45klm	1	100%	0%	0%
9	13.08	230.4W / 45klm	1	100%	0%	0%
10	14.10	230.4W / 45klm	1	100%	0%	0%
11	15.90	230.4W / 45klm	1	100%	0%	0%
12	16.89	230.4W / 45klm	1	100%	0%	0%
13	17.87	230.4W / 45klm	1	100%	0%	0%
14	18.84	230.4W / 45klm	1	100%	0%	0%
15	19.81	230.4W / 45klm	1	100%	0%	0%
16	20.78	230.4W / 45klm	1	100%	0%	0%
17	21.75	230.4W / 45klm	1	100%	0%	0%
18	22.72	230.4W / 45klm	1	100%	0%	0%
19	23.69	230.4W / 45klm	1	100%	0%	0%
20	24.66	230.4W / 45klm	1	100%	0%	0%
21	25.63	230.4W / 45klm	1	100%	0%	0%
22	26.60	230.4W / 45klm	1	100%	0%	0%
23	28.40	230.4W / 45klm	1	100%	0%	0%
24	29.38	230.4W / 45klm	1	100%	0%	0%
25	30.36	230.4W / 45klm	1	100%	0%	0%
26	31.34	230.4W / 45klm	1	100%	0%	0%
27	32.31	230.4W / 45klm	1	100%	0%	0%
28	33.28	230.4W / 45klm	1	100%	0%	0%
29	34.25	230.4W / 45klm	1	100%	0%	0%
30	35.22	230.4W / 45klm	1	100%	0%	0%
31	36.19	230.4W / 45klm	1	100%	0%	0%
32	37.16	230.4W / 45klm	1	100%	0%	0%
33	38.13	230.4W / 45klm	1	100%	0%	0%
34	39.10	230.4W / 45klm	1	100%	0%	0%
35	40.90	230.4W / 45klm	1	100%	0%	0%
36	41.88	230.4W / 45klm	1	100%	0%	0%
37	42.86	230.4W / 45klm	1	100%	0%	0%
38	43.84	230.4W / 45klm	1	100%	0%	0%
39	44.81	230.4W / 45klm	1	100%	0%	0%
40	45.78	230.4W / 45klm	1	100%	0%	0%
41	46.75	230.4W / 45klm	1	100%	0%	0%
42	47.72	230.4W / 45klm	1	100%	0%	0%
43	48.69	230.4W / 45klm	1	100%	0%	0%
44	49.66	230.4W / 45klm	1	100%	0%	0%

3.1 Description, T2 portal MP, driving direction towards KU

3.1.2 Luminaire list

45	50.63	230.4W / 45klm	1	100%	0%	0%
46	51.60	230.4W / 45klm	1	100%	0%	0%
47	53.40	230.4W / 45klm	1	100%	0%	0%
48	54.40	230.4W / 45klm	1	100%	0%	0%
49	55.40	230.4W / 45klm	1	100%	0%	0%
50	56.40	230.4W / 45klm	1	100%	0%	0%
51	57.50	230.4W / 45klm	1	100%	0%	0%
52	58.60	230.4W / 45klm	1	100%	0%	0%
53	59.70	230.4W / 45klm	1	100%	0%	0%
54	60.80	230.4W / 45klm	1	100%	0%	0%
55	61.90	230.4W / 45klm	1	100%	0%	0%
56	63.00	230.4W / 45klm	1	100%	0%	0%
57	64.10	230.4W / 45klm	1	100%	0%	0%
58	65.90	230.4W / 45klm	1	100%	0%	0%
59	67.00	230.4W / 45klm	1	100%	0%	0%
60	68.10	230.4W / 45klm	1	100%	0%	0%
61	69.36	230.4W / 45klm	1	100%	0%	0%
62	70.71	230.4W / 45klm	1	100%	0%	0%
63	72.06	230.4W / 45klm	1	100%	0%	0%
64	73.59	230.4W / 45klm	1	100%	0%	0%
65	75.10	230.4W / 45klm	1	100%	0%	0%
66	76.60	230.4W / 45klm	1	100%	0%	0%
67	78.40	230.4W / 45klm	1	100%	0%	0%
68	80.09	230.4W / 45klm	1	100%	0%	0%
69	81.78	230.4W / 45klm	1	100%	0%	0%
70	83.47	230.4W / 45klm	1	100%	0%	0%
71	85.16	230.4W / 45klm	1	100%	0%	0%
72	87.07	230.4W / 45klm	1	100%	0%	0%
73	89.00	230.4W / 45klm	1	100%	0%	0%
74	90.93	230.4W / 45klm	1	100%	0%	0%
75	92.86	230.4W / 45klm	1	100%	0%	0%
76	95.10	230.4W / 45klm	1	100%	0%	0%
77	97.35	230.4W / 45klm	1	100%	0%	0%
78	99.59	230.4W / 45klm	1	100%	0%	0%
79	102.28	230.4W / 45klm	1	100%	0%	0%
80	104.96	230.4W / 45klm	1	100%	0%	0%
81	107.64	230.4W / 45klm	1	100%	0%	0%
82	111.49	230.4W / 45klm	1	100%	0%	0%
83	116.22	230.4W / 45klm	1	100%	0%	0%
84	120.95	230.4W / 45klm	1	100%	0%	0%
85	125.68	230.4W / 45klm	1	100%	0%	0%
86	132.90	230.4W / 45klm	1	100%	0%	0%
87	140.90	131.8W / 26klm	1	100%	0%	0%
88	148.12	131.8W / 26klm	1	100%	0%	0%
89	157.38	131.8W / 26klm	1	100%	0%	0%
90	167.42	131.8W / 26klm	1	100%	0%	0%
91	171.90	51.6W / 10klm	1	100%	0%	0%
92	176.38	51.6W / 10klm	1	100%	0%	0%
93	180.86	51.6W / 10klm	1	100%	0%	0%
94	185.34	51.6W / 10klm	1	100%	0%	0%

3.1 Description, T2 portal MP, driving direction towards KU

3.1.2 Luminaire list

Row of luminaires: Row 4.1
Number of luminaires: 32 System power (total): 7.4kW
Basic position: x=5.00m y=2.80m, z=6.30m -variable distances-
Rotation: z=0.0° C0=0.0° C90=0.0°

Nr.	Pos. X [m]	Power level	Control gr.	S1	Int.1	EMG
1	5.00	230.4W / 45klm	1	100%	0%	0%
2	7.20	230.4W / 45klm	1	100%	0%	0%
3	9.40	230.4W / 45klm	1	100%	0%	0%
4	11.60	230.4W / 45klm	1	100%	0%	0%
5	13.75	230.4W / 45klm	1	100%	0%	0%
6	15.90	230.4W / 45klm	1	100%	0%	0%
7	17.98	230.4W / 45klm	1	100%	0%	0%
8	20.06	230.4W / 45klm	1	100%	0%	0%
9	22.14	230.4W / 45klm	1	100%	0%	0%
10	24.22	230.4W / 45klm	1	100%	0%	0%
11	26.31	230.4W / 45klm	1	100%	0%	0%
12	28.40	230.4W / 45klm	1	100%	0%	0%
13	30.48	230.4W / 45klm	1	100%	0%	0%
14	32.56	230.4W / 45klm	1	100%	0%	0%
15	34.64	230.4W / 45klm	1	100%	0%	0%
16	36.72	230.4W / 45klm	1	100%	0%	0%
17	38.79	230.4W / 45klm	1	100%	0%	0%
18	40.90	230.4W / 45klm	1	100%	0%	0%
19	42.98	230.4W / 45klm	1	100%	0%	0%
20	45.06	230.4W / 45klm	1	100%	0%	0%
21	47.14	230.4W / 45klm	1	100%	0%	0%
22	49.22	230.4W / 45klm	1	100%	0%	0%
23	51.30	230.4W / 45klm	1	100%	0%	0%
24	53.40	230.4W / 45klm	1	100%	0%	0%
25	55.48	230.4W / 45klm	1	100%	0%	0%
26	57.56	230.4W / 45klm	1	100%	0%	0%
27	59.64	230.4W / 45klm	1	100%	0%	0%
28	61.72	230.4W / 45klm	1	100%	0%	0%
29	64.10	230.4W / 45klm	1	100%	0%	0%
30	66.67	230.4W / 45klm	1	100%	0%	0%
31	69.47	230.4W / 45klm	1	100%	0%	0%
32	72.25	230.4W / 45klm	1	100%	0%	0%

