SLOVENSKI STANDARD
SIST EN IEC 60809:2021/oprA1:2023

01-april-2023

Sijalke in viri svetlobe za cestna vozila - Dimenzijske, električne in svetlobne zahteve - Dopolnilo A1

Amendment 1 - Lamps and light sources for road vehicles - Dimensional, electrical and luminous requirements

Lampen und Lichtquellen für Straßenfahrzeuge - Maße, elektrische und lichttechnische Anforderungen

Fragment 1 - Amendement 1 - Lampes et sources lumineuses pour véhicules routiers - Exigences dimensionnelles, électriques et lumineuses

Ta slovenski standard je istoveten z: **EN IEC 60809:2021/prA1:2023**

ICS:

29.140.20	Žarnice z žarilno nitko	Incandescent lamps
43.040.20	Naprave za osvetlitev, signalizacijo in opozarjanje	Lighting, signalling and warning devices

SIST EN IEC 60809:2021/oprA1:2023 **en**

34A/2328/CDV

COMMITTEE DRAFT FOR VOTE (CDV)

PROJECT NUMBER: **IEC 60809/AMD1 ED4**	
DATE OF CIRCULATION: **2023-02-03**	CLOSING DATE FOR VOTING: **2023-04-28**
SUPERSEDES DOCUMENTS: **34A/2295/CD, 34A/2315A/CC**	

IEC SC 34A : ELECTRIC LIGHT SOURCES	
SECRETARIAT: United Kingdom	SECRETARY: Mr Petar Luzajic
OF INTEREST TO THE FOLLOWING COMMITTEES:	PROPOSED HORIZONTAL STANDARD: ☐ Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.
FUNCTIONS CONCERNED: ☐ EMC ☐ ENVIRONMENT ☐ QUALITY ASSURANCE ☒ SAFETY	
☒ SUBMITTED FOR CENELEC PARALLEL VOTING	☐ NOT SUBMITTED FOR CENELEC PARALLEL VOTING
Attention IEC-CENELEC parallel voting The attention of IEC National Committees, members of CENELEC, is drawn to the fact that this Committee Draft for Vote (CDV) is submitted for parallel voting. The CENELEC members are invited to vote through the CENELEC online voting system.	

This document is still under study and subject to change. It should not be used for reference purposes.

Recipients of this document are invited to submit, with their comments, notification of

- any relevant patent rights of which they are aware and to provide supporting documentation,
- any relevant “in some countries” clauses to be included should this proposal proceed. Recipients are reminded that the enquiry stage is the final stage for submitting "in some countries" clauses. See AC/22/2007.

TITLE:

Amendment 1 - Lamps and light sources for road vehicles - Dimensional, electrical and luminous requirements

PROPOSED STABILITY DATE: 2026

NOTE FROM TC/SC OFFICERS:

This document is the result of the agreed observations by 34A/WG2 during their meeting on 30-November 2022, related to the comments received on 34A/2295/CD and 34A/2296/CD. For reference see also 34A/2315A/CC (IEC 60809/AMD1 ED4) and 34A/2316A/CC (IEC 60809/AMD1/FRAG1 ED4), respectively.

Proposal

Insert new reference in Clause 2.

IEC 62707-1:2018, LED-binning – Part 1: General requirements and white colour grid intended for automotive applications

Insert three new items in Clause 3 in the correct alphabetical order.

3.x1
matrix light source (MLS)
LED light source consisting of a grid of individually operated pixels in two perpendicular directions

NOTE 1 to entry: m pixels in direction x (row) and n pixels in direction y (column)

3.x2
pitch px, py
nominal distance (center-to-center) in direction x respectively in direction y between adjacent pixels in an MLS having a rectilinear grid pattern

3.x3
pixel
smallest element of a matrix light source that is capable to be operated individually

Insert Lx6 in Clause 6.5. (Note: all proposed changes are marked in red text)

6.5 Lamp dimensions

The LED light source dimensions shall comply with the limiting values given in the lamp drawing or on the relevant data sheet.

The values of light centre lengths of Lx3A, Lx3B, Lx4A, Lx4B, Lx5A, Lx5B, Lx6A, Lx6B[5], L1A/6 and L1B/6 are measured as follows…….

