



SURFACE VEHICLE STANDARD

J588™**MAR2021**Issued 1927-02
Revised 2021-03

Superseding J588 AUG2011

Turn Signal Lamps for Use on Motor Vehicles
Less than 2032 mm in Overall Width

RATIONALE

Updated Table of Contents.

Section 2: Moved SAE J1319 and SAE J567 to Related Publications, added SAE J2442, SAE J2999, SAE J3069, and a reference to CMVSS. Added Transport Canada contact information.

Section 3: Added sequential turn signal definition. Removed multiple lamp arrangement reference and reference to SAE J387. Alphabetized definitions.

Section 5: Inserted "lens" to effective projected luminous area term. Renumbered 5.1.7 to 5.2.

Section 6: Changed "comply" to "conform" and "with" to "to."

Added 6.4.5. Sequential turn signals have appeared more frequently on vehicles in the U.S. and Canadian market. Requirements were added to this document to appropriately limit sequential turn signal executions such that they would not cause confusion. UN requirements for sequential turn signals were used as a starting point for these requirements, and expanded based on common turn signal configurations in the U.S. and Canada, such as allowing sequential activation and deactivation and to use the centroid of each sequential area to determine the trajectory of the turn signal.

Section 7: Added "optically" and removed FMVSS 108 reference.

Section 7.1.6: Added additional information for how EPLLA applies to a sequential turn signal.

SAE Executive Standards Committee Rules provide that: "This report is published by SAE to advance the state of technical and engineering sciences. The use of this report is entirely voluntary, and its applicability and suitability for any particular use, including any patent infringement arising therefrom, is the sole responsibility of the user."

SAE reviews each technical report at least every five years at which time it may be revised, reaffirmed, stabilized, or cancelled. SAE invites your written comments and suggestions.

Copyright © 2021 SAE International

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of SAE.

TO PLACE A DOCUMENT ORDER: Tel: 877-606-7323 (inside USA and Canada)
Tel: +1 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: CustomerService@sae.org
http://www.sae.org

SAE WEB ADDRESS:

For more information on this standard, visit
https://www.sae.org/standards/content/J588_202103

TABLE OF CONTENTS

1.	SCOPE.....	4
2.	REFERENCES.....	4
2.1	Applicable Documents	4
2.1.1	SAE Publications.....	4
2.2	Related Publications	4
2.2.1	SAE Publications.....	4
2.2.2	Code of Federal Regulations (CFR) Publications.....	5
2.2.3	Transport Canada Publications.....	5
2.2.4	United Nations Publications.....	5
3.	DEFINITIONS	5
4.	LIGHTING IDENTIFICATION CODE	6
5.	TESTS.....	6
6.	REQUIREMENTS	7
6.1	Performance Requirements	7
6.1.1	Vibration	7
6.1.2	Moisture	7
6.1.3	Dust.....	7
6.1.4	Corrosion.....	7
6.1.5	Photometry.....	7
6.1.6	Warpage.....	17
6.2	Color.....	17
6.3	Materials Requirements	17
6.4	Design Requirements.....	17
6.4.5	Sequential Turn Signal Operation.....	18
6.5	Installation Requirements.....	18
7.	GUIDELINES	19
7.1	Installation Guidelines.....	19
8.	ADDITIONAL INFORMATION	20
9.	NOTES.....	20
9.1	Revision Indicator.....	20
Figure 1F	Front signal lamps (yellow) photometric requirements minimum luminous intensity (cd) size 1 (less than 225 cm ²)	8
Figure 2F	Front signal lamps (yellow) photometric requirements minimum luminous intensity (cd) size 2 (225 to 450 cm ²).....	9
Figure 3F	Front signal lamps (yellow) photometric requirements minimum luminous intensity (cd) size 3 (greater than 450 cm ²)	10
Figure 1RY	Rear signal lamps (yellow) photometric requirements minimum luminous intensity (cd) size 1 (less than 225 cm ²)	11
Figure 2RY	Rear signal lamps (yellow) photometric requirements minimum luminous intensity (cd) size 2 (225 to 450 cm ²).....	12
Figure 3RY	Rear signal lamps (yellow) photometric requirements minimum luminous intensity (cd) size 3 (greater than 450 cm ²)	13
Figure 1RR	Rear signal lamps (red) photometric requirements minimum luminous intensity (cd) size 1 (less than 225 cm ²)	14
Figure 2RR	Rear signal lamps (red) photometric requirements minimum luminous intensity (cd) size 2 (225 to 450 cm ²).....	15

