

Underpass Road in Urban Area

Installation : Permanent lighting only ; lighting level 6cd/m²

Project number : T15-059-LDD-A1

(ΗΛΕΚΤΡΟΦΩΤΙΣΜΟΣ ΥΠΟΓΕΙΑΣ ΔΙΑΒΑΣΗΣ ΦΑΡΣΑΛΩΝ ΜΕ ΦΩΤΙΣΤΙΚΑ LED)

Customer : ΔΗΜΟΣ ΛΑΡΙΣΑΙΩΝ

Processed by : Lighting Designer :

Date : 23.10.2015

The following values are based on exact calculations on calibrated lamps, luminaires and their arrangement. In practice, gradual divergences can occur.

Guarantee claims for luminaire data are excluded.

Relux and the luminaire manufacturers accept no liability for consequential damage and damage which is occasioned to the user or to third parties.

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1 Luminaire data

1.1 AEC ILLUMINAZIONE SRL, GALILEO 0F6 SS-6W 6.5-... (GALILEO 0F6 SS-...)

1.1.1 Data sheet

Manufacturer: AEC ILLUMINAZIONE SRL

GALILEO 0F6 SS-6W 6.5-3M-1U

GALILEO 0F6 SS-6W 6.5-3M-1U

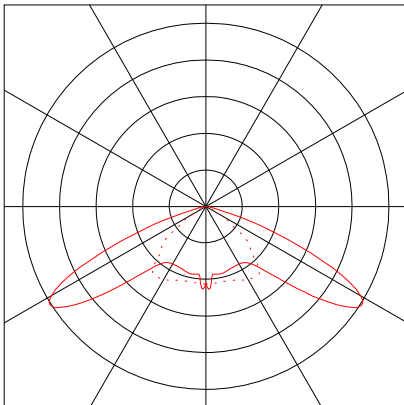
Luminaire data

Luminaire efficiency : 100%
Luminaire efficacy : 117.84 lm/W
Classification : A30 ↓100.0% ↑0.0%
CIE Flux Codes : 31 74 99 100 100
UGR 4H 8H (20%, 50%, 70%)
C0 / C90 : 37.1 / 30.3
Control gear :
System power : 116 W
Length : 437 mm
Width : 300 mm
Height : 230 mm

Equipped with

Quantity : 1
Designation :

Colour : 5700
Luminous flux : 13670 lm
Colour reproduction : 70

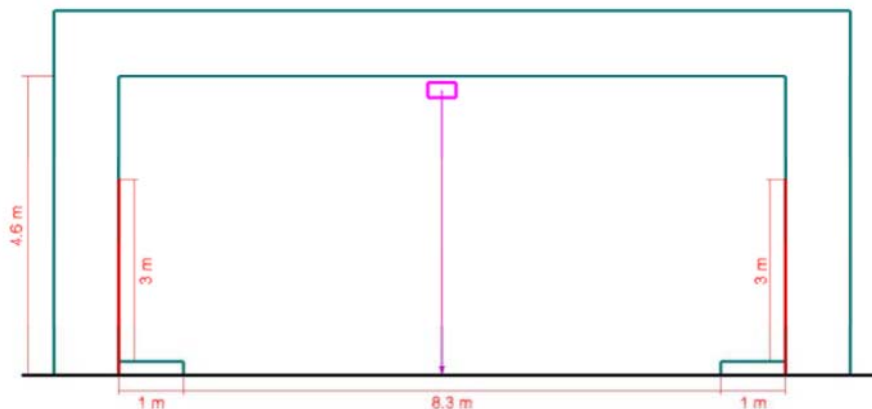


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2 Tunnel

2.1 Description, Tunnel

2.1.1 Project data



Geometry tunnel

Length of the tunnel : 90 m
 Length of the tunnel (calculation model) : 90 m
 Height of the tunnel : 4.6 m

Width of the lane : 8.3 m
 Number of lanes : 2
 Covering / material : R3, q0 = 0.07
 Marginal strip right : 1 m
 Marginal strip left : 1 m

Height of the wall (right) : 3 m
 Covering / material : diffus 40%

Height of the wall (left) : 3 m
 Covering / material : diffus 40%

Calculation specifications

Speed : 50 km/h
 Length of the threshold zone : 39 m
 Luminance threshold zone : 100 cd/m²
 Luminance interior zone : 6 cd/m²