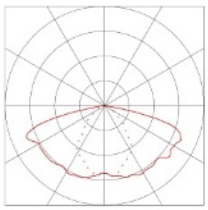
Interior
LDC in use

3.1 Description, T2 portal MP, driving direction towards KU

3.1.2 Luminaire list

4

Order No. :
Luminaire name :
Equipment : 1 x LED100/740 51.6 W / 10000 lm
Maintenance factor: 0.70



Row of luminaires: Row 1.1

Number of luminaires: 111
Basic position: x=2.50m y=6.40m, z=6.30m
Rotation: z=0.0° C0=0.0° C90=0.0°
System power (total): 5.7kW (1.38 km)
Constant distance: 12.50m
Flicker frequency (v=70 km/h): 1.6 Hz

Nr.	Pos. X [m]	Power level	Control gr.	S1	Int.1	EMG
1	2.50	51.6W / 10klm	2	100%	100%	100%
2	15.00	51.6W / 10klm	3	100%	100%	0%
3	27.50	51.6W / 10klm	2	100%	100%	100%
4	40.00	51.6W / 10klm	3	100%	100%	0%
5	52.50	51.6W / 10klm	2	100%	100%	100%
6	65.00	51.6W / 10klm	3	100%	100%	0%

Row of luminaires: Row 3.1

Number of luminaires: 111
Basic position: x=2.50m y=2.80m, z=6.30m
Rotation: z=0.0° C0=0.0° C90=0.0°
System power (total): 5.7kW (1.38 km)
Constant distance: 12.50m
Flicker frequency (v=70 km/h): 1.6 Hz

Nr.	Pos. X [m]	Power level	Control gr.	S1	Int.1	EMG
1	2.50	51.6W / 10klm	2	100%	100%	100%
2	15.00	51.6W / 10klm	3	100%	100%	0%
3	27.50	51.6W / 10klm	2	100%	100%	100%
4	40.00	51.6W / 10klm	3	100%	100%	0%
5	52.50	51.6W / 10klm	2	100%	100%	100%
6	65.00	51.6W / 10klm	3	100%	100%	0%

3 T2 portal MP, driving direction towards KU

3.2 Calculation results, T2 portal MP, driving direction towards KU

3.2.1 Result overview, S1: 100%

Regulating step: S1: 100%
Adaptation
1: 100%
Interior
2: 100%
3: 100%

Entrance, Threshold zone (constant)
Measuring range: 11.60 m - 35.80 m Points: nx = 10, ny = 9, nz = 3
Observer (starting point coordinate) : x = -48.40 m; z = 1.50 m dx = 61.21 m (fix)

			y =1.51 m	y =4.81 m	y =8.37 m	
Roadway (R3, q0 = 0.07)						
$\bar{L}_m$		:	236.52 cd/m²	236.39 cd/m²	236.33 cd/m²	
U_o	$L_{min}/\bar{L}_m$	:	0.56	0.58	0.52	0.4
U_l	$L_{l,min}/L_{l,max}$	:	0.98	0.99	0.98	0.6
$f_{TI,max}$	Max.	:	4 %	5 %	5 %	

Wall left (diffus 47%)

$\bar{L}_m$		:	210.50 cd/m²
U_o	$L_{min}/\bar{L}_m$	:	0.91
Lwall/L		:	0.89

Wall right (diffus 47%)

$\bar{L}_m$		:	184.08 cd/m²
U_o	$L_{min}/\bar{L}_m$	:	0.93
Lwall/L		:	0.78

Illuminance
Roadway

$\bar{E}_m$			2568.45 lx
U_o	$E_{min}/\bar{E}_m$	:	0.82

Border area (y = 10.15 m, |0.50 m|)				Border area (y = 0.00 m, |0.50 m|)			
$\bar{E}_m$			2136.65 lx	$\bar{E}_m$			1977.84 lx
U_o	$E_{min}/\bar{E}_m$	:	0.94	U_o	$E_{min}/\bar{E}_m$	:	0.94

Wall left				Wall right			
$\bar{E}_m$			1406.85 lx	$\bar{E}_m$			1230.15 lx
U_o	$E_{min}/\bar{E}_m$	:	0.91	U_o	$E_{min}/\bar{E}_m$	:	0.93

3 T2 portal MP, driving direction towards KU

3.2 Calculation results, T2 portal MP, driving direction towards KU

3.2.1 Result overview, S1: 100%

Interior, Interior zone
Measuring range: 27.50 m - 52.50 m Points: nx = 10, ny = 9, nz = 3
Observer (starting point coordinate) : x = -32.50 m; z = 1.50 m dx = 61.25 m (fix)

			y =1.51 m	y =4.81 m	y =8.37 m	
Roadway (R3, q0 = 0.07)						
$\overline{L}_m$		:	4.61 cd/m²	4.63 cd/m²	4.63 cd/m²	
U_o	$L_{min}/\overline{L}_m$	:	0.44	0.47	0.50	0.4
U_l	$L_{l,min}/L_{l,max}$	:	0.85	0.84	0.86	0.6
$f_{TI,max}$	Max.	:	8 %	11 %	7 %	

Wall left (diffus 47%)

$\overline{L}_m$		:	3.10 cd/m²
U_o	$L_{min}/\overline{L}_m$	:	0.83
Lwall/L		:	0.67

Wall right (diffus 47%)

$\overline{L}_m$		:	3.92 cd/m²
U_o	$L_{min}/\overline{L}_m$	:	0.89
Lwall/L		:	0.85

Illuminance
Roadway

$\overline{E}_m$		:	72.91 lx
U_o	$E_{min}/\overline{E}_m$	:	0.55

Border area (y = 10.15 m, |0.50 m|)				Border area (y = 0.00 m, |0.50 m|)			
$\overline{E}_m$		:	37.10 lx	$\overline{E}_m$		:	48.21 lx
U_o	$E_{min}/\overline{E}_m$	:	0.85	U_o	$E_{min}/\overline{E}_m$	:	0.85

Wall left				Wall right			
$\overline{E}_m$		:	20.76 lx	$\overline{E}_m$		:	26.23 lx
U_o	$E_{min}/\overline{E}_m$	:	0.82	U_o	$E_{min}/\overline{E}_m$	:	0.89

3 T2 portal MP, driving direction towards KU

3.2 Calculation results, T2 portal MP, driving direction towards KU

3.2.1 Result overview, S1: 100%

Adaptation, Threshold and transition zone
Measuring range: -0.50 m - 285.06 m Points: nx = 118, ny = 9, nz = 3
Observer (starting point coordinate) : x = -85.22 m; z = 1.50 m dx = 85.93 m (moving)
y =1.51 m y =4.81 m y =8.37 m
Roadway (R3, q0 = 0.07)

Wall left (diffus 47%)

Wall right (diffus 47%)

Object : Tunnel under Martwa Wisla - Gdansk
Installation :
Project number :
Date : 21.11.2025

3.2 Calculation results, T2 portal MP, driving direction towards KU

3.2.2 Result overview, EMG

Regulating step: EMG
Adaptation
1: 0%
Interior
2: 100%
3: 0%

Interior, Interior zone
Measuring range: 27.50 m - 52.50 m Points: nx = 10, ny = 9, nz = 3
Observer (starting point coordinate) : x = -32.50 m; z = 1.50 m dx = 61.25 m (fix)

			y =1.51 m	y =4.81 m	y =8.37 m	
Roadway (R3, q0 = 0.07)						
$\overline{L}_m$		:	2.23 cd/m²	2.24 cd/m²	2.24 cd/m²	
U_o	$L_{min}/\overline{L}_m$	:	0.42	0.46	0.50	0.4
U_l	$L_{l,min}/L_{l,max}$	:	0.77	0.78	0.79	0.6
$f_{TI,max}$	Max.	:	13 %	17 %	11 %	

Wall left (diffus 47%)
$\overline{L}_m$: 1.54 cd/m²
U_o $L_{min}/\overline{L}_m$: 0.79
Lwall/L : 0.69

Wall right (diffus 47%)
$\overline{L}_m$: 1.95 cd/m²
U_o $L_{min}/\overline{L}_m$: 0.74
Lwall/L : 0.87

Illuminance
Roadway
$\overline{E}_m$: 36.36 lx
U_o $E_{min}/\overline{E}_m$: 0.41