Figure 3RR	Rear signal lamps (red) photometric requirements minimum luminous intensity (cd) size 3 (greater than 450 cm²)	16
Figure 4	Turn signal lamp visibility requirements - unobstructed projected area.....	19
Figure 5	Turn signal lamp visibility requirements - luminous intensity	19
Table 1	Effective projected luminous lens area	6
Table 2	Luminous intensity multipliers for front turn signal spacing	17

SAENORM.COM : Click to view the full PDF of j588_202103

1. SCOPE

This SAE Standard provides test procedures, requirements, and guidelines for turn signal lamps intended for use on vehicles of less than 2032 mm in overall width.

2. REFERENCES

2.1 Applicable Documents

The following publications form a part of this specification to the extent specified herein. Unless otherwise indicated, the latest issue of SAE publications shall apply.

2.1.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

SAE J575	Test Methods and Equipment for Lighting Devices for Use on Vehicles Less than 2032 mm in Overall Width
SAE J576	Plastic Material or Materials for Use in Optical Parts Such as Lenses and Reflex Reflectors of Motor Vehicle Lighting Devices
SAE J578	Chromaticity Requirements for Ground Vehicle Lamps and Lighting Equipment
SAE J759	Lighting Identification Code
SAE J914	Side Turn Signal Lamps for Vehicles Less than 12 m in Length
SAE J1690	Flashers
SAE J1889	LED Signal and Marking Lighting Devices

2.2 Related Publications

The following publications are provided for information purposes only and are not a required part of this SAE Technical Report.

2.2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

SAE J222	Front Position Lamp
SAE J387	Terminology—Motor Vehicle Lighting
SAE J567	Light Source Retention System
SAE J585	Tail Lamps (Rear Position Lamps) for Use on Motor Vehicles Less than 2032 mm in Overall Width
SAE J586	Stop Lamps for Use on Motor Vehicles Less than 2032 mm in Overall Width
SAE J592	Sidemarkers Lamps for Use on Road Vehicles Less than 2032 mm in Overall Width
SAE J594	Reflex Reflectors
SAE J1050	Describing and Measuring the Driver's Field of View

SAE J1319	Rear Fog Lamp Systems
SAE J1957	Center High Mounted Stop Lamp Standard for Vehicles Less than 2032 mm Overall Width
SAE J2040	Tail Lamps (Rear Position Lamps) for Use on Vehicles 2032 mm or More in Overall Width
SAE J2042	Clearance, Sidemarker, and Identification Lamps for On-Road Vehicles 2032 mm or More in Overall Width
SAE J2261	Stop Lamps and Front- and Rear-Turn Signal Lamps for Use on Motor Vehicles 2032 mm or More in Overall Width
SAE J2442	Harmonized Provisions for Installation of Exterior Lamps and Retro-Reflecting Devices on Road Vehicles Except Motorcycles
SAE J2999	Determination of the Effective Projected Luminous Lens Area (EPLLA) by Design Analysis
SAE J3069	Adaptive Driving Beam System

2.2.2 Code of Federal Regulations (CFR) Publications

Available from the United States Government Printing Office, 732 North Capitol Street, NW, Washington, DC 20401, Tel: 202-512-1800, www.gpo.gov.

CFR Title 49 Part 571.108 Lamps, Reflective Devices and Associated Equipment (FMVSS 108)

2.2.3 Transport Canada Publications

Transport Canada documents are available from Transport Canada, Tower C, Place de Ville, 330 Sparks Street Ottawa, Ontario K1A 0N5, Tel: 1-800-305-2059, www.tc.gc.ca.

CMVSS 108 Lighting Systems and Reflective Devices

2.2.4 United Nations Publications

Available from United Nations Economic Commission for Europe, Palais des Nations, CH-1211, Geneva 10, Switzerland, Tel: +41-0-22-917-12-34, <http://www.unece.org/trans/main/wp29/wp29regs.html>.

UN R06 Uniform Provisions Concerning the Approval of Direction Indicators for Motor Vehicles and Their Trailers

UN R148 Uniform Provisions Concerning the Approval of Light-Signaling Devices (Lamps) for Power-Driven Vehicles and Their Trailers

3. DEFINITIONS

3.1 SEQUENTIAL TURN SIGNAL

A turn signal function where adjacent illuminated areas activate or deactivate consecutively.