Insert a new Clause 7 and renumber the existing Clauses 7 and 8 and their subclauses accordingly.

7 Requirements and test conditions for matrix light sources (MLS)

7.1 General requirements

Matrix light sources shall be so designed as to be and to remain in good working order when in normal use. They shall, moreover, exhibit no fault in design or manufacture.

This clause 7 applies to matrix light sources with a Lambertian-like intensity distribution, i.e. $I(\theta) \approx I_0 * \cos(\theta)$ (see clause 7.2.5.4).

NOTE: In the case of an MLS with an emission pattern that is not Lambertian-like, e.g. with primary optics, some parts of this document may still be applicable, but special considerations and deviations from the specified procedures may be necessary

Matrix light sources may consist of areas with different pitch values px and py, e.g. a central area with a smaller pitch and outer areas with a larger pitch.

NOTE: In the case of an MLS with areas of different pitch values, it may be necessary to evaluate each area separately, and some deviations from the specified procedures may be necessary

This clause 7 is intended to be applied to matrix light sources with a number of pixels in the order of one hundred or less.

NOTE: In the case of an MLS with (much) more than 100 pixels, some parts of this document may still be applicable, but certain deviations from the specified procedures may be necessary

7.2 Photometrical requirements and test conditions

7.2.1 Measurement methods

NOTE: Appropriate measurement methods are under consideration and may be derived from relevant CIE publications.

7.2.2 Reference system

The reference system for the (x, y) reference plane shall be specified on the manufacturer's data sheet. The (z) reference axis shall be normal to the (x, y) reference plane and intersect the centre point of the grid.

7.2.3 Operating Conditions

For testing purposes one of the following operating conditions shall be applied:

- Pulsed operation, defined by
  - Pulse definition and measurement intervals according to IEC 62707-1: ed1.1 clause 5.3
  - Drive current I_f , according to the data sheet
  - Ambient temperature 23°C ± 5° (see IEC 62707-1: ed1.1 clause 5.2)
- Steady state operation, defined by
  - Drive current I_f , according to the data sheet
  - PWM duty cycle, according to the data sheet
  - Position of Tb-point, according to the data sheet
  - Stabilization temperature Tb (within ± 3°C) at Tb-point, according to the data sheet

If not otherwise specified in the data sheet, all measurements shall be performed under pulsed operation.

7.2.4 Parameters determined by all pixels

7.2.4.1 General

Clause 7.2.4 covers parameters which are determined by the entirety of all pixels.

7.2.4.2 Partial luminous flux

The partial luminous flux Φ_{cone} of an MLS is the luminous flux emitted into a cone of θ = 45° around the z axis according

$$\Phi_{cone} = \iint_{\theta=0^\circ\,\varphi=0}^{\theta=45^\circ\,\varphi=2\pi} I \sin\theta \, d\theta \, d\varphi$$

The partial luminous flux Φ_{cone} shall comply with the limiting values given on the relevant data sheet.

7.2.4.3 Colour

The colour of an MLS is the colour of the light emitted into a cone of θ = 45° around the z axis. The chromaticity coordinates shall comply with the limiting values given on the relevant data sheet.

7.2.5 Parameters determined per pixel

7.2.5.1 General

Clause 7.2.5 covers parameters which are determined for each pixel individually.

Measurements of pixel parameters are made along the z-axis of the MLS.

The minimum distance between the grid and the aperture of the measurement equipment shall be 10-times the diagonal of the grid.

7.2.5.2 Partial luminous flux

The partial luminous flux $\Phi_{cone,i}$ of a single-pixel “i” is the luminous flux emitted by this single pixel into a cone of θ = 45° around the z axis according

$$\Phi_{cone,i} = \iint_{\theta=0°\ \varphi=0}^{\theta=45°\ \varphi=2\pi} I_i\ \sin\theta\ d\theta\ d\varphi$$

for all pixels i= 1, …, (m · n)

The arithmetic average $\Phi_{cone,ave}$ of the partial luminous flux of all pixels is:

$$\Phi_{cone,ave} = \sum_{i=1}^{m \cdot n} \Phi_{cone,i} /(m \cdot n)$$

The relative deviation $\Delta\Phi_{cone,i} = \left|\Phi_{cone,i} - \Phi_{cone,ave}\right|$ of each pixel shall comply with the limiting value given on the relevant data sheet.

