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HARMONIZED SYMMETRICAL PASSING (DIPPED) BEAM PATTERN FOR MOTORCYCLES

Transmitted by the Expert from
the International Motorcycle Manufacturers Association (IMMA)

Note: The text reproduced below was prepared by the experts from IMMA in order to propose a harmonized symmetrical passing beam pattern for motorcycle headlamps and it is transmitted to GRE for consideration (TRANS/WP.29/GRE/44, paras. 74-76).

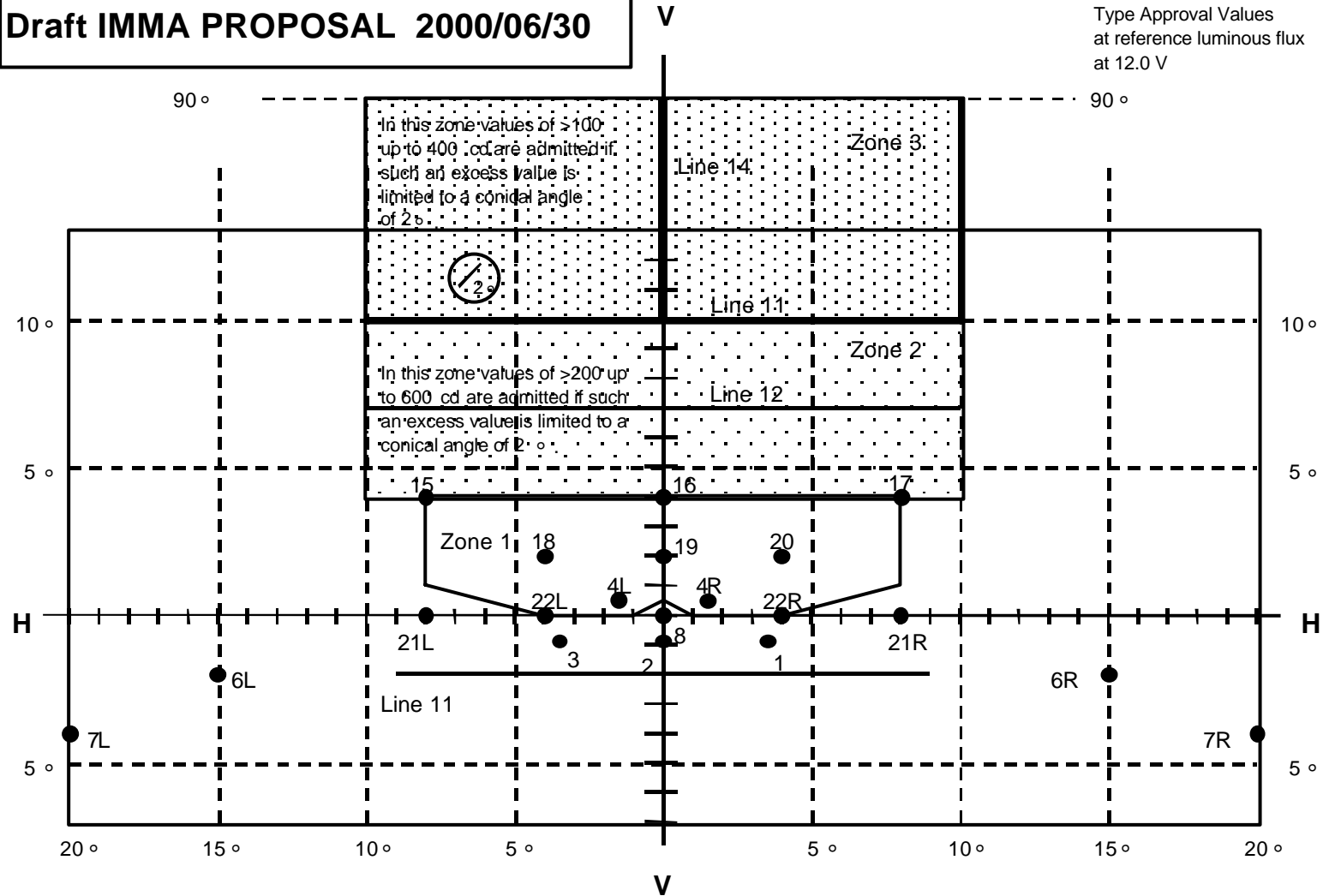
Note: This document is distributed to the Experts on lighting and light-signalling only.