3.2 TURN SIGNAL FUNCTION

A flashing light to the front, side, or rear of a vehicle on the side toward which a change of direction is intended.

3.3 TURN SIGNAL LAMP

A device providing the turn signal function.

3.4 TURN SIGNAL LAMP ARRANGEMENT

The lighted lamps, areas, or segments that provide the turn signal function.

4. LIGHTING IDENTIFICATION CODE

Turn signal lamps for use on vehicles less than 2032 mm in overall width may be identified by the codes I, I3, I4, or I5, in accordance with SAE J759.

5. TESTS

5.1 The following tests in SAE J575 are applicable with modifications as indicated.

5.1.1 Vibration Test

5.1.2 Moisture Test

5.1.3 Dust Test

5.1.4 Corrosion Test

5.1.5 Photometry Test

5.1.5.1 Test distance shall be at least 3.05 m or at least ten times the maximum linear extent of the effective projected luminous lens area (EPLLA) of the signal lamp, whichever is greater. The H-V axis shall be taken as parallel to the axis of reference of the lamp as mounted on the vehicle.

Table 1 - Effective projected luminous lens area

Effective Projected Luminous Lens Area	Size
Less than 225 cm ²	1
225 to 450 cm ²	2
Greater than 450 cm ²	3

5.1.5.2 The photometric requirements specified in Figures 1F, 2F, 3F, 1RY, 2RY, 3RY, 1RR, 2RR, and 3RR shall be applied based on the effective projected luminous lens area for the entire turn signal function on each side of the vehicle as depicted in Table 1 and the following paragraphs.

5.1.5.3 Photometric measurements of multiple lamp arrangements shall be made by one of the following methods:

5.1.5.3.1 If a multiple lamp arrangement on each side of the vehicle is used to obtain the turn signal function, all lamps shall be photometered together provided that a line from the optical axis of each lamp to the center of the photometer sensing device does not make an angle of more than 0.6 degree with the photometer H-V axis. When lamps are photometered together, the H-V axis shall intersect the midpoint between their optical axes. If these conditions are not met, use the following method.

5.1.5.3.2 Each lamp shall be photometered separately by aligning the axis of each lamp with the photometer. The photometric measurement for the multiple lamp arrangement shall be determined by adding the photometric outputs from each individual lamp at corresponding test points.

5.1.5.4 The test methods and procedures of SAE J1889 shall also be applied if LED light sources are present in the turn signal lamp(s).

5.1.5.5 Photometry of sequential turn signals shall be tested with all illuminated areas switched on at their full intended intensity.

5.1.6 Warpage Test for Devices with Plastic Components

5.2 Color Test

The color of turn signal lamps shall be determined by SAE J578.

5.3 Materials Test

Plastic materials used in the optical parts shall be tested according to SAE J576.

6. REQUIREMENTS

6.1 Performance Requirements

A device when tested in accordance with the test procedures specified in Section 5, shall meet the following requirements per SAE J575; in addition, lamps with LED light sources shall also meet the requirements of SAE J1889.