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2 Tunnel

2.1 Description, Tunnel

2.1.1 Project data

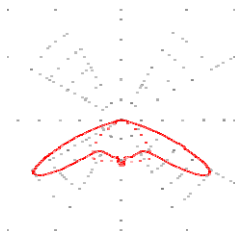
LDC in use

1



AEC ILLUMINAZIONE SRL

Order No. : GALILEO 0F6 SS-6W 6.5-3M-1U
Luminaire name : GALILEO 0F6 SS-6W 6.5-3M-1U
Equipment : 1 x L-GAL-0F6-5700-525-3M1U / 13670 lm
Maintenance factor: 0.80




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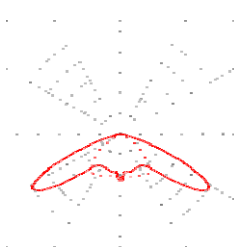
2.1 Description, Tunnel

2.1.2 Luminaire list

Transito
 LDC in use

AEC ILLUMINAZIONE SRL

1  Order No. : GALILEO 0F6 SS-6W 6.5-3M-1U
 Luminaire name : GALILEO 0F6 SS-6W 6.5-3M-1U
 Equipment : 1 x L-GAL-0F6-5700-525-3M1U / 13670 lm
 Maintenance factor: 0.80



Row of luminaires: Row 1.1

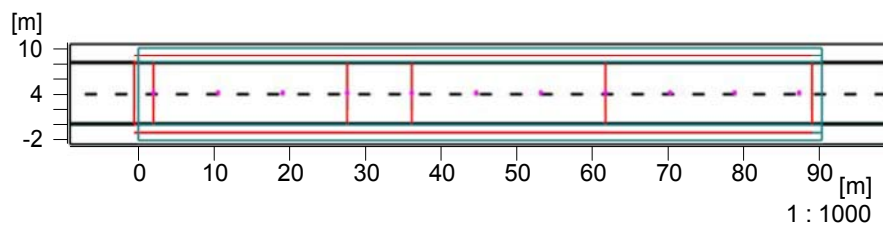
Number of luminaires: 11 System power (total): 1.3kW (0.09 km)
 Basic position: x=2.00m y=4.31m, z=4.50m Constant distance: 8.50m
 Rotation: z=180.0° C0=0.0° C90=0.0° Flicker frequency (v=50 km/h): 1.6 Hz

Nr.	Pos. X [m]	Power level	Control gr.S1	Int.1
1	2.00	116W / 13.67klm	2	100% 100%
2	10.50	116W / 13.67klm	2	100% 100%
3	19.00	116W / 13.67klm	2	100% 100%
4	27.50	116W / 13.67klm	2	100% 100%
5	36.00	116W / 13.67klm	2	100% 100%
6	44.50	116W / 13.67klm	2	100% 100%
7	53.00	116W / 13.67klm	2	100% 100%
8	61.50	116W / 13.67klm	2	100% 100%
9	70.00	116W / 13.67klm	2	100% 100%
10	78.50	116W / 13.67klm	2	100% 100%
11	87.00	116W / 13.67klm	2	100% 100%

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2.1 Description, Tunnel

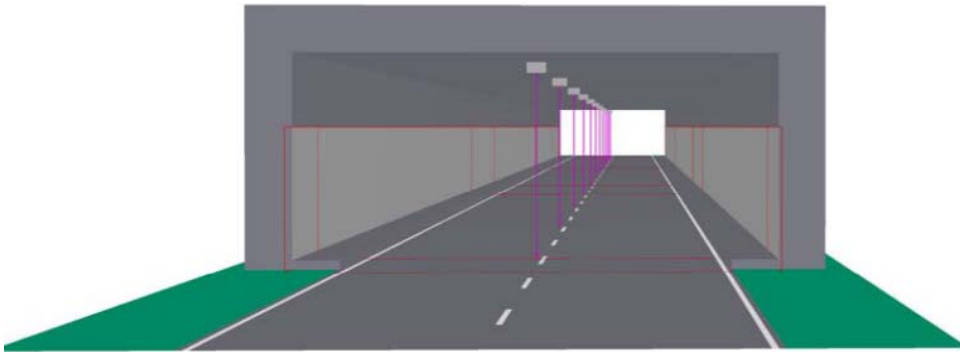
2.1.3 Floor plan



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2.1 Description, Tunnel

2.1.4 3D view, View from the left



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2 Tunnel

2.2 Calculation results, Tunnel

2.2.1 Result overview, Int.1

Regulating step: Int.1

Adaptation

1: 0%

Interior

2: 100%

Interno, Interior zone

Measuring range: 36.00 m - 61.50 m Points: nx = 10, ny = 6, nz = 3

Observer (starting point coordinate) : x = -24.00 m; z = 1.50 m dx = 61.28 m (fix)

y = 2.08 m y = 6.23 m

Roadway (R3, q0 = 0.07)