GE.00-22657

PTW HARMONIZED LOW BEAM PROPOSAL

Draft IMMA PROPOSAL 2000/06/30

Type Approval Values
at reference luminous flux
at 12.0 V



Draft IMMA PROPOSAL 2000/06/30

PTW HARMONIZED BEAM PATTERN-- BASED ON THE GTB PROPOSAL (TRANS/WP.29/GRE/1999/18 ; 22 July 1999)
 TYPE APPROVAL VALUES; REFERENCE LUMINOUS FLUX at 12.0 V

| TEST POINT | Position in B-β Grid | | Minimum Intensity cd | | Maximum Intensity cd | |
|------------|---|----------------|----------------------|----------|--------------------------------|----------|
| | Vertical | β Horizontal B | > 125cc | 125cc >= | > 125cc | 125cc >= |
| 1 | 0.86 D | 3.5 R | 1,440 | | 9,600 | |
| 2 | 0.86 D | 0 | 3,600 | 1,800 | - | |
| 3 | 0.86 D | 3.5 L | 1,440 | | 9,600 | |
| 4 | 0.50 U | 1.50 L & 1.5R | - | | 672 | |
| 6 | 2.00 D | 15 L & 15 R | 800 | 400 | - | |
| 7 | 4.00 D | 20 L & 20 R | 240 | 120 | - | |
| 8 | 0 | 0 | - | | 1200 | |
| Line 11 | 2.00 D | 9 L to 9 R | 1,000 | | - | |
| Line 12 | 7.00 U | 10 L to 10 R | - | | 200; but 600 if within 2° cone | |
| Line 13 | 10.00 U | 10 L to 10 R | - | | 100; but 400 if within 2° cone | |
| Line 14 | 10 U to 90 U | 0 | - | | 100; but 400 if within 2° cone | |
| 15* | 4.00 U | 8.0 L | 62.5* | | 672 | |
| 16* | 4.00 U | 0 | 62.5* | | 672 | |
| 17* | 4.00 U | 8.0 R | 62.5* | | 672 | |
| 18* | 2.00 U | 4.0 L | 125* | | 672 | |
| 19* | 2.00 U | 0 | 125* | | 672 | |
| 20* | 2.00 U | 4.0 R | 125* | | 672 | |
| 21* | 0 | 8.0 L & 8.0 R | 62.5* | | - | |
| 22* | 0 | 4.0 L & 4.0 R | 125* | | 672 | |
| Zone 1 | 1U/8L-4U/8L-4U/8R-0/1R-0.5U/0-0/1L-0/4L-1U/8L | 1U/8R-0/4R- | - | | 672 | |
| Zone 2 | >4U to <10 U | 10 L to 10 R | - | | 200; but 600 if within 2° cone | |
| Zone 3 | 10 U to 90 U | 10 L to 10 R | - | | 100; but 400 if within 2° cone | |

| Radial Illuminance in Lux at 25 m | | | |
|-----------------------------------|----------|----------------------------------|----------|
| Minimum | | Maximum | |
| > 125cc | 125cc >= | > 125cc | 125cc >= |
| 2.3 | | 15.4 | |
| 5.8 | 2.9 | - | |
| 2.3 | | 15.4 | |
| - | | 1.08 | |
| 1.28 | 0.64 | - | |
| 0.38 | 0.19 | - | |
| - | | 1.92 | |
| 1.6 | | - | |
| - | | 0.3; but 0.96 if within 2° cone | |
| - | | 0.15; but 0.64 if within 2° cone | |
| - | | 0.15; but 0.64 if within 2° cone | |
| 0.1* | | 1.08 | |
| 0.1* | | 1.08 | |
| 0.1* | | 1.08 | |
| 0.2* | | 1.08 | |
| 0.2* | | 1.08 | |
| 0.2* | | 1.08 | |
| 0.1* | | - | |
| 0.2* | | 1.08 | |
| - | | 1.08 | |
| - | | 0.3; but 0.96 if within 2° cone | |
| - | | 0.15; but 0.64 if within 2° cone | |

Notes:

* During measurement of these points, the front position lamp if combined or reciprocally incorporated may be switched on.

