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Road lighting - Part 1: Selection of lighting classes

Straßenbeleuchtung - Teil 1: Auswahl der Beleuchtungsklassen

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Eclairage public - Partie 1: Sélection des classes d'eclairage

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Road lighting - Part 1: Selection of lighting classes

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Straßenbeleuchtung - Teil 1: Auswahl der Beleuchtungsklassen

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Foreword

This document CEN/TR 13201-1:2004 has been prepared by Technical Committee CEN/TC 169 “Light and Lighting”, the secretariat of which is held by DIN.

Road lighting is dealt with by CEN as follows:

CR 13201-1: *Road lighting – Part 1: Selection of lighting classes*.

EN 13201-2*: Road lighting – Part 2: Performance requirements.*

EN 13201-3*: Road lighting – Part 3: Calculation of performance.*

EN 13201-4*: Road lighting – Part 4: Methods of measuring the light performance of installations.*

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Introduction

This document offers further guidance on the selection of lighting classes and related aspects. It is applicable to fixed lighting installations intended to provide good visibility to users of outdoor public traffic areas during the hours of darkness to support traffic safety, traffic flow and public security.

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1 Scope

This document specifies the lighting classes set out in EN 13201-2 and gives guidelines on the application of these classes. To do this, it includes a system to define an outdoor public traffic area in terms of parameters relevant to lighting. To assist in the application of classes, it suggests a practical relationship between the various series of lighting classes, in terms of comparable or alternative classes.

It also gives guidelines on the selection of the relevant area to which the lighting classes from EN 13201-2 and the calculation grids and procedure from EN 13201-3 should be applied.

The parameters used in this document allow:

a) a lighting situation to be described in terms of:

- the geometry of the area under consideration;
- the use of the area;
- the influence of the surrounding environment;

b) a specific approach to situations to be taken to enable the effective use of energy.

This document does not give the criteria on which a decision to light an area can be made, nor on how a lighting installation should be used.

This document does not give guidelines on the selection of lighting classes for toll stations, tunnels or canals and locks.

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2 Normative references

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The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 13201-2:2003, *Road lighting – Part 2: Performance requirements.*

EN 13201-3:2003, *Road lighting – Part 3: Calculation of performance.*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 13201-2:2003, EN 13201-3:2003 and the following terms and definitions apply.

3.1
user type
category of person or vehicle in an outdoor public traffic area

NOTE In this document, only user types as specified in this Clause are considered.

3.2
motorised traffic (M)
motor powered vehicles other than slow moving vehicles

3.3
slow moving vehicles (S)
motor powered vehicles, animal drawn vehicles and people on animals with speed limited to 40 km/h

NOTE In some countries this may be 50 km/h.

3.4
cyclists (C)
people on pedal cyclists and mopeds with speed limited to 50 km/h

NOTE In some countries this can be 40 km/h.

3.5
pedestrians (P)
people on foot or using wheelchairs

3.6
typical speed of main user
the assessed speed of the user defined as the main user type of the relevant area. Where the main user type is a combination of motorised traffic and one or more of the other types, motorised traffic is taken as the main user

NOTE For lighting purposes broad speed categories are sufficient. Speed is therefore assessed rather than measured and the method of assessment is a matter for the road authorities.

3.7
relevant area
part of the public traffic area under consideration

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3.8
conflict area
relevant area where motorised traffic streams intersect each other or overlap areas frequented by other user types

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3.9
interchange
a grade-separated junction with one or more turning roadways (ramps) for travel between the through roads

3.10
intersection
the general area where two or more roads join or cross at the same level, within which are included the roadway and roadside facilities for traffic movements

3.11
traffic flow of vehicles
the number of vehicles passing a given point in a stated time in both directions. This is measured as average daily traffic (see 3.12)

NOTE Although not necessary for lighting, the road authority may use traffic flow per lane and compose the figures together. In the case of a parking area, the given point is the entrance.

3.12
average daily traffic (ADT)
the total traffic during a given time period, in whole days, divided by the number of days in that time period

3.13
difficulty of navigational task
the degree of effort necessary by the road user, as a result of the information presented, to select route and lane, and to maintain or change speed and position on the carriageway

NOTE Visual guidance provided by the road is part of this information.

3.14
crime risk
crime risk in the considered traffic area compared to crime risk in the larger area

NOTE Ideally this should be objectively related to crime statistics, but experience indicates that a truly objective approach is very difficult.

3.15
complexity of visual field
the amount of lighting and other visual elements existing in the visual field of the road user which mislead, distract, disturb or annoy the road user

NOTE Although visual guidance provided by the road and environment can be adequate, such elements can cause problems in detecting high priority objects such as traffic lights and other road users changing direction. Examples can include advertisements, lighting columns, lighted buildings, sports lighting.

3.16
ambient brightness level
assessed luminance level of the surroundings

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3.17
main weather type
the weather conditions which prevail for a significant proportion of the time

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4 Outline of selection procedure

This document is arranged in such a way that a step by step selection procedure may be followed to arrive at the appropriate lighting recommendations:

a) define the public traffic area in one or more relevant areas and select the set of lighting situations (5.1);

b) go to the table indicated for the selected set (see Annex A);

c) define the relevant area in detail (see 5.2 and 5.3);

d) select the range of lighting classes;

e) select one lighting class from the range;

f) find the lighting performance requirements for the selected lighting class(es);

g) consider the general recommendations (see Clause 6).