Border area (y = 10.15 m, |0.50 m|)				Border area (y = 0.00 m, |0.50 m|)			
$\overline{E}_m$		:	18.46 lx	$\overline{E}_m$		:	24.01 lx
U_o	$E_{min}/\overline{E}_m$	:	0.67	U_o	$E_{min}/\overline{E}_m$	:	0.64

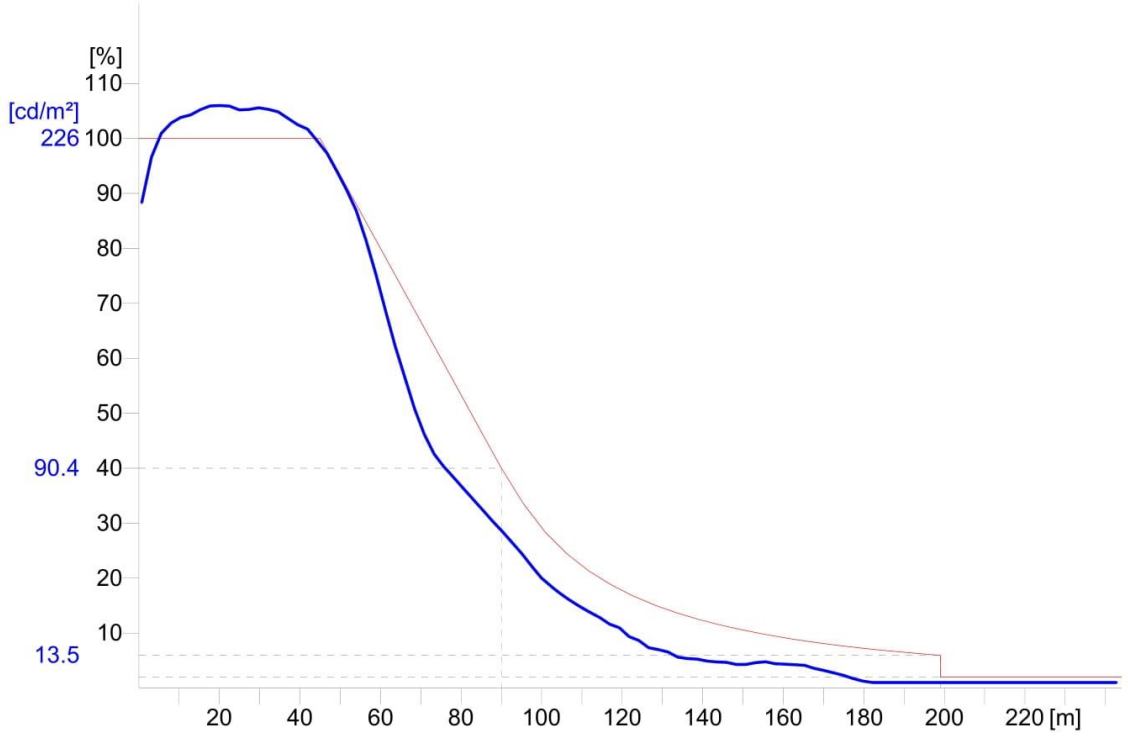
Wall left				Wall right			
$\overline{E}_m$		:	10.33 lx	$\overline{E}_m$		:	13.07 lx
U_o	$E_{min}/\overline{E}_m$	:	0.80	U_o	$E_{min}/\overline{E}_m$	:	0.74

3.2 Calculation results, T2 portal MP, driving direction towards KU

3.2.2 Result overview, EMG

3.2 Calculation results, T2 portal MP, driving direction towards KU

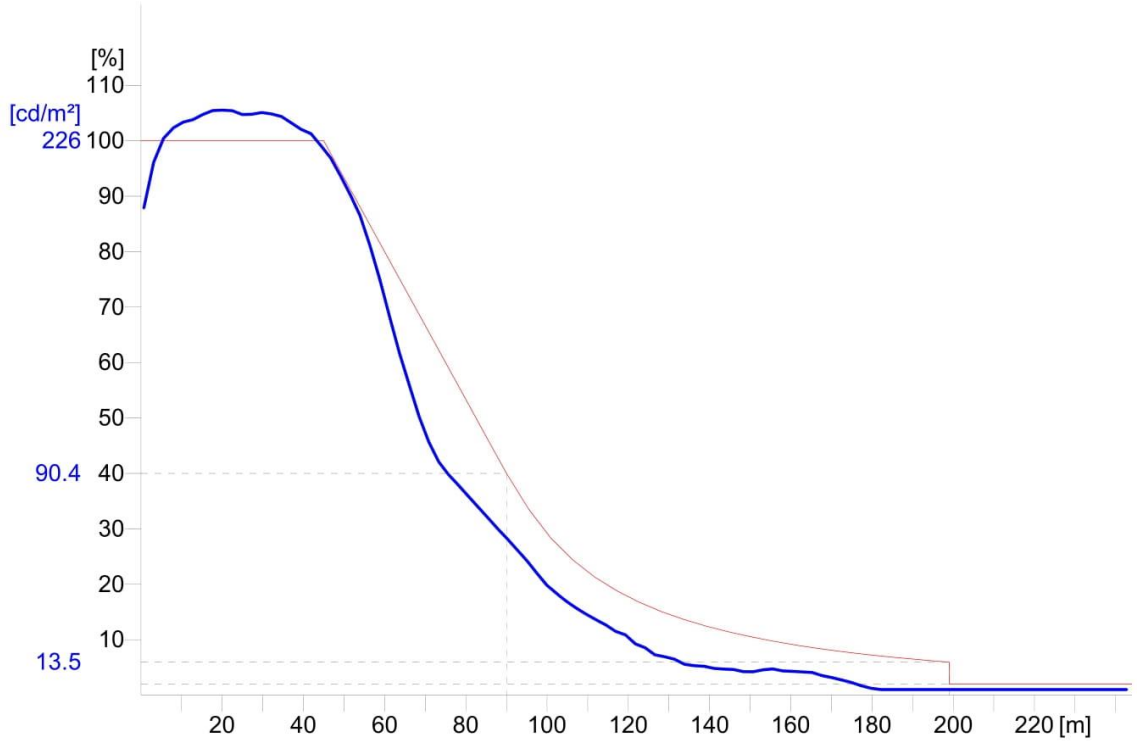
3.2.3 Evolution, Adaptation (L), S1: 100%, Obs. 1



Observer location 1 : x = -85.2, y = 1.52, z = 1.5 (dx = 85.93)
Evaluation of L on whole width of road

3.2 Calculation results, T2 portal MP, driving direction towards KU

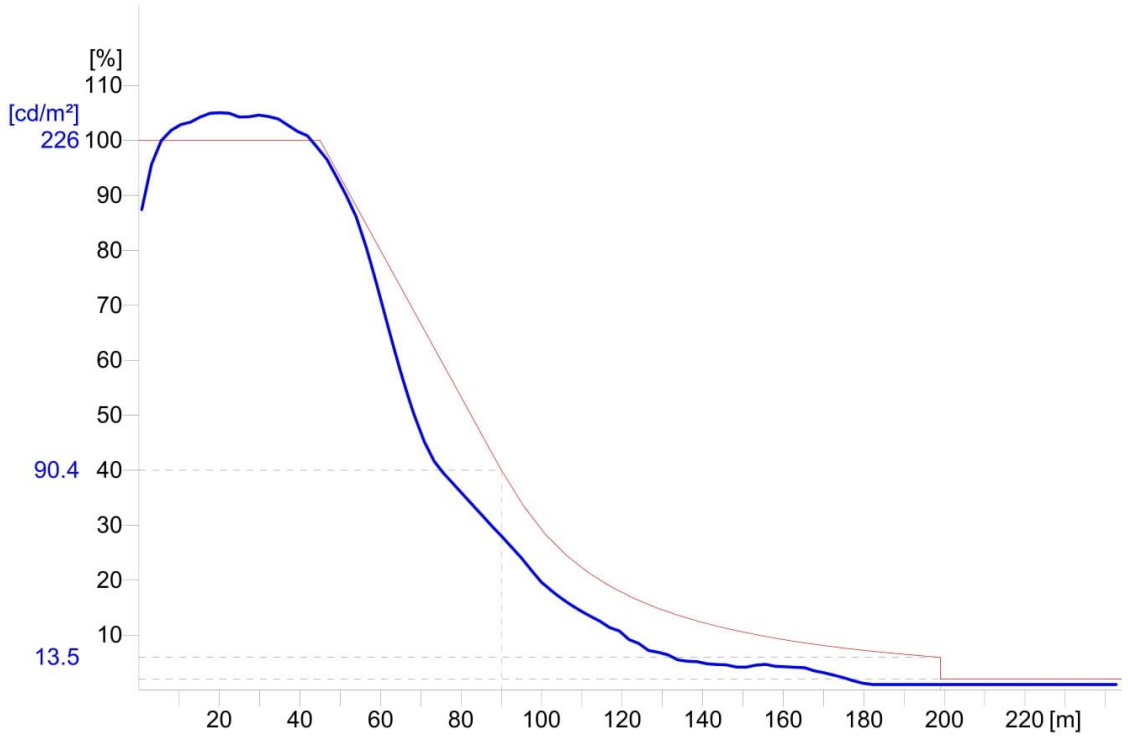
3.2.4 Evolution, Adaptation (L), S1: 100%, Obs. 2