** 0.25° tolerance allowed independently at each test point for photometry unless indicated otherwise.

Other general text:

ECE-Type Approval at reference luminous flux according to Regulation No. 37 or at objective luminous flux for gas-discharge light sources according to Regulation No. 99.

Nominal Aim For Photometry:

Vertical: 1%D (0.57 °D)

Horizontal: 0°

Allowed Tolerances for Photometry:

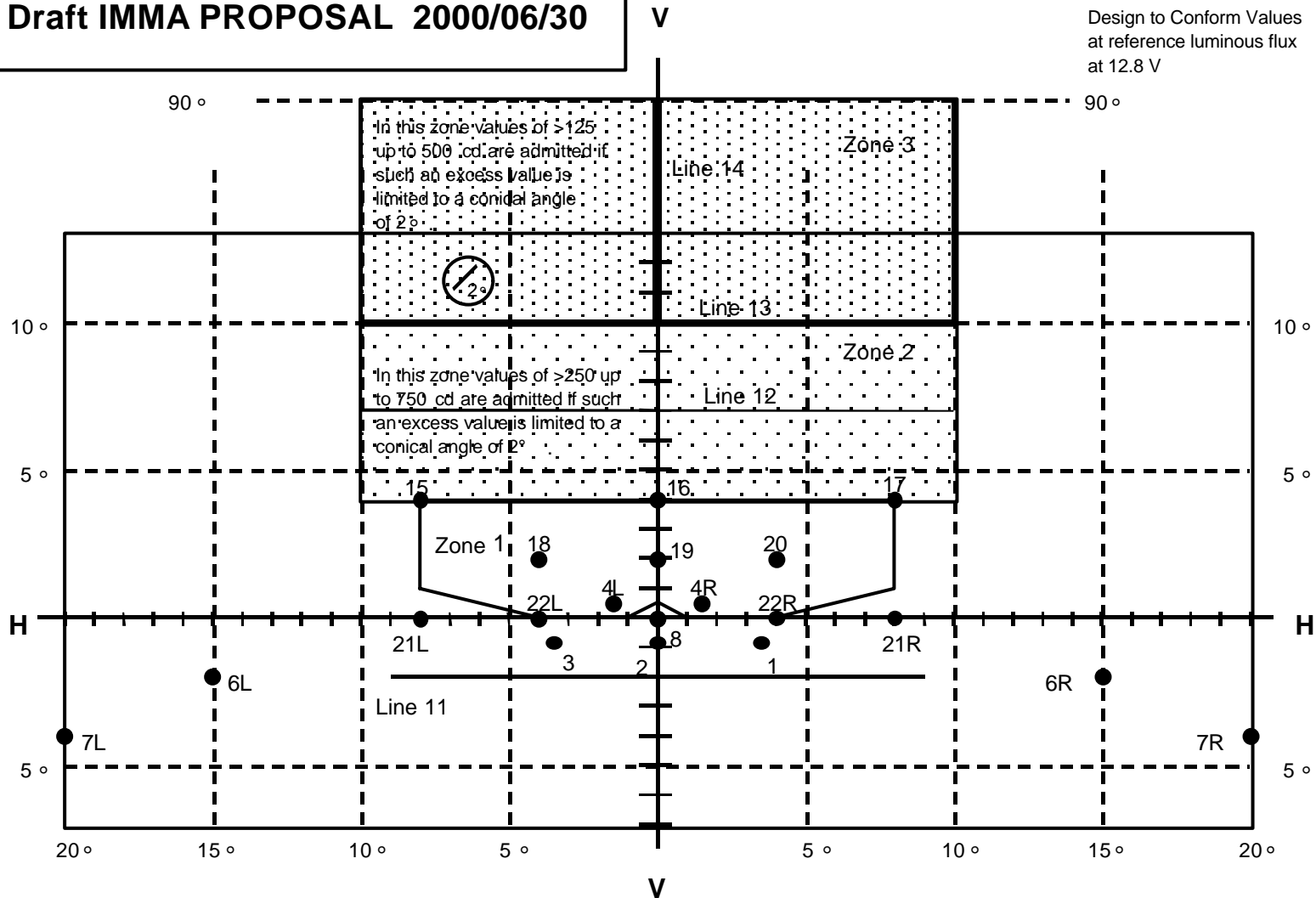
Vertical: 0.3 °D to 0.8 °D

Horizontal: ± 0.5 °D L-R

PTW HARMONIZED LOW BEAM PROPOSAL

Draft IMMA PROPOSAL 2000/06/30

Design to Conform Values
at reference luminous flux
at 12.8 V



Draft IMMA PROPOSAL 2000/06/30

PTW HARMONIZED BEAM PATTERN--BASED ON THE GTB PROPOSAL
(TRANS/WP.29/GRE/1999/18; 22 July 1999)
TYPE APPROVAL VALUES; REFERENCE LUMINOUS FLUX at 12.8 v

| TEST POINT | Position in B-β Grid | | Minimum Intensity cd | | Maximum Intensity cd | |
|------------|--|----------------|----------------------|----------|--------------------------------|----------|
| | Vertical β | Horizontal B | ** | | ** | |
| | | | > 125cc | 125cc >= | > 125cc | 125cc >= |
| 1 | 0.86 D | 3.5 R | 1,800 | | 12,000 | |
| 2 | 0.86 D | 0 | 4,500 | 2,250 | - | |
| 3 | 0.86 D | 3.5 L | 1,800 | | 12,000 | |
| 4 | 0.50 U | 1.50 L & 1.5 R | - | | 840 | |
| 6 | 2.00 D | 15 L & 15 R | 1,000 | 500 | - | |
| 7 | 4.00 D | 20 L & 20 R | 300 | 150 | - | |
| 8 | 0 | 0 | - | | 1800 | |
| Line 11 | 2.00 D | 9 L to 9 R | 1,250 | | - | |
| Line 12 | 7.00 U | 10 L to 10 R | - | | 250; but 750 if within 2° cone | |
| Line 13 | 10.00 U | 10 L to 10 R | - | | 125; but 500 if within 2° cone | |
| Line 14 | 10 U to 90 U | 0 | - | | 125; but 500 if within 2° cone | |