6.1.1 Vibration

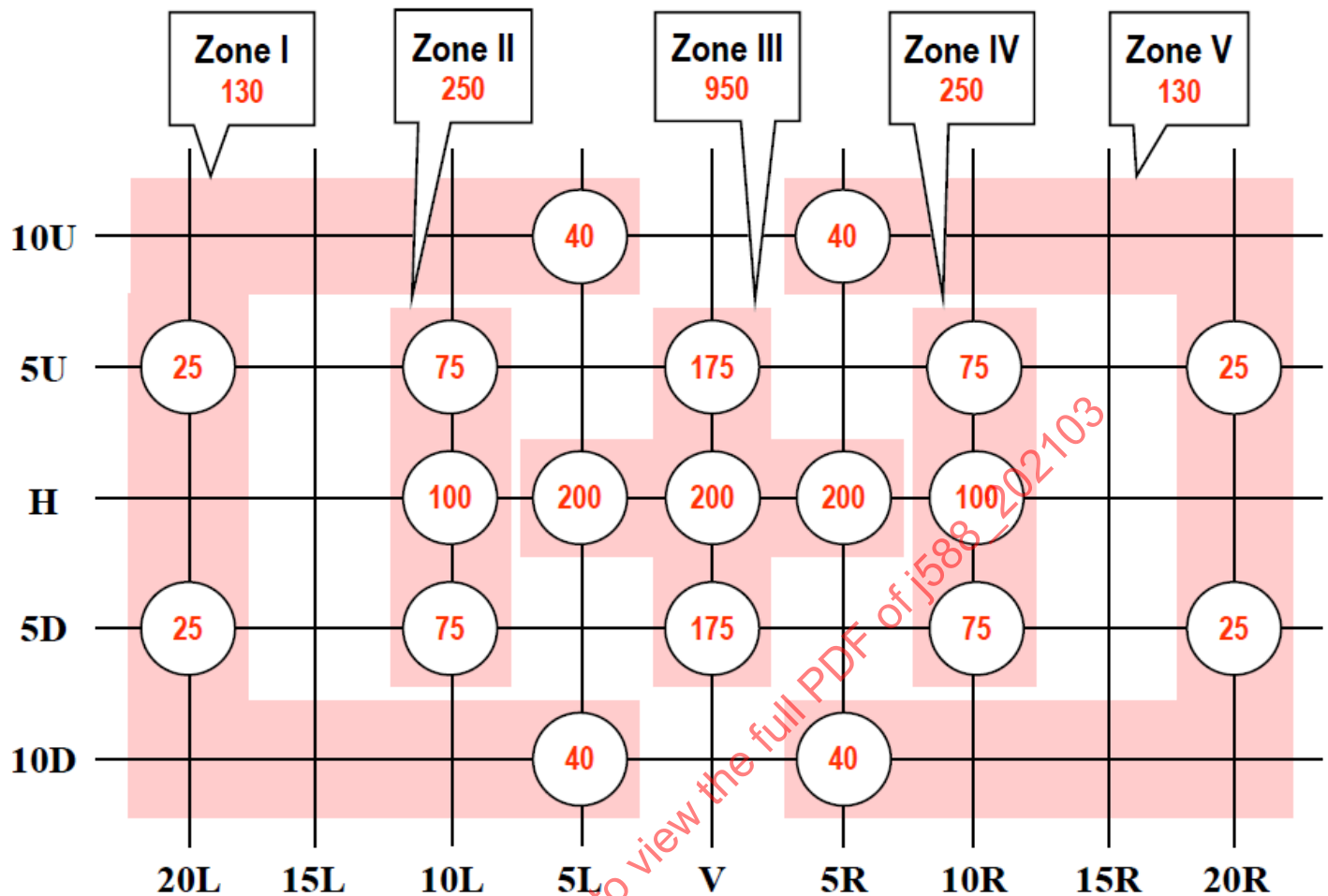
6.1.2 Moisture

6.1.3 Dust

6.1.4 Corrosion

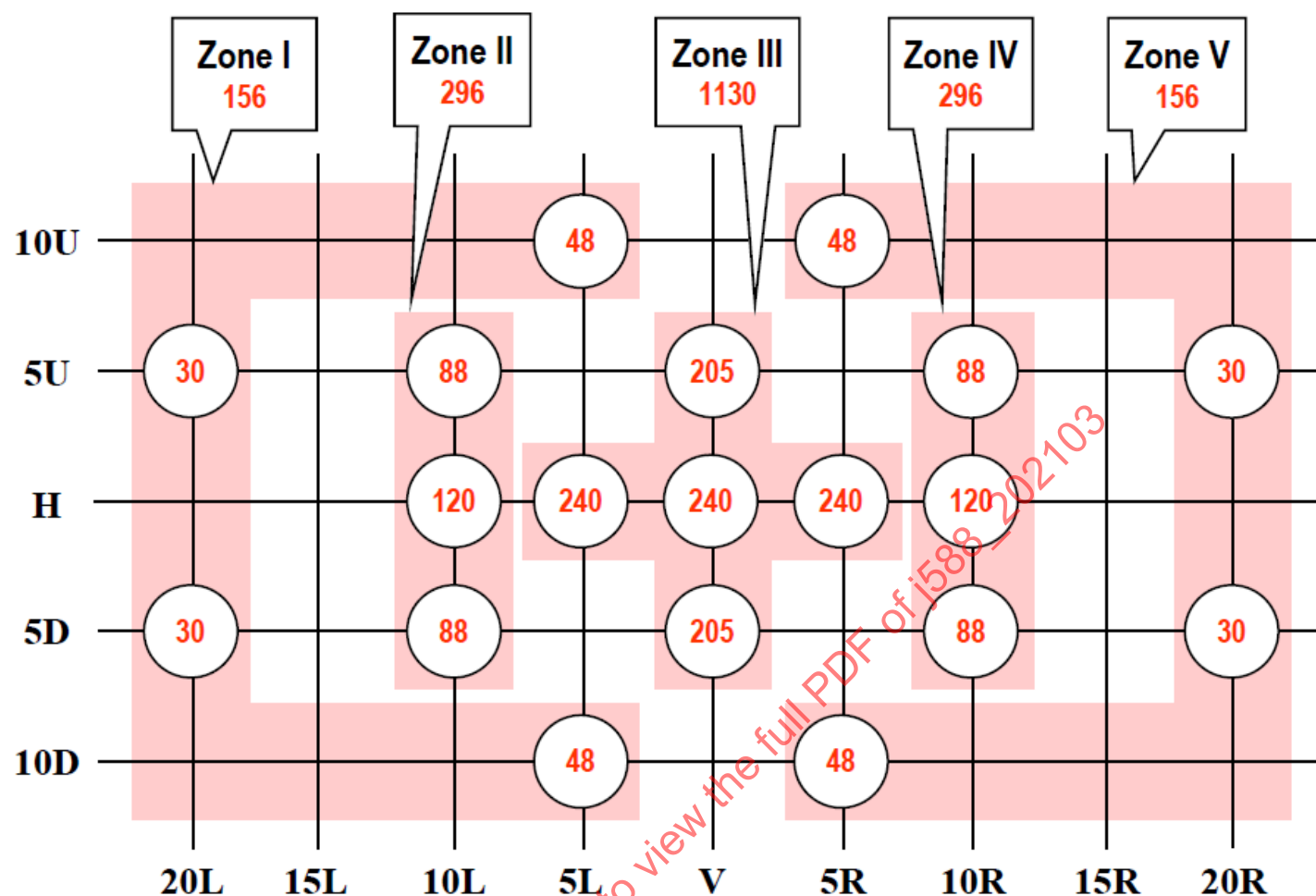
6.1.5 Photometry

- 6.1.5.1 The lamp shall be designed to conform to the zone total photometric requirements of the corresponding figures: Figures 1F, 2F, or 3F (front yellow); Figures 1RY, 2RY, or 3RY (rear yellow); or Figures 1RR, 2RR, or 3RR (rear red) photometric requirements and their footnotes. The summation of the luminous intensity measurements at the test points in a zone shall be at least the value shown. The lamp size, either 1, 2, or 3, is determined by its effective projected luminous lens area from Table 1.
- 6.1.5.2 A multiple compartment or multiple lamp arrangement on each side of the vehicle may be used to meet the photometric requirements of a turn signal lamp. If multiple lamps are used and the distance between optical axes does not exceed 560 mm for two lamp arrangements and does not exceed 410 mm for three lamp arrangements, then the entire lamp arrangement must be used to meet the photometric requirements for the corresponding figure and size of lamp. Two lamps meet Size 2; three lamps meet Size 3, respectively (see Figures 2F, 2RY, or 2RR and Figures 3R, 3RY, or 3RR). If the distance between adjacent optical axes exceeds the previous dimensions, each lamp shall comply with the photometric requirements in the corresponding Figure 1F - Size 1, Figure 1RY - Size 1, or Figure 1RR - Size 1.
- 6.1.5.3 When a tail lamp or parking lamp is combined with the turn signal lamp, the signal lamp shall not be less than three times the luminous intensity (a) of the tail lamp at any test point, or (b) of the parking lamp at any test point on or above horizontal except that at H-V, H-5L, H-5R, and 5U-V, the turn signal lamp shall not be less than five times the luminous intensity of the tail lamp or parking lamp. If a size 2, 3, or multiple lamp arrangement is used and the distance between optical axes for both the tail lamp (parking lamp) and the turn signal is within the dimensions specified in 6.1.5.2, the ratio of the signal to the tail lamp (parking lamp) shall be computed with the entire lamp or all the lamps lighted. If a multiple lamp arrangement is used and the distance between optical axes for one of the functions exceeds the dimensions specified in 6.1.5.2, the ratio shall be computed for only those lamps where the tail lamp or parking lamp and turn signal are optically combined. When the tail lamp is combined with the turn signal lamp, and the maximum luminous intensity of the tail lamp is located below horizontal and within an area generated by a 0.5 degree radius around a test point, the ratio for the test point may be computed using the lowest value of the tail lamp luminous intensity within the generated area.