Observer location 2 : x = -85.2, y = 4.81, z = 1.5 (dx = 85.93)
Evaluation of L on whole width of road

3.2 Calculation results, T2 portal MP, driving direction towards KU

3.2.5 Evolution, Adaptation (L), S1: 100%, Obs. 3



Observer location 3 : x = -85.2, y = 8.37, z = 1.5 (dx = 85.93)
Evaluation of L on whole width of road

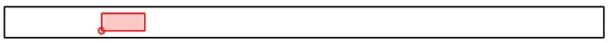
3 T2 portal MP, driving direction towards KU

3.3 Calculation results, T2 portal MP, driving direction towards KU

3.3.1 Table, Interior (E), EMG

[m]	28.75	31.25	33.75	36.25	38.75	41.25	43.75	46.25	48.75	51.25
9.56	35.3	27.7	20.1	16.1	**(14.8)**	14.9	15.8	19.8	27	34.1
8.37	48.1	38.3	26.3	20	17.5	17.7	19.7	25.8	37.6	47.6
7.18	67.4	49.8	31.9	22.8	19.1	19.1	22.4	31.7	49.5	67
6.00	78.2	55.9	35.5	25.2	20.6	20.8	24.5	35.4	55.3	75.7
4.81	**[81.1]**	59.7	37.9	26.4	21.7	22.2	25.7	37.1	57.8	79.1
3.62	80	57.9	37.3	26	21.4	21.2	25.2	36.3	57.1	79.2
2.53	73.6	53.3	34	24.3	20	19.9	23.2	33.7	52.7	72.2
1.51	60.2	46.4	30	22	18.6	18.5	21.3	29.4	45.1	59
0.50	45.9	36.5	25.3	19.5	17.3	17	18.8	24.2	35.8	45.7

Illuminance [lx]

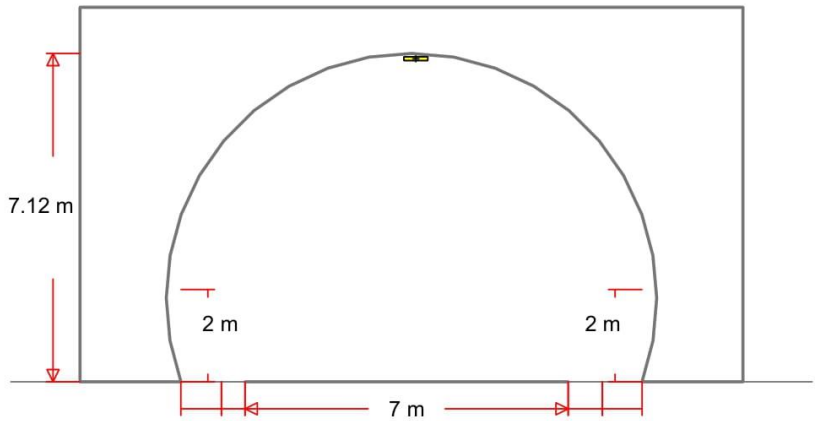


Height reference plane		: 0.00 m
Average illuminance	$\bar{E}_m$	: 36.4 lx
Minimum illuminance	E_{min}	: 14.8 lx
Maximum illuminance	E_{max}	: 81.1 lx
Uniformity U_o	$E_{min}/\bar{E}_m$	: 1 : 2.46 (0.41)
Diversity U_d	E_{min}/E_{max}	: 1 : 5.48 (0.18)

4 T1 and T2 interior circular part of the tunnel

4.1 Description, T1 and T2 interior circular part of the tunnel

4.1.1 Project data



Geometry tunnel

Length of the tunnel	:	1378 m
Length of the tunnel (calculation model)	:	280 m
Height of the tunnel	:	7.12 m
Width of the carriageway	:	7 m
Number of lanes	:	2
Covering / material	:	R3, q0 = 0.07

Border area (y=7.00 m)	:	0.51 m	Border area (y=0.00 m)	:	0.74 m
Covering / material	:	diffus 22%	Covering / material	:	diffus 22%
Marginal strip left	:	0.88 m	Marginal strip right	:	0.86 m
Height of the wall (right)	:	2 m	Height of the wall (left)	:	2 m
Covering / material	:	diffus 47%	Covering / material	:	diffus 47%

Calculation specifications

Speed	:	70 km/h
Length of the threshold zone	:	90 m
Luminance threshold zone	:	207 cd/m²
Luminance interior zone	:	4.5 cd/m²

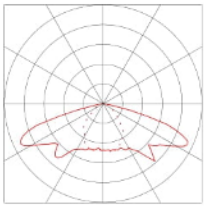
4 T1 and T2 interior circular part of the tunnel

4.1 Description, T1 and T2 interior circular part of the tunnel

4.1.1 Project data

LDC in use

3
Order No. :
Luminaire name
Equipment : 1 x LED150/740 75 W / 15000 lm
Maintenance factor: 0.70

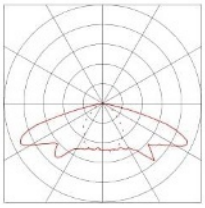


4.1 Description, T1 and T2 interior circular part of the tunnel

4.1.2 Luminaire list

Interior
LDC in use

3 Order No. :
Luminaire name :
Equipment : 1 x LED150/740 75 W / 15000 lm
Maintenance factor: 0.70



Row of luminaires: Row 1.1
Number of luminaires: 111
Basic position: x=0.00m y=3.30m, z=7.00m
Rotation: z=0.0° C0=0.0° C90=0.0°
System power (total): 8.3kW (1.38 km)
Constant distance: 12.50m
Flicker frequency (v=70 km/h): 1.6 Hz

Nr.	Pos. X [m]	Power level	Control gr.	S1	Int.1	EMG
1	0.00	75W / 15klm	2	100%	100%	100%
2	12.50	75W / 15klm	3	100%	100%	0%
3	25.00	75W / 15klm	2	100%	100%	100%
4	37.50	75W / 15klm	3	100%	100%	0%
5	50.00	75W / 15klm	2	100%	100%	100%
6	62.50	75W / 15klm	3	100%	100%	0%
7	75.00	75W / 15klm	2	100%	100%	100%
8	87.50	75W / 15klm	3	100%	100%	0%
9	100.00	75W / 15klm	2	100%	100%	100%
10	112.50	75W / 15klm	3	100%	100%	0%
11	125.00	75W / 15klm	2	100%	100%	100%
12	137.50	75W / 15klm	3	100%	100%	0%
13	150.00	75W / 15klm	2	100%	100%	100%
14	162.50	75W / 15klm	3	100%	100%	0%
15	175.00	75W / 15klm	2	100%	100%	100%
16	187.50	75W / 15klm	3	100%	100%	0%
17	200.00	75W / 15klm	2	100%	100%	100%
18	212.50	75W / 15klm	3	100%	100%	0%
19	225.00	75W / 15klm	2	100%	100%	100%
20	237.50	75W / 15klm	3	100%	100%	0%
21	250.00	75W / 15klm	2	100%	100%	100%
22	262.50	75W / 15klm	3	100%	100%	0%
23	275.00	75W / 15klm	2	100%	100%	100%
:	:	:	:			
107	1325.00	75W / 15klm	2	100%	100%	100%

4.1 Description, T1 and T2 interior circular part of the tunnel

4.1.2 Luminaire list

108	1337.50	75W / 15klm	3	100%	100%	0%
109	1350.00	75W / 15klm	2	100%	100%	100%
110	1362.50	75W / 15klm	3	100%	100%	0%
111	1375.00	75W / 15klm	2	100%	100%	100%