7.2.5.3 Colour

The colour of each pixel is the colour of the light emitted by this single pixel into a cone of θ = 45° around the z axis. The chromaticity coordinates shall comply with the limiting values given on the relevant data sheet for the entire MLS.

7.2.5.4 Luminous intensity distribution

The deviation of the luminous intensity distribution I(θ) from a Lambertian distribution is tested in the following directions:

- 0° (corresponding to the z-axis)
- ± 22,5° and ± 45° (in the x-z plane)
- ± 22,5° and ± 45° (in the y-z plane)

In each of these directions, the relative deviation characterized by the coefficient k

$$k = |\mathrm{I}(\theta)/(\mathrm{I}(0°) \cdot \cos\theta) - 1|$$

shall comply with the upper limit k_{max} given on the relevant data sheet, whereby k_{max} shall be 0,3 or less.

7.2.5.5 Luminance uniformity

The light emitting area (LEA) of a pixel is determined from luminance measurements of an area with dimension px and py which contains the whole pixel. The value L_{98} is the 98th percentile of all values of these luminance measurements.

The LEA of a pixel is the smallest circumferential rectangle having the same orientation as the grid and containing all luminance measurements with a value of 20 percent or more of the value L_{98}.

In case the luminance does not drop below 20 percent of the value L_{98} in this area, the nominal pitch size (px, py) shall determine the LEA of a pixel.

The value L_{ave} is the arithmetic average of the values of all luminance measurements within the LEA.

The LEA is sub-divided into nine sub-sections (three by three rectangles of equal size), see Figure x1.

For each of the sub-section (i = 1, …, 9) the value L_i is the arithmetic average of the values of all luminance measurements in the corresponding sub-section.

The value ΔL is the maximum relative deviation of all luminance values L_i from the luminance value L_{ave}.

$$\Delta L = \mathrm{Max}\{|(L_i - L_{ave})/L_{ave}|; i = 1, \ldots, 9\}$$

The maximum relative deviation ΔL shall comply with the limiting values given on the relevant data sheet.