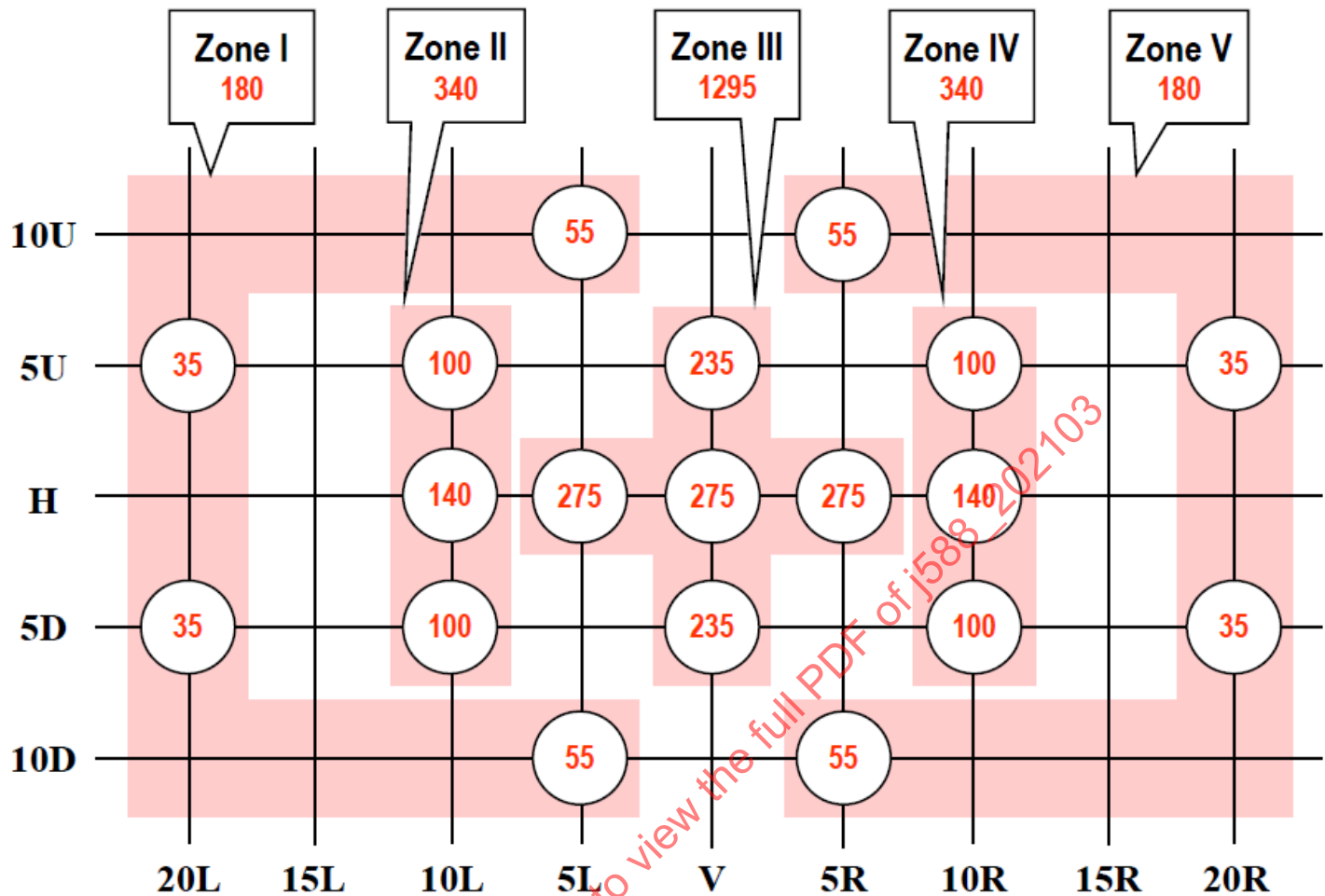
1. The measured value at each test point shall not be less than 60% of the required minimum value shown for that individual test point location.
2. The sum of the luminous intensity measurements at each test point within a zone shall not be less than the zone total shown. The luminous intensity measurements at each discrete test point shown within the corresponding zone are the values used to calculate the specified zone total.
3. Ratio requirements of 6.1.5.3 apply.
4. Multiple lamps requirements of 6.1.5.2 apply.
5. Multipliers of Table 2 are applicable per 6.1.5.4

**Figure 1F - Front signal lamps (yellow) photometric requirements
minimum luminous intensity (cd) size 1 (less than 225 cm²)**