4 T1 and T2 interior circular part of the tunnel

4.2 Calculation results, T1 and T2 interior circular part of the tunnel

4.2.1 Result overview, Int.1

Regulating step: Int.1
Adaptation
1: 0%
Interior
2: 100%
3: 100%

Interior, Interior zone
Measuring range: 187.50 m - 212.50 m Points: nx = 10, ny = 6, nz = 3
Observer (starting point coordinate) : x = 127.50 m; z = 1.50 m dx = 61.25 m (fix)

			y =1.75 m	y =5.25 m	
Roadway (R3, q0 = 0.07)					
$\overline{L}_m$		:	4.57 cd/m²	4.59 cd/m²	
U_o	$L_{min}/\overline{L}_m$	:	0.62	0.69	0.4
U_l	$L_{l,min}/L_{l,max}$	:	0.95	0.96	0.6
$f_{TI,max}$	Max.	:	6 %	6 %	

Wall left (diffus 47%)
$\overline{L}_m$: 4.16 cd/m²
U_o $L_{min}/\overline{L}_m$: 0.90
Lwall/L : 0.91

Wall right (diffus 47%)
$\overline{L}_m$: 4.41 cd/m²
U_o $L_{min}/\overline{L}_m$: 0.94
Lwall/L : 0.97

Illuminance
Roadway
$\overline{E}_m$: 65.62 lx
U_o $E_{min}/\overline{E}_m$: 0.85

Border area (y = 7.00 m, |0.51 m|)				Border area (y = 0.00 m, |0.74 m|)			
$\overline{E}_m$		:	49.24 lx	$\overline{E}_m$		:	51.49 lx
U_o	$E_{min}/\overline{E}_m$	:	0.97	U_o	$E_{min}/\overline{E}_m$	:	0.94

Wall left				Wall right			
$\overline{E}_m$		:	27.78 lx	$\overline{E}_m$		:	29.50 lx
U_o	$E_{min}/\overline{E}_m$	:	0.90	U_o	$E_{min}/\overline{E}_m$	:	0.94

Object : Tunnel under Martwa Wisla - Gdansk
Installation :
Project number :
Date : 21.11.2025

4.2 Calculation results, T1 and T2 interior circular part of the tunnel

4.2.2 Result overview, EMG

Regulating step: EMG
Adaptation
1: 0%
Interior
2: 100%
3: 0%

Interior, Interior zone
Measuring range: 187.50 m - 212.50 m Points: nx = 10, ny = 6, nz = 3
Observer (starting point coordinate) : x = 127.50 m; z = 1.50 m dx = 61.25 m (fix)

			y =1.75 m	y =5.25 m	
Roadway (R3, q0 = 0.07)					
$\bar{L}_m$		:	2.28 cd/m²	2.30 cd/m²	
U_o	$L_{min}/\bar{L}_m$	:	0.59	0.63	0.4
U_l	$L_{l,min}/L_{l,max}$	:	0.71	0.74	0.6
$fT_{l,max}$	Max.	:	10 %	10 %	

Wall left (diffus 47%)

$\bar{L}_m$		:	2.08 cd/m²
U_o	$L_{min}/\bar{L}_m$	:	0.68
Lwall/L		:	0.91

Wall right (diffus 47%)

$\bar{L}_m$		:	2.21 cd/m²
U_o	$L_{min}/\bar{L}_m$	:	0.66
Lwall/L		:	0.97

Illuminance
Roadway

$\bar{E}_m$		:	32.81 lx
U_o	$E_{min}/\bar{E}_m$	:	0.59

Border area (y = 7.00 m, |0.51 m|)				Border area (y = 0.00 m, |0.74 m|)			
$\bar{E}_m$		:	24.62 lx	$\bar{E}_m$		:	25.75 lx
U_o	$E_{min}/\bar{E}_m$	:	0.71	U_o	$E_{min}/\bar{E}_m$	:	0.69

Wall left				Wall right			
$\bar{E}_m$		:	13.88 lx	$\bar{E}_m$		:	14.74 lx
U_o	$E_{min}/\bar{E}_m$	:	0.68	U_o	$E_{min}/\bar{E}_m$	:	0.66

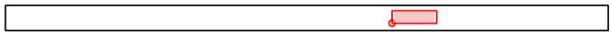
4 T1 and T2 interior circular part of the tunnel

4.3 Calculation results, T1 and T2 interior circular part of the tunnel

4.3.1 Table, Interior (E), EMG

[m]	188.75	191.25	193.75	196.25	198.75	201.25	203.75	206.25	208.75	211.25
6.42	19.5	21.8	27.7	34.2	38.1	38.4	34.4	28.1	21.6	**(19.2)**
5.25	22	24.7	32.8	39.8	47.8	49.2	39.7	35	24.9	21.9
4.08	22.6	25.3	38.4	42.4	47.6	49.4	41.9	39.7	25.1	22.8
2.92	21.9	23.1	36.8	41	50.6	**[51.5]**	42.1	39.1	23.8	22
1.75	21.4	24.2	33.9	39.6	48.6	48.7	40.7	35.4	24.6	22
0.58	20	22.4	29	36.4	42.7	41.5	37.1	30.1	23	19.5

Illuminance [lx]

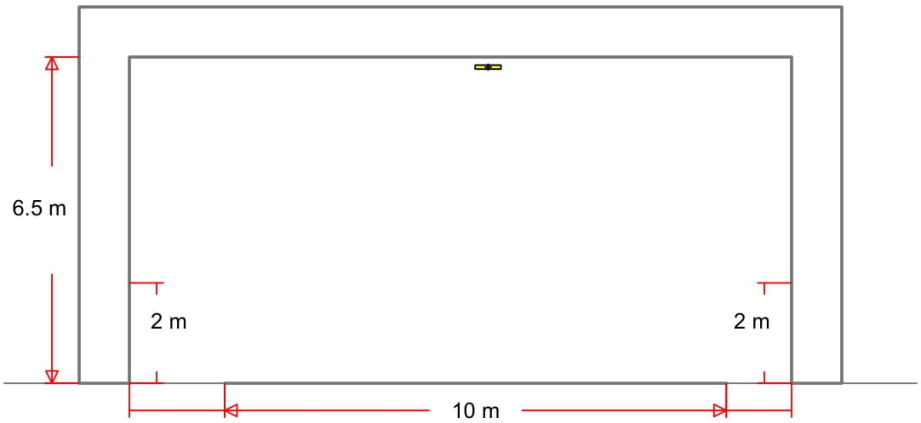


Height reference plane		: 0.00 m
Average illuminance	$\bar{E}_m$	: 32.8 lx
Minimum illuminance	E_{min}	: 19.2 lx
Maximum illuminance	E_{max}	: 51.5 lx
Uniformity U_o	$E_{min}/\bar{E}_m$	: 1 : 1.71 (0.59)
Diversity U_d	E_{min}/E_{max}	: 1 : 2.67 (0.37)

5 T1 3 lanes at exit interior

5.1 Description, T1 3 lanes at exit interior

5.1.1 Project data



Geometry tunnel

Length of the tunnel	:	72 m
Length of the tunnel (calculation model)	:	72 m
Height of the tunnel	:	6.5 m
Width of the carriageway	:	10 m
Number of lanes	:	3
Covering / material	:	R3, q0 = 0.07

Marginal strip left	:	1.9 m	Marginal strip right	:	1.3 m
Height of the wall (right)	:	2 m	Height of the wall (left)	:	2 m
Covering / material	:	diffus 47%	Covering / material	:	diffus 47%

Calculation specifications

Speed	:	70 km/h
Length of the threshold zone	:	90 m
Luminance threshold zone	:	226 cd/m²
Luminance interior zone	:	4.5 cd/m²

5 T1 3 lanes at exit interior

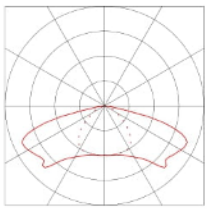
5.1 Description, T1 3 lanes at exit interior

5.1.1 Project data

LDC in use

5

Order No. :
Luminaire name :
Equipment : 1 x LED200/740 100 W / 20000 lm
Maintenance factor: 0.70