Lav	:	6.94 cd/m ²	6.93 cd/m ²
Uo	Lmin/Lavg :	0.60	0.57
UI	Llmin/Llmax :	0.76	0.72
qc(av)	:	0.10 cd/m ² /lx	0.10 cd/m ² /lx
qc(min)	:	0.06 cd/m ² /lx	0.06 cd/m ² /lx
TI max.	Max. :	4.39 %	4.93 %
Lseq	Max. :	0.35 cd/m ²	0.40 cd/m ²
B	Max. :	0.02	0.02

Wall left (diffus 40%)

Lav	:	7.16 cd/m ²	7.16 cd/m ²
Uo	Lmin/Lavg :	0.50	0.50
Lwall/Lfsp min.	:	1.04	0.95

Wall right (diffus 40%)

Lav	:	6.37 cd/m ²	6.37 cd/m ²
Uo	Lmin/Lavg :	0.48	0.48
Lwall/Lfsp min.	:	0.91	1.01

Illuminance

Roadway

Em : 117.79 lx

Uo Emin/Eav : 0.82

Wall left

Em : 56.24 lx

Uo Emin/Eav : 0.50

Wall right

Em : 49.99 lx

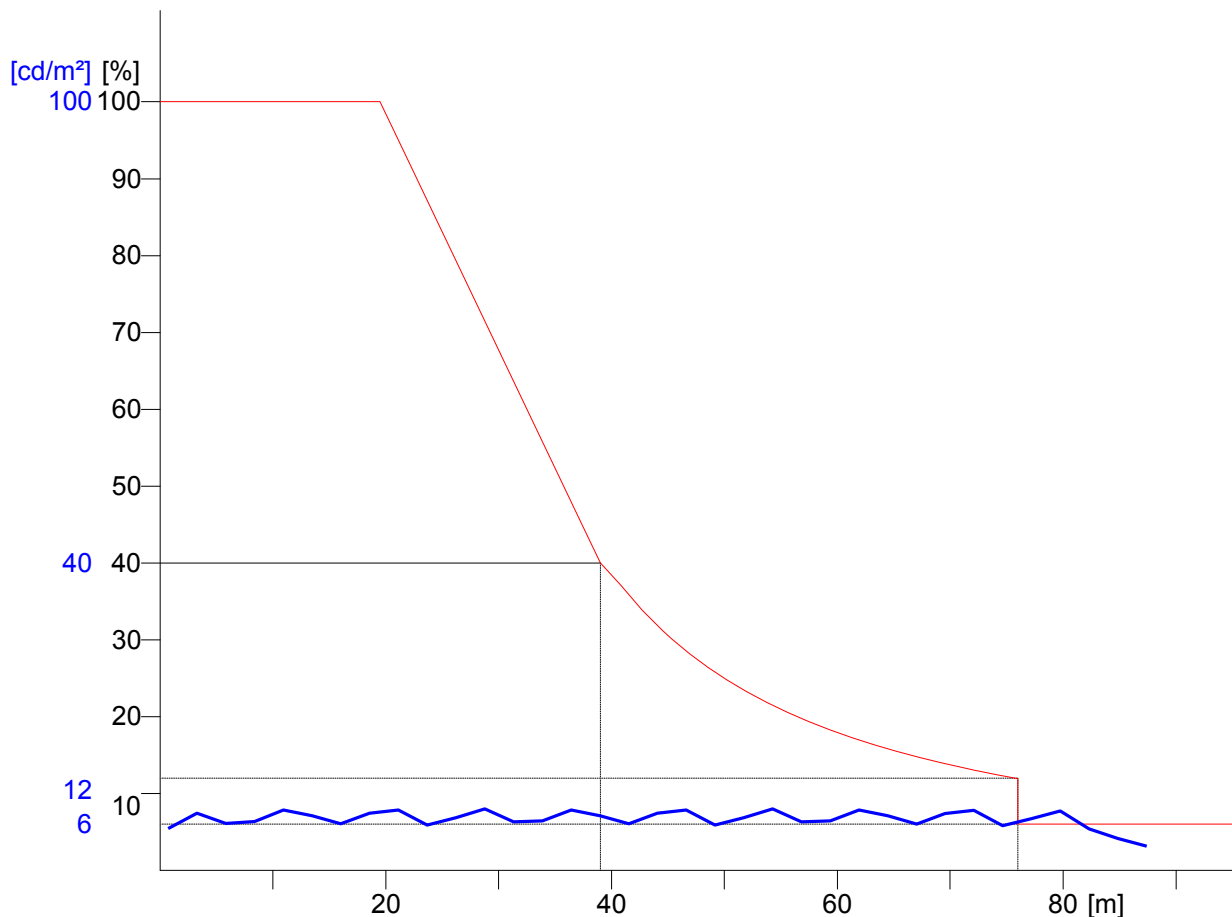
Uo Emin/Eav : 0.48

qc: The backward reflection of the road was calculated.

