Informal document **GRE-83-27**
83rd GRE, 19-23 October 2020
Agenda item 4

R150
RETRO-REFLECTIVE DEVICES

Simplification stage 2

SLR-41-14
(Rev. of SLR-39-01/Rev.2)

UPDATE OF DEFINITIONS

CORRECTION OF THE PHOTOMETRIC DEFINITIONS

Referenced Document:
CIE Publication 54.2:2001;CIE 54:2001
Retroreflection - Definition and measurement

In the current version of Reg 150 (former Reg 3) there is no definition of the CIL value

NEW

"*Coefficient of luminous intensity* R_I" means the quotient of the luminous intensity I reflected by the retro-reflective device in the direction considered, divided by the normal illumination $E_\perp$ of the retro-reflecting device for given angles of illumination, divergence and rotation.

$$\boldsymbol{R_I = \frac{I}{E_\perp}}$$

NOTE 1 R_I is often referred to as CIL. The unit is cd/lx.

Old definition of R´

"*Coefficient of retro-reflection (symbol R')*" means the quotient of the coefficient of luminous intensity R of a plane retro-reflecting surface and its area A

$$\left(R' = \frac{R}{A}\right) \qquad \left(R' = \frac{I}{E_\perp . A}\right)$$

$R´ \rightarrow R_A$

"Specific c*oefficient of retro-reflection (symbol* R_A*)*" means the quotient of the coefficient of luminous intensity R of a plane retro-reflecting surface and its area A

$$\boldsymbol{R_A = \frac{R_I}{A} = \frac{I}{E_\perp \cdot A}}$$

The coefficient of retro-reflection R_A is expressed in candelas per m^2 per lx ($cd \cdot m^{-2} \cdot lx^{-1}$)

UPDATE OF DEFINITIONS

CORRECTION OF THE PHOTOMETRIC DEFINITIONS

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Luminance factor

(symbol ß) - means the ratio of the luminance of the body to the luminance of a perfect diffuser under identical conditions of illumination and observation;

(symbol ß) → (symbol R_F)

"*Luminance factor (symbol R_F)*" means the ratio of the luminance of the body to the luminance of a perfect diffuser under identical conditions of illumination and observation;

All definitions for angles are Greek symbols (α, β, …) – to prevent mix-ups.

Definition of the angles for the measuring geometry setup

In Reg. 150 there is a mix of the definitions for the observation angles.

E.g. β_V , β_H or V , H or β_1 , β_2

Depending from the Reg 3 or 70, 104, …

Consistently using $ß_1$ and $ß_2$

"*Entrance angle (symbol β)*" means the angle from the illumination axis to the reference axis. The entrance angle is usually not larger than 90° but, for completeness, its full range is defined as $0° < \beta < 180°$. In order to specify the orientation in full, this angle is characterised by two components, β_1 and β_2;

"*Observation angle (symbol α)*" means the angle between the illumination axis and the observation axis. The observation angle is always positive and, in the case of retro-reflection, is restricted to small angles;

RESISTANCE TO WEATHERING

Annex 13 and 22

- Weathering with xenon-arc weathering device
- Evaluation by reference materials blue wool – grey scale

Justification

- State of the art test, defined parameter in refrenced ISO 4892-2

Annex X (new)

- Weathering with xenon-arc weathering device
- Defined time of 500 h
- Evaluation by set up minimum level for specific coefficient of retroreflection at 80% of required values
- Evaluation of colour as defined in R48

RESISTANCE TO WEATHERING

Methode applicable for retroreflective sheeting material used for

- retroreflective markings of
- Classes C, D, E, F
- Classes 1, 2, 3, 4, 5
- and SMV Class 1 and 2

Not applicable for retroreflectors of

- Classes IA, IB, IIIA, IIIB and IVA
- Advance Warning Triangle of Type 1 and 2

ANNEX 24
ARRANGEMENT OF APPROVAL MARKINGS

Adjustment of the sizes of the approval markings

- In Table 1, to reduce the number of minimum sizes of “a”,
  the value “4 mm” should become “5 mm” and
  the value “12 mm” should become “8 mm”.

Changes in the examples of the approval markings

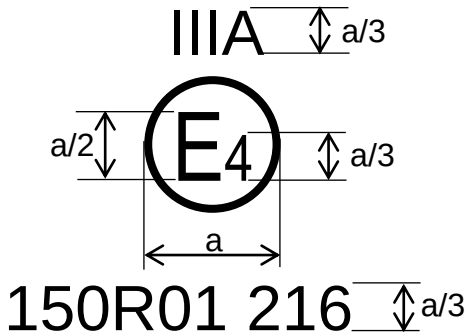
- Space removed for class IIIA
- Size aligned
- „104R“ removed
- „27R“ replaced by WT