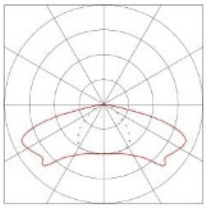
5.1 Description, T1 3 lanes at exit interior

5.1.2 Luminaire list

Interior
LDC in use

5

Order No. :
Luminaire name :
Equipment : 1 x LED200/740 100 W / 20000 lm
Maintenance factor: 0.70



Row of luminaires: Row 1.1

Number of luminaires: 6
Basic position: x=0.00m y=4.75m, z=6.30m
Rotation: z=0.0° C0=0.0° C90=0.0°

System power (total): 0.6kW (0.07 km)
Constant distance: 12.50m
Flicker frequency (v=70 km/h): 1.6 Hz

Nr.	Pos. X [m]	Power level	Control gr.	S1	Int.1	EMG
1	0.00	100W / 20klm	2	100%	100%	100%
2	12.50	100W / 20klm	3	100%	100%	0%
3	25.00	100W / 20klm	2	100%	100%	100%
4	37.50	100W / 20klm	3	100%	100%	0%
5	50.00	100W / 20klm	2	100%	100%	100%
6	62.50	100W / 20klm	3	100%	100%	0%

5 T1 3 lanes at exit interior

5.2 Calculation results, T1 3 lanes at exit interior

5.2.1 Result overview, Int.1

Regulating step: Int.1
Adaptation
1: 0%
Interior
2: 100%
3: 100%

Interior, Interior zone
Measuring range: 25.00 m - 50.00 m Points: nx = 10, ny = 9, nz = 3
Observer (starting point coordinate) : x = -35.00 m; z = 1.50 m dx = 61.25 m (fix)

			y =1.50 m	y =4.75 m	y =8.25 m	
Roadway (R3, q0 = 0.07)						
$\bar{L}_m$		:	4.77 cd/m²	4.78 cd/m²	4.78 cd/m²	
U_o	$L_{min}/\bar{L}_m$	:	0.46	0.47	0.49	0.4
U_l	$L_{l,min}/L_{l,max}$	:	0.88	0.77	0.88	0.6
$f_{TI,max}$	Max.	:	7 %	11 %	6 %	

Wall left (diffus 47%)
$\bar{L}_m$: 3.53 cd/m²
U_o $L_{min}/\bar{L}_m$: 0.82
Lwall/L : 0.74

Wall right (diffus 47%)
$\bar{L}_m$: 4.94 cd/m²
U_o $L_{min}/\bar{L}_m$: 0.92
Lwall/L : 1.04

Illuminance
Roadway
$\bar{E}_m$: 74.23 lx
U_o $E_{min}/\bar{E}_m$: 0.66

Wall left				Wall right			
$\bar{E}_m$		:	23.58 lx	$\bar{E}_m$		:	33.02 lx
U_o	$E_{min}/\bar{E}_m$	:	0.82	U_o	$E_{min}/\bar{E}_m$	:	0.92

5.2 Calculation results, T1 3 lanes at exit interior

5.2.2 Result overview, EMG

Regulating step: EMG
Adaptation
1: 0%
Interior
2: 100%
3: 0%

Interior, Interior zone
Measuring range: 25.00 m - 50.00 m Points: nx = 10, ny = 9, nz = 3
Observer (starting point coordinate) : x = -35.00 m; z = 1.50 m dx = 61.25 m (fix)

			y =1.50 m	y =4.75 m	y =8.25 m	
Roadway (R3, q0 = 0.07)						
$\bar{L}_m$		:	2.34 cd/m²	2.34 cd/m²	2.34 cd/m²	
U_o	$L_{min}/\bar{L}_m$	:	0.44	0.45	0.45	0.4
U_l	$L_{l,min}/L_{l,max}$	:	0.71	0.51	0.72	0.6
$f_{TI,max}$	Max.	:	11 %	18 %	10 %	

Wall left (diffus 47%)
$\bar{L}_m$: 1.76 cd/m²
U_o $L_{min}/\bar{L}_m$: 0.71
Lwall/L : 0.75

Wall right (diffus 47%)
$\bar{L}_m$: 2.47 cd/m²
U_o $L_{min}/\bar{L}_m$: 0.70
Lwall/L : 1.05

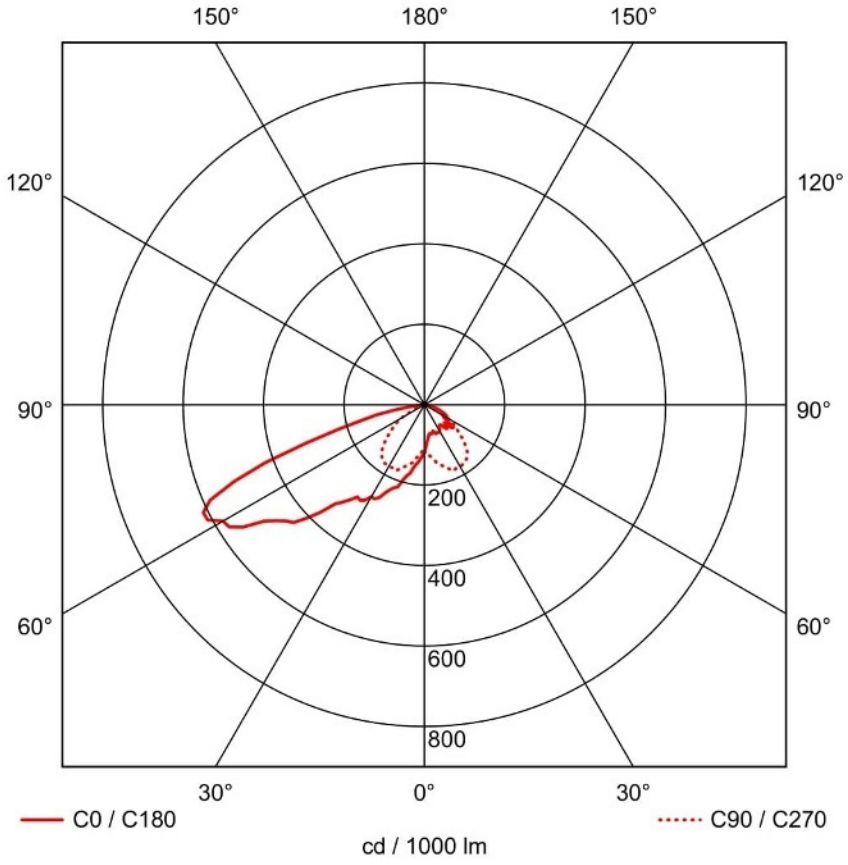
Illuminance
Roadway
$\bar{E}_m$: 37.06 lx
U_o $E_{min}/\bar{E}_m$: 0.48

Wall left				Wall right			
$\bar{E}_m$		:	11.77 lx	$\bar{E}_m$		:	16.49 lx
U_o	$E_{min}/\bar{E}_m$	:	0.71	U_o	$E_{min}/\bar{E}_m$	:	0.70

Object	:	Tunnel under Martwa Wisla - Gdansk
Installation	:	
Project number	:	
Date	:	21.11.2025