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2.2 Calculation results, Tunnel

2.2.2 Evolution, Adattamento (L), Int.1, Obs. 2



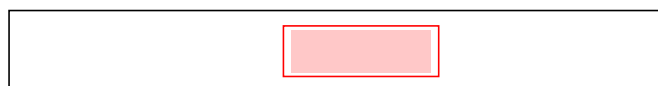
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2 Tunnel

2.3 Calculation results, Tunnel

2.3.1 Table, Interno (E), Int.1

[m]	104	106	105	111	106	106	111	105	106	104
7.61	127	109	121	134	115	115	134	121	109	127
6.22	144	113	133	150	121	121	150	133	113	144
4.84	141	112	130	147	120	120	147	130	112	141
3.46	122	108	118	127	112	112	127	118	108	122
2.08	97	101	98	102	100	100	102	98	101	97
0.69										
	37.28	39.83	42.38	44.92	47.47	50.03	52.58	55.13	57.67	60.22
	Illuminance [lx]									



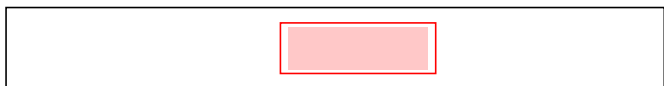
Height of the reference plane		: 0.00 m
Average illuminance	Eav	: 118 lx
Minimum illuminance	Emin	: 97 lx
Maximum illuminance	Emax	: 150 lx
Uniformity Uo	min/average	: 1 : 1.22 (0.82)
Diversity Ud	min/max	: 1 : 1.55 (0.64)

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2.3 Calculation results, Tunnel

2.3.2 Table, Interno (L), Int.1, Obs. 1

[m]										
7.61	4.9	4.4	4.3	5	4.6	4.3	4.8	4.9	4.3	4.5
6.22	7.1	5.6	5.8	7	6.4	5.6	6.7	7.3	5.5	6.3
4.84	11.4	8.4	8.7	11.2	9.9	8	10.5	11.2	7.7	9.7
3.46	[12.1]	8.9	9.2	11.8	10.1	8.4	10.9	11.4	8	10
2.08	7.4	5.8	6	7.2	6.6	5.7	6.8	7.4	5.6	6.3
0.69	4.7	4.4	4.2	4.8	4.6	(4.1)	4.6	4.7	4.2	4.3
	37.28	39.83	42.38	44.92	47.47	50.03	52.58	55.13	57.67	60.22



Observer location 1 : x = -24, y = 2.08, z = 1.5 (dx = 61.28)
 Average luminance Lav : 6.94 cd/m²
 Minimum luminance Lmin : 4.15 cd/m²
 Overall uniformity Uo Lmin/Lm : 0.6
 Longitudinal uniformity UI Lmin/Lmax : 0.76
 Threshold increment TI : 4.39 %
 Average contrast revealing coefficient Lr/Ev (av) : 0.103
 Minimum contrast revealing coefficient Lr/Ev (min) : 0.057

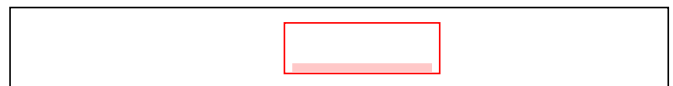
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2.3 Calculation results, Tunnel

2.3.3 Table, Interno (E), Wall right, Int.1

[m]										
1.67	27.2	51.2	34.7	(24)	43.9	43.9	(24)	34.7	51.2	27.2
1.00	44.3	66.4	52	41.3	60.6	60.6	41.3	52	66.4	44.3
0.33	56.3	[67.4]	60.5	54.9	65	65	54.9	60.5	[67.4]	56.3
	37.28	39.83	42.38	44.92	47.47	50.03	52.58	55.13	57.67	60.22
	Illuminance [lx]									