5 Lighting situations

5.1 Groups of lighting situations

A lighting situation can be classified within a group in terms of the base parameters given in Table 1, which identifies for each group the appropriate set of lighting situations.

A full description of each set of lighting situations by specific parameters is given in the Tables in Annex A.

Table 1 — Grouping of lighting situations

Typical speed of main user km/h	User types in the same relevant area			Sets of lighting situations
	Main user	Other allowed user	Excluded user	
> 60	Motorised traffic		Slow moving vehicles Cyclists Pedestrians	A1
		Slow moving vehicles	Cyclists Pedestrians	A2
		Slow moving vehicles Cyclists Pedestrians		A3
> 30 and ≤ 60	Motorised traffic Slow moving vehicles	Cyclists Pedestrians		B1
	Motorised traffic Slow moving vehicles Cyclists	Pedestrians		B2
	Cyclists	Pedestrians	Motorised traffic Slow moving vehicles	C1
> 5 and ≤ 30	Motorised traffic Pedestrian		Slow moving vehicles Cyclists	D1
		Slow moving vehicles Cyclists		D2
	Motorised traffic Cyclists	Slow moving vehicles Pedestrians		D3
	Motorised traffic Slow moving vehicles Cyclists Pedestrians			D4
Walking speed	Pedestrians		Motorised traffic Slow moving vehicles Cyclists	E1
		Motorised traffic Slow moving vehicles Cyclists		E2

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5.2 Assessment of parameters

The lighting recommendations depend on the geometry of the relevant area and on traffic and time dependant circumstances. It is for the road authority to describe these circumstances for the relevant area, and thus evaluate the appropriate parameters.

A list of parameters with their possible options or values is given in Table 2.

Table 2 — Specific parameters

Parameters		Options
Area (geometry)	Separation of carriageways	Yes No
	Types of junctions	Interchanges Intersections
	Interchange spacing, distance between bridges	>3 km ≤ 3 km
	Intersection density	< 3 intersections/km ≥ 3 intersections/km
	Conflict area	No Yes
	Geometric measures for traffic calming	No Yes
Traffic use	Traffic flow of vehicles per day	< 4 000 4 000 to 7 000 7000 to 15 000 15 000 to 25 000 25 000 to 40 000 > 40 000
	Traffic flow of cyclists	Normal High
	Traffic flow of pedestrian	Normal High
	Difficulty of navigational task	Normal Higher than normal
	Parked vehicles	Not present Present
	Facial recognition	Unnecessary Necessary
	Crime risk	Normal Higher than normal
Environmental and external influences	Complexity of visual field	Normal High
	Ambient luminance	Rural Urban City centre
	Main weather type	Dry Wet

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5.3 Relevant areas

5.3.1 General

A public area normally consists of more than one traffic area. Often, along a route, there is a carriageway with an adjacent footway or cycle path. When the relevant area is defined so that all parts of the route are included, the lighting recommendations should apply to the whole relevant area, and the calculation procedure and appropriate calculation grid from EN 13201-3 applied to the whole area.

When the road authority chooses to consider different traffic areas separately, each area should be defined separately, and the calculation procedure applied separately.

Conflict areas can occur within areas where motorised traffic is the main user. The boundaries of the conflict area should be defined in order to apply the recommended lighting class.

Geometric measures for traffic calming can occur within all areas where motorised traffic and cyclists are users. The boundaries of this relevant area of traffic calming measures should be defined in order to apply the recommended lighting class.

Detailed guidance, on the definition of the relevant area, the traffic area within the relevant area, and on the definition of the adjacent strip to determine surround ratio, is given below.

5.3.2 Relevant area for lighting situation sets A1, A2, A3

If there are no adjacent emergency lanes, footways or cyclepaths, the area is the total width of carriageway between the outer edges of the carriageway (kerbs).

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For dual carriageways, the area is the total width of both carriageways including the central reservation unless the width of the reserve is such that the carriageways can be considered separately.

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If there are adjacent emergency lanes, there are two alternatives:

a) Consider the total area.

   The area is the total width of carriageway including emergency lanes between the outer edges of the emergency lanes;

b) Consider separately the carriageway and emergency lanes:

   The area for the carriageway is the total width of the running lanes only.

   The area for the emergency lane is the width of the emergency lane only.

If there are adjacent footways or cyclepaths, there are two alternatives:

a) Consider the area for the carriageway only.

   The area for the carriageway is the width of the carriageway between kerbs.

b) Consider separately the carriageway and footway or cyclepath:

   The area of the carriageway is the total width of the carriageway between kerbs.

   The area for the footway or cyclepath is as in 5.3.4.

The width of the adjacent strip for surround ratio if used, when the ME lighting classes from EN 13201-2:2003, Table 1a and Table 1b are chosen and there are no adjacent traffic areas is taken as being equal to the width of the first lane of the carriageway.