1 Luminaire data

1.1.1 LDC



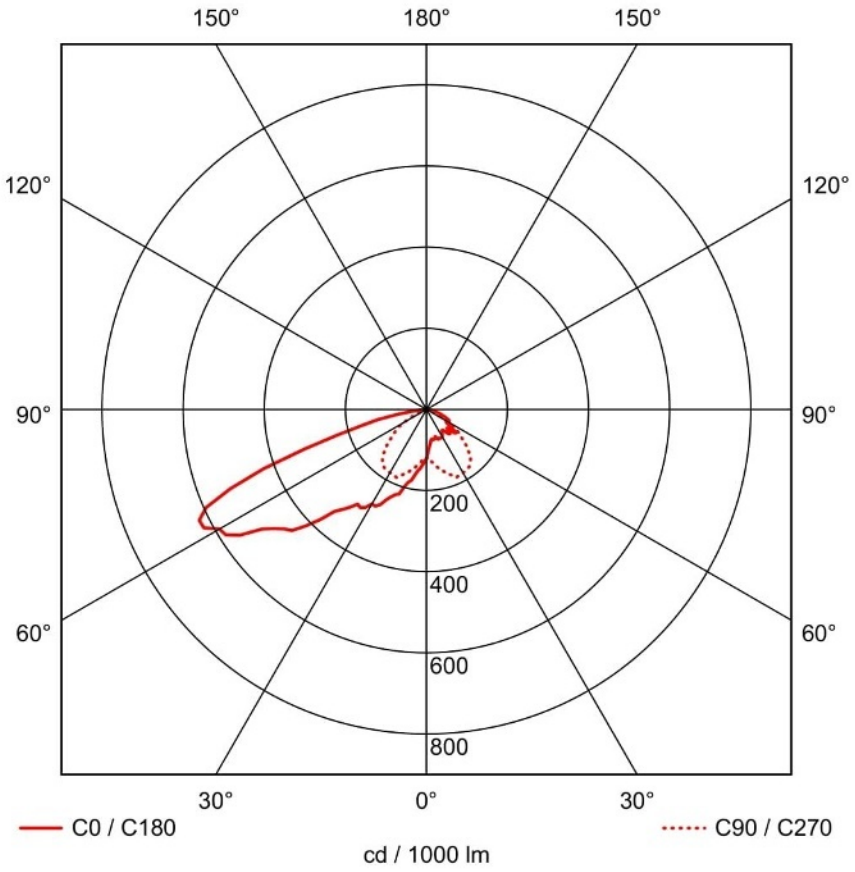
	C0	C90	C180
0°	119	119	119
5°	89	125	139
10°	73	138	160
15°	74	154	188
20°	76	168	219
25°	76	181	246
30°	76	177	264
35°	65	175	281
40°	68	166	316
45°	81	145	389
50°	90	116	450
55°	68	92	512
60°	58	64	579
65°	57	28	604
70°	40	14	420
75°	26	9	189
80°	13	4	75
85°	3	1	8
90°	0	0	0
	cd / 1000 lm		

Manufacturer	:	Efficiency factor	: 85%
Order number	:	Luminaire efficacy	: 167.68 lm/W (A30)
Luminaire name		Light distribution	: asymmetric
Equipment	: 1 x LED260/740 131.8 W / 26000 lm	Beam Angle	: -- C0
Dimensions	: L 518 mm x W 435 mm x H 81 mm		-- C90
File name	:		69.7° C180
			-- C270

Object : Tunnel under Martwa Wisla - Gdansk
Installation :
Project number :
Date : 21.11.2025

1 Luminaire data

1.2.1 LDC



	C0	C90	C180
0°	122	122	122
5°	91	127	142
10°	74	141	163
15°	76	157	191
20°	77	171	223
25°	77	184	251
30°	78	180	269
35°	67	179	286
40°	70	169	322
45°	82	148	396
50°	92	119	458
55°	70	94	521
60°	59	65	590
65°	58	28	615
70°	41	14	428
75°	27	9	192
80°	13	4	76
85°	3	1	8
90°	0	0	0
	cd / 1000 lm		

Manufacturer :
Order number :
Luminaire name :
Equipment : 1 x LED100/740 51.6 W / 10000 lm
Dimensions : L 518 mm x W 435 mm x H 81 mm
File name :

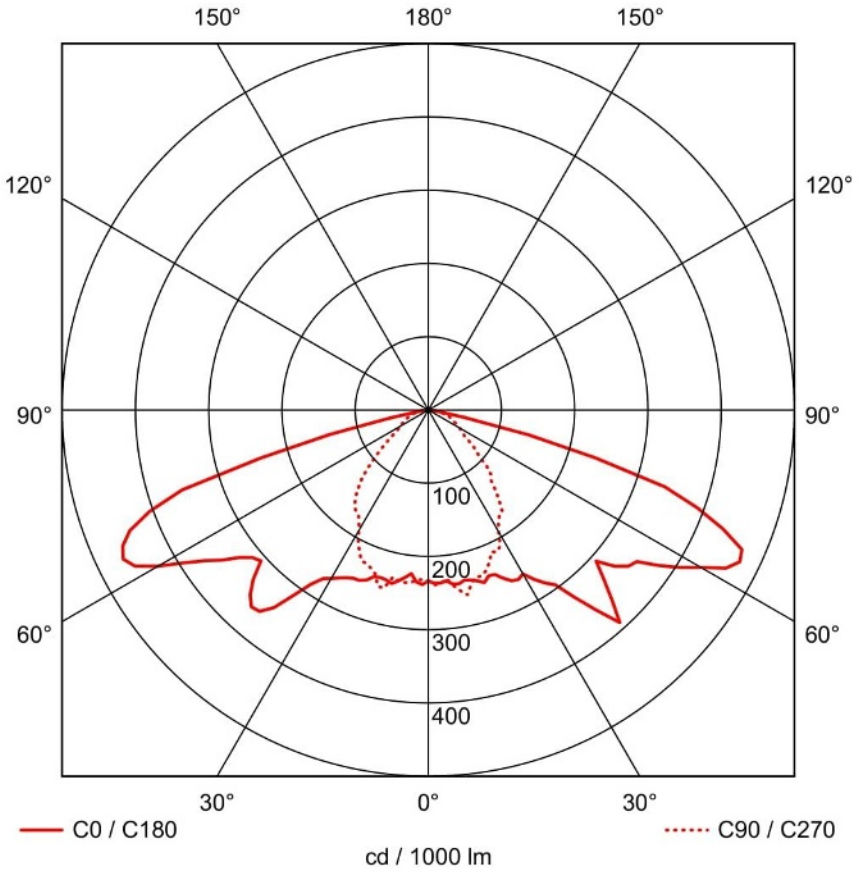
Efficiency factor : 87%
Luminaire efficacy : 168.6 lm/W (A30)
Light distribution : asymmetric
Beam Angle : -- C0
-- C90
69.7° C180
-- C270

Object : Tunnel under Martwa Wisla - Gdansk
Installation :
Project number :
Date : 21.11.2025

1 Luminaire data

1.3

1.3.1 LDC



	C0	C90	C180
0°	233	233	233
5°	234	231	227
10°	241	250	237
15°	241	239	238
20°	241	232	247
25°	255	210	253
30°	258	192	266
35°	286	176	300
40°	356	142	359
45°	347	118	342
50°	332	84	314
55°	362	58	359
60°	430	50	427
65°	475	38	461
70°	391	32	405
75°	189	24	186
80°	20	15	21
85°	0	8	1
90°	0	0	0
	cd / 1000 lm		

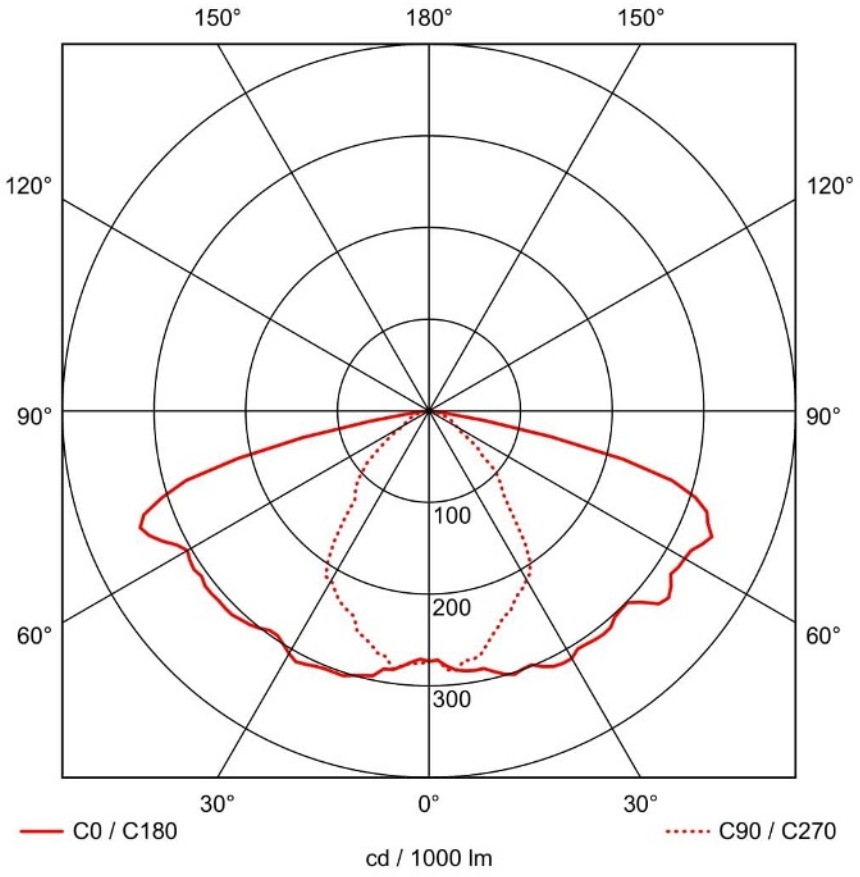
Manufacturer :
Order number :
Luminaire name :
Equipment : 1 x LED150/740 75 W / 15000 lm
Dimensions : L 518 mm x W 435 mm x H 81 mm
File name :