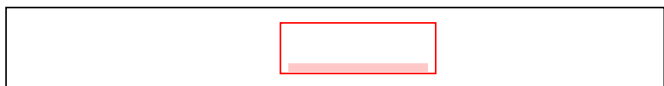
Average illuminance	Eav	: 50 lx
Minimum illuminance	Emin	: 24 lx
Maximum illuminance	Emax	: 67.4 lx
Uniformity Uo	min/average	: 1 : 2.08 (0.48)
Diversity Ud	min/max	: 1 : 2.8 (0.36)

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2.3 Calculation results, Tunnel

2.3.4 Table, Interno (L), Wall right, Int.1, Obs. 1

[m]										
1.67	3.46	6.52	4.42	(3.06)	5.6	5.6	(3.06)	4.42	6.52	3.46
1.00	5.64	8.45	6.62	5.26	7.72	7.72	5.26	6.62	8.45	5.64
0.33	7.17	[8.58]	7.7	6.99	8.28	8.28	6.99	7.7	[8.58]	7.17
	37.28	39.83	42.38	44.92	47.47	50.03	52.58	55.13	57.67	60.22



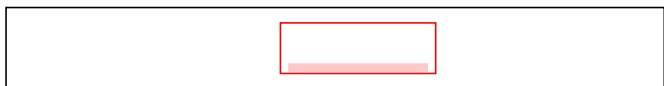
Observer location 1 : x = -24, y = 2.08, z = 1.5 (dx = 61.28)
 Average luminance Lav : 6.37 cd/m²
 Minimum luminance Lmin : 3.06 cd/m²
 Overall uniformity Uo Lmin/Lm : 0.48
 Longitudinal uniformity UI Lmin/Lmax : 0.62 (1.00m)

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2.3 Calculation results, Tunnel

2.3.5 Table, Interno (E), Wall left, Int.1

[m]										
1.67	31.9	61.5	40.9	(28.2)	52.5	52.5	(28.2)	40.9	61.5	31.9
1.00	49.1	[74.4]	57.7	45.6	67.6	67.6	45.6	57.7	[74.4]	49.1
0.33	61.8	73.9	66.4	60.8	71.3	71.3	60.8	66.3	73.9	61.8
	37.28	39.83	42.38	44.92	47.47	50.03	52.58	55.13	57.67	60.22
	Illuminance [lx]									



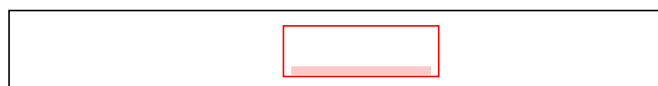
Average illuminance	Eav	: 56.2 lx
Minimum illuminance	Emin	: 28.2 lx
Maximum illuminance	E _{max}	: 74.4 lx
Uniformity U _o	min/average	: 1 : 1.99 (0.5)
Diversity U _d	min/max	: 1 : 2.63 (0.38)

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2.3 Calculation results, Tunnel

2.3.6 Table, Interno (L), Wall left, Int.1, Obs. 1

[m]										
1.67	4.06	7.83	5.21	(3.59)	6.68	6.68	(3.59)	5.21	7.83	4.06
1.00	6.25	[9.47]	7.35	5.81	8.61	8.61	5.81	7.35	[9.47]	6.25
0.33	7.87	9.41	8.45	7.74	9.07	9.07	7.74	8.45	9.41	7.87
	37.28	39.83	42.38	44.92	47.47	50.03	52.58	55.13	57.67	60.22



Observer location 1 : x = -24, y = 2.08, z = 1.5 (dx = 61.28)
 Average luminance Lav : 7.16 cd/m²
 Minimum luminance Lmin : 3.59 cd/m²
 Overall uniformity Uo : 0.5
 Longitudinal uniformity Ul : 0.61 (1.00m)

ΣΥΝΤΑΧΘΗΚΕ

Ο ΣΥΝΤΑΞΑΣ

ΤΖΙΛΑΚΑΣ Αργύριος

ΑΚΡΙΒΕΣ ΑΝΤΙΓΡΑΦΟ

ΘΕΩΡΗΘΗΚΕ

Η ΔΙΕΥΘΥΝΤΡΙΑ
 ΤΕΧΝΙΚΩΝ ΥΠΗΡΕΣΙΩΝ

ΓΙΟΒΡΗ Ευαγγελία

Λάρισα, 23/10/2015

ΕΓΚΡΙΘΗΚΕ

Η ΠΡΟΪΣΤΑΜΕΝΗ
 ΤΜΗΜΑΤΟΣ Η-Μ

ΜΠΟΥΜΠΙΤΣΑ Βασιλική