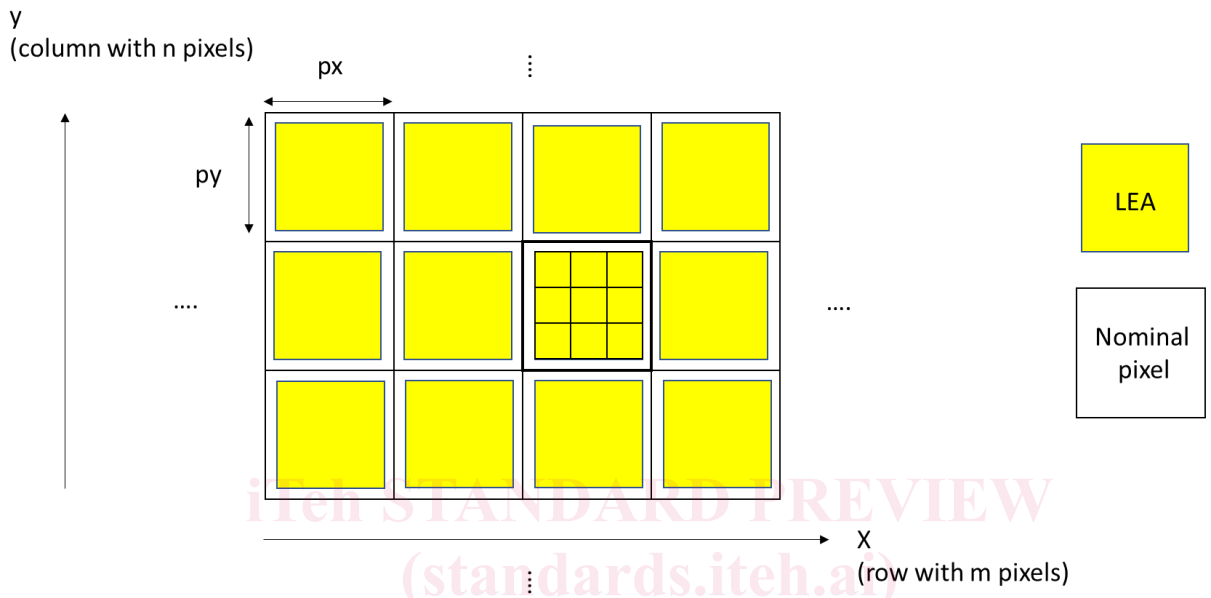

Figure x1 – Illustration of a grid of pixel with corresponding LEAs and sub-sections of pixel under test

It is recommended to use a luminance camera with minimum 30 pixel of the smaller pitch length.

7.2.5.6 Spatial colour uniformity

The LEA of a pixel and the sub-sections of the LEA shall be determined according to 7.2.5.5.

For each of the sub-sections (i = 1, …, 9) the chromaticity coordinates x_i and y_i shall be determined.

The spatial colour uniformity described by the values Δx and Δy according

$$\Delta x = \mathrm{Max}\{x_i\} - \mathrm{Min}\{x_i\}; i = 1, \ldots, 9$$

$$\Delta y = \mathrm{Max}\{y_i\} - \mathrm{Min}\{y_i\}; i = 1, \ldots, 9$$

shall comply with limiting values given on the relevant data sheet.

7.2.5.7 Gap width

The gap width shall be determined for all direct neighbour pixels in x and y direction, while (at least) the two neighbour pixels are switched ON, see Figure x2.

The gap width in x-direction is determined from the luminance profile L(x), averaging along the y axis over a width of LEA/3, starting from the centre of LEA of the “pixel under test” with the nominal length px.

The gap width in y-direction is determined from the luminance profile L(y), averaging along the x axis over a width of LEA/3, starting from the centre of LEA of the “pixel under test” with the nominal length py.

The gap width is characterized by the parameters g50 and g90, which are determined at a luminance level of 50 percent, respectively 90 percent, of the average luminance of the corresponding luminance profiles (L(x) and L(y) respectively), see Figure x3. In case the luminance profile does not drop below 50 percent of the average, the g50 value is zero.

The gap widths g50 and g90 for all pairs of neighbour pixels shall comply with the limiting values given on the relevant data sheet.