| 15* | 4.00 U | 8.0 L | 77* | | 840 | |
| 16* | 4.00 U | 0 | 77* | | 840 | |
| 17* | 4.00 U | 8.0 R | 77* | | 840 | |
| 18* | 2.00 U | 4.0 L | 155* | | 840 | |
| 19* | 2.00 U | 0 | 155* | | 840 | |
| 20* | 2.00 U | 4.0 R | 155* | | 840 | |
| 21* | 0 | 8.0 L & 8.0 R | 77* | | - | |
| 22* | 0 | 4.0 L & 4.0 R | 155* | | 840 | |
| Zone 1 | 1U/8L-4U/8L-4U/8R-1U/8R-0/4R-0/1R-0.5U/0-0/1L-0/4L-1U/8L | | - | | 840 | |
| Zone 2 | >4U to <10 U | 10 L to 10 R | - | | 250; but 750 if within 2° cone | |
| Zone 3 | 10 U to 90 U | 10 L to 10 R | - | | 125; but 500 if within 2° cone | |

Notes:-

* During measurement of these points, the front position lamp-if combined or reciprocally incorporated-may be switched on.

** 0.25° tolerance allowed independently a test point for photometry unless indicated otherwise.

Other general text:-

Design to Conform values; reference luminous flux at 12.8v.

Nominal Aim For Photometry:

Vertical: 0.4°D
Horizontal: 0° [Evaluate SVP results whenever they are available.]

Allowed Tolerances for Photometry:

Vertical: 0.3°D to 0.8°D
Horizontal: ±0.5°D L-R

IMMA 2000/04/03

JUSTIFICATION

1. Background

ECE Regulations Nos. 57 and 72, respectively, give the photometric requirements for symmetrical and asymmetrical motorcycle headlamp beams. ECE Regulation No. 57, which is used for mopeds and small motorcycles, is no longer in line with current technology.

Because motorcycles bank when in a curve or turn, symmetrical beam patterns provide the rider with well-balanced visibility. However, for large motorcycles asymmetrical beams conforming to ECE Regulations 8 and 20 are widely used to provide greater headlamp performance.