Table 1

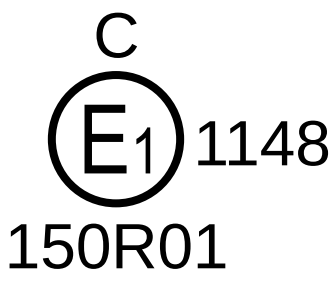
List of retro-reflective devices and their symbols

Retro-reflective devices	Symbol	Minimum “a” for examples of figures in Annex 24 (values in mm)	Paragraph
Retro-reflector for motor vehicles (independent)	IA	5	5.1.
Retro-reflector for motor vehicles (combined with other signal lamps which are not watertight)	IB	5	5.1.
Retro-reflector for trailers (independent)	IIIA	5	5.1.
Retro-reflector for trailers (combined with other signal lamps which are not watertight)	IIIB	5	5.1.
Wide-angle retro reflector	IVA	5	5.1.
Conspicuity marking (material for contour/strip marking)	C	8	5.2.
Conspicuity marking (material for distinctive markings/graphics intended for a limited area)	D	8	5.2.
Conspicuity marking (material for distinctive markings/graphics intended for an extended area)	E	8	5.2.
Conspicuity marking (materials for distinctive markings or graphics as base or background in printing process for fully coloured logos and markings of class "E" in use which fulfil the requirements of class "D" materials)	D/E	8	5.2.
Retro-reflective materials for extremities marking of class F	F	8	5.2.
Retro-reflective marking for long or heavy vehicles (retro-reflective and fluorescent materials) Marking plate of class 1 or class 2	RF	5	5.2.
Retro-reflective marking for long or heavy vehicles (retro-reflective only materials) - Marking plate of class 3, class 4 or class 5	RR	5	5.2.
Marking for slow moving vehicles (retro-reflective and fluorescent materials) - Marking plate of class 1	RF	5	5.2.
Marking for slow moving vehicles (retro-reflective only materials) - Marking plate of class 2	RR	5	5.2.
Advance Warning Triangle (Type 1)	T1	8	5.3
Advance Warning Triangle (Type 2)	T2	8	5.3

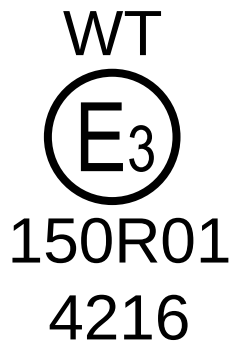
CHANGES IN THE EXAMPLES OF THE APPROVAL MARKINGS



Space removed



104R replaced by 150R



27R replaced by WT

EXISTING EXAMPLES IN R148 ANNEX 7 AND R150 (REAL SIZE OF THE MARKING)

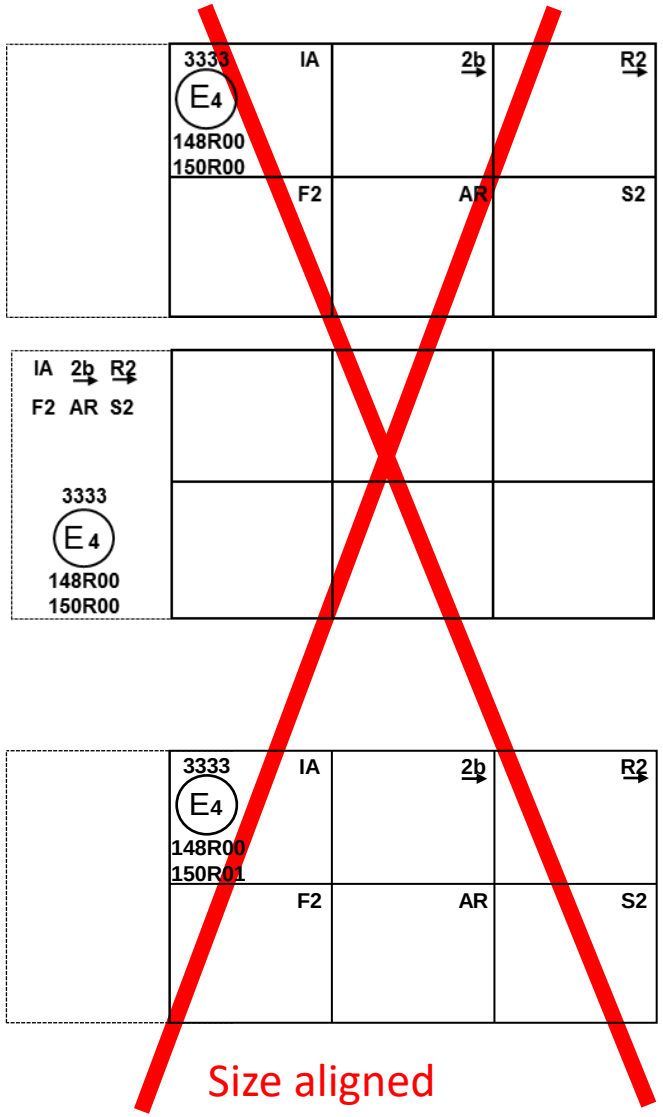


Figure YYY - Marking example ZZ