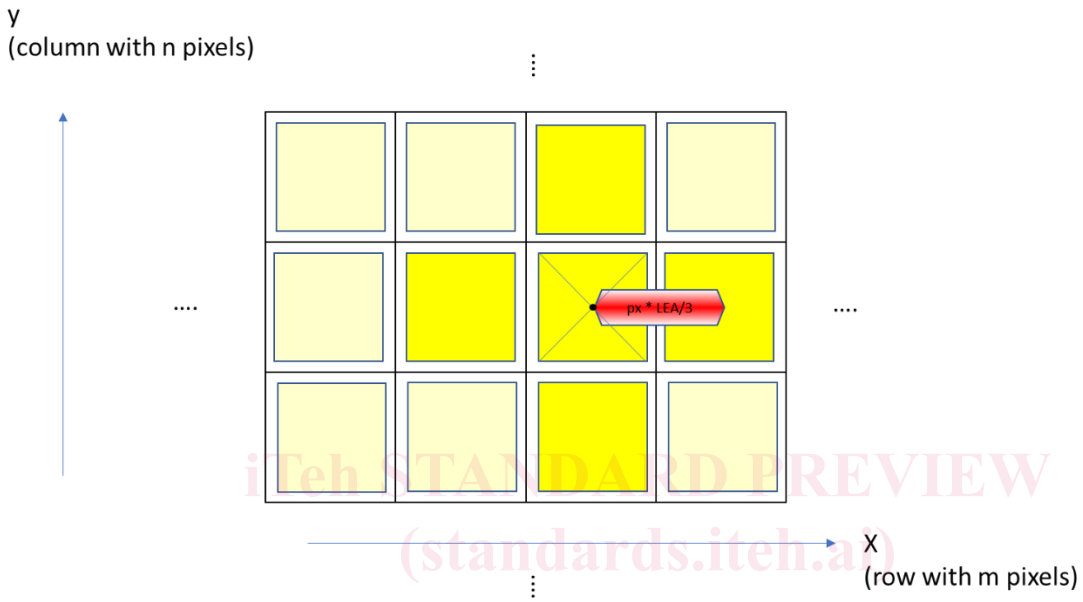

Figure x2 – Illustration of method to determine the gap width

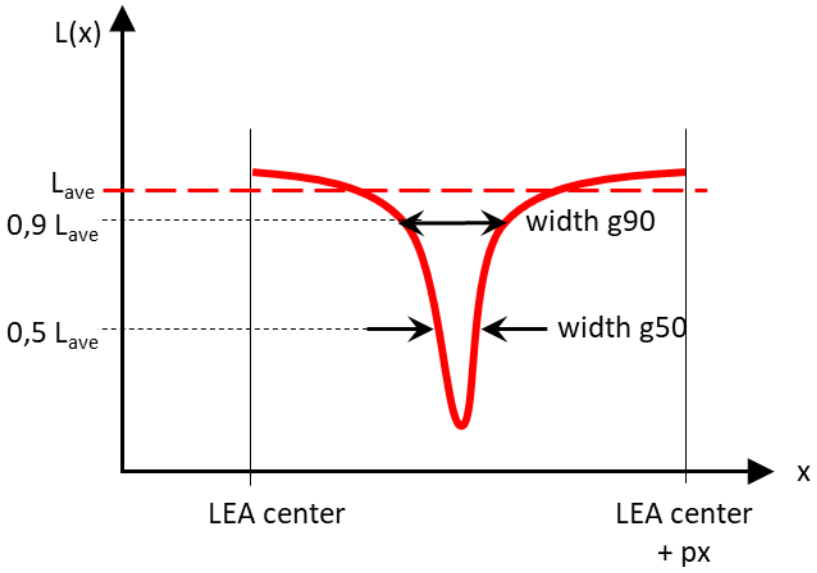

Figure x3 – Example for gap width characterization (luminance profile)

It is recommended to use a luminance camera with minimum 30 pixel of the smaller pitch length which is able to detect a luminance contrast ratio of at least 200.

7.2.6 Additional parameters

7.2.6.1 The characteristic parameters for luminance contrast behaviour

The luminance contrast shall be determined for each row / column separately, while the row / column under test is switched ON and the neighbour row(s) / column(s) are switched OFF.

It is recommended to use a luminance camera with minimum 30 pixel of the smaller pitch length which is able to detect a luminance contrast ratio of at least 200.

Figure x4 shows the details for a certain column.

Figure x5 shows an example for the determination of the luminance contrast, based on the measured luminance profile.

For each column the luminance profile L(x) is calculated from the measured luminance data by averaging all values along the y-axis (parallel to the columns), where:

- L_{max} is maximum value of L(x).
- x_1 and x_2 are the positions where L(x) drops below 50 percent of L_{max}.
- L_{ave} is the arithmetic average of all L(x) between x_1 and x_2.
- $X_{N:1}$ is the distance between the position x_1 respectively x_2 and the position where the luminance L(x) drops below L_{ave}/N.
- L_{dx} is the value in the luminance profile L(x) at the distance px/2 from position x1 or x2 of the column under test.
- $X_{100:1}$ and $X_{200:1}$ and optionally additionally L_{ave}/L_{dx} shall comply with the limiting values given on the relevant data sheet.

For each row the luminance profile L(y) is calculated from the measured luminance data by averaging all values along the x-axis (parallel to the row), where:

- L_{max} is maximum value of L(y).
- y_1 and y_2 are the positions where L(y) drops below 50 percent of L_{max}.
- L_{ave} is the arithmetic average of all L(y) between y_1 and y_2.
- $Y_{N:1}$ is the distance between the position y_1 respectively y_2 and the position where the luminance L(y) drops below L_{ave}/N.
- L_{dy} is the value in the luminance profile L(y) at the distance py/2 from position y1 or y2 of the row under test.
- $Y_{100:1}$ and $Y_{200:1}$ and optionally additionally L_{ave}/L_{dy} shall comply with the limiting values given on the relevant data sheet.