A harmonized asymmetrical beam pattern for headlamps, based on the requirements in Europe, U.S., and Japan, has been prepared by GTB, submitted to GRE (TRANS/WP.29/GRE/1999/18), and is now in the process of finalization.

A large portion of this proposed asymmetrical beam pattern can be adapted for use in a harmonised symmetrical beam pattern, suitable for motorcycles. IMMA presented the concept of this new beam pattern at the 44th session of GRE. The related informal document N° 12 provided a draft specification for beams suitable for different sized motorcycles.

IMMA now submits its formal proposal.

2. The concepts behind IMMA's proposal

The following concepts lie behind IMMA's proposal:

- horizontal light distribution patterns are advantageous for motorcycles when banking in corners
- the night-time and daytime conspicuity functions have to be fulfilled without glare
- in general terms, the output of the lamp should be related to the vehicle's speed and electrical capacity
- the proposal should use the harmonized asymmetrical beam pattern wherever possible
- there is a need for a new light source in ECE Regulation No. 37, to power the beam for the smaller of the proposed lamps

3. Technical explanation of the IMMA proposal

The light distribution is obtained by the symmetrical expansion of the left-hand portion of the harmonized asymmetrical beam pattern to the right-hand side of the vertical (V-V) line. The glare values remain the same as those for the harmonized asymmetrical beam pattern. (A detailed comparison of the measurement points is contained in Section 5. below.)

For the light distribution below the H-H line, the same pattern is used but two different sets of values are proposed; one for small motorcycles (with a maximum speed not exceeding 120 km/h) and the other for large motorcycles (with a maximum speed of over 120 km/h). The values for the large motorcycles provide a performance equivalent to that specified in the harmonized asymmetrical beam pattern: those for the smaller motorcycles are a major improvement on the Regulation 57 headlamp.

The IMMA proposals include a "European" version (page 2 of this document: "Type approval values, reference luminous flux at approx. 12.0 V") and an "American" version (page 4 of this document: "Design to conform values, reference luminous flux at approx. 12.8 V"). The conversion rate from 12.0 V to the U.S. 12.8 V is 125 per cent, the rate used by GTB.

4. Practical testing

In order to assess the proposed beam pattern, several headlamps were prepared and tested, with favourable results - see informal document No. 14, distributed during the forty-fourth session of GRE (TRANS/WP.29/GRE/44, para. 74).

Research on the glare resulting from two passing beams on a motorcycle showed that in the worst case the glare output was equivalent to two asymmetrical lamps mounted on a passenger - see informal document No. 13, distributed during the forty-fourth session of GRE (TRANS/WP.29/GRE/44, para. 75).

5. Discussion of asymmetrical beam pattern measurement points

Point 1: 0.86D-3.5R

While the equivalent point is located at 0.60D-1.3R for the asymmetrical beam pattern, Point 1 is a mirror of point 3 (0.86D-3.5L) in the left-hand side of the asymmetrical beam pattern.

Points 4: 0.50U-1.5L & 0.50U-1.5R

Although there is only 0.50U-1.5L for the asymmetrical beam pattern, the symmetrical point 0.50U-1.5R was added for the symmetrical beam pattern.

Point 5: No specification

The asymmetrical beam pattern has Point 5 at 0.50D-4.0R which Point 1 in the symmetrical beam makes unnecessary. It is also not possible to set a high minimum value at such a point due to its position close to the H-H line.

Point 9: No specification

As with Point 5, this point is specific to the asymmetrical beam pattern.

Line 10: No specification

The line 4.00D 4L to 4R is provided for the asymmetrical beam pattern to set the upper limit for illumination to the front. This line is not provided for motorcycles so that the rider's visibility is not adversely affected during driving.

Points 21: 0-8.0L & 8.0R

Although there is only 0-8.0L for the asymmetrical beam pattern, the symmetrical point 0-8.0R was added for the symmetrical beam pattern

Points 22: 0-4.0L & 4.0R

The same reason as for the Points 21.

Zone 1: This zone was adapted to symmetrical light distribution.

For Points 2, 6, 7, 8, 15, 16, 17, 18, 19, 20, Lines 11, 12, 13, 14, and Zones 2 and 3, the same measurement points as those for the asymmetrical beam pattern were applied.