Efficiency factor : 89%
Luminaire efficacy : 178 lm/W (A30)
Light distribution : asymmetric
Beam Angle : 74.1° C0
18.6° C90
74.1° C180
17.9° C270

1 Luminaire data

1.4

1.4.1 LDC



	C0	C90	C180
0°	273	273	273
5°	282	286	277
10°	288	275	286
15°	296	258	299
20°	300	238	303
25°	308	225	306
30°	312	213	306
35°	308	188	295
40°	308	134	304
45°	301	110	310
50°	327	76	310
55°	322	52	308
60°	322	35	305
65°	335	28	329
70°	323	20	331
75°	247	12	246
80°	62	7	66
85°	3	2	4
90°	0	0	0
	cd / 1000 lm		

Manufacturer :
Order number :
Luminaire name :

Equipment : 1 x LED100/740 51.6 W / 10000 lm
Dimensions : L 518 mm x W 435 mm x H 81 mm
File name :

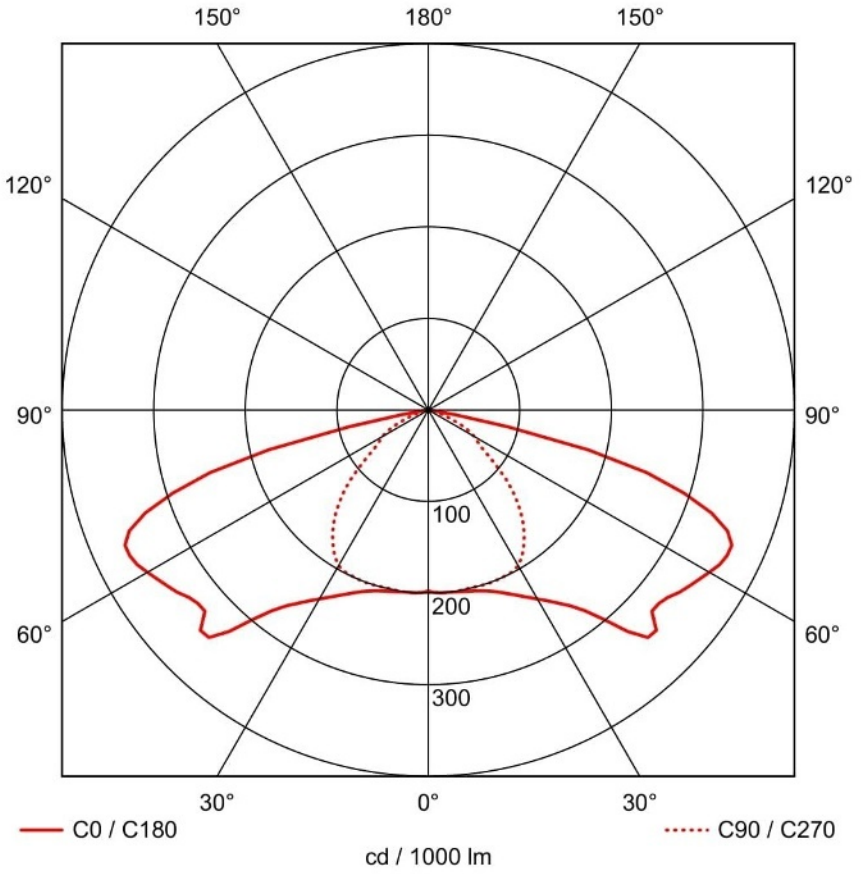
Efficiency factor : 89%
Luminaire efficacy : 172.48 lm/W (A30)
Light distribution : asymmetric
Beam Angle : 76.7° C0
35.4° C90
76.8° C180
35.3° C270

Object : Tunnel under Martwa Wisla - Gdansk
Installation :
Project number :
Date : 21.11.2025

1 Luminaire data

1.5

1.5.1 LDC



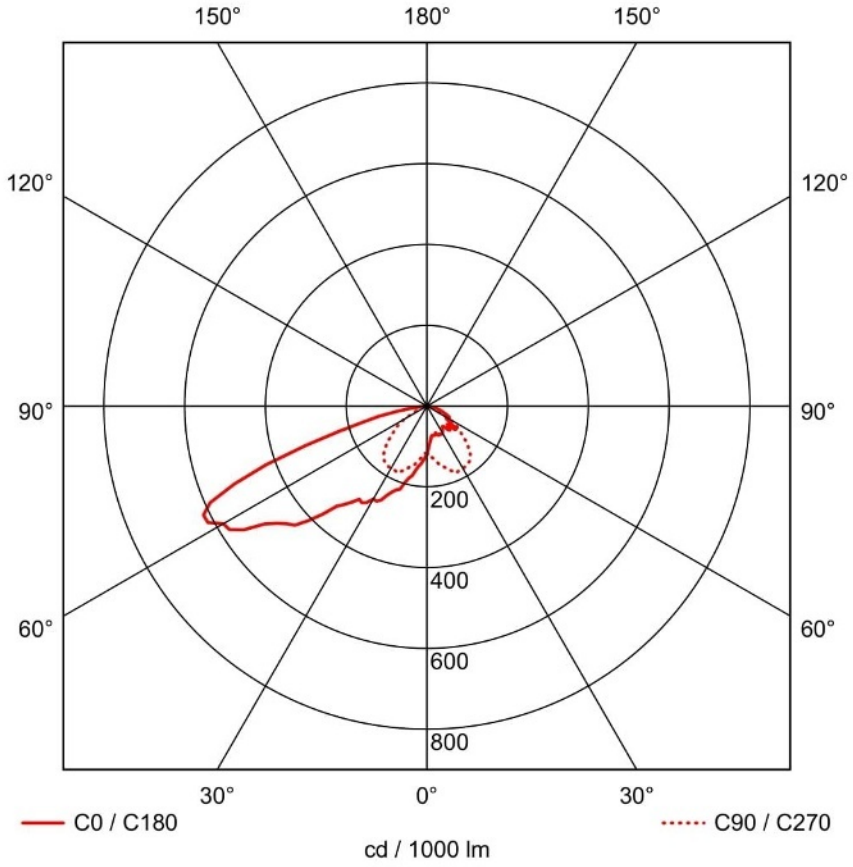
	C0	C90	C180
0°	198	198	198
5°	200	200	200
10°	201	200	201
15°	204	200	204
20°	211	201	211
25°	223	199	223
30°	238	196	238
35°	259	182	259
40°	299	161	299
45°	348	135	348
50°	329	101	329
55°	341	70	341
60°	354	58	354
65°	365	41	365
70°	329	20	329
75°	217	9	217
80°	29	4	29
85°	1	0	1
90°	0	0	0
	cd / 1000 lm		

Manufacturer :
Order number :
Luminaire name :
Equipment : 1 x LED200/740 100 W / 20000 lm
Dimensions : L 518 mm x W 435 mm x H 81 mm
File name :

Efficiency factor : 89%
Luminaire efficacy : 178 lm/W (A30)
Light distribution : asymmetric
Beam Angle : 75.8° C0
34.6° C90
75.8° C180
34.6° C270

1 Luminaire data

1.6.1 LDC



	C0	C90	C180
0°	120	120	120
5°	90	126	140
10°	74	139	161
15°	75	155	189
20°	76	169	221
25°	77	182	248
30°	77	178	266
35°	66	176	283
40°	69	167	318
45°	82	146	391
50°	90	117	453
55°	69	93	515
60°	59	64	583
65°	57	28	608
70°	41	14	423
75°	26	9	190
80°	13	4	75
85°	3	1	8
90°	0	0	0

cd / 1000 lm

Manufacturer :
Order number :
Luminaire name
Equipment : 1 x LED450/740 230.4 W / 45000 lm
Dimensions : L 518 mm x W 676 mm x H 81 mm
File name :

Efficiency factor : 86%
Luminaire efficacy : 167.97 lm/W (A30)
Light distribution : asymmetric
Beam Angle : -- C0
-- C90
69.7° C180
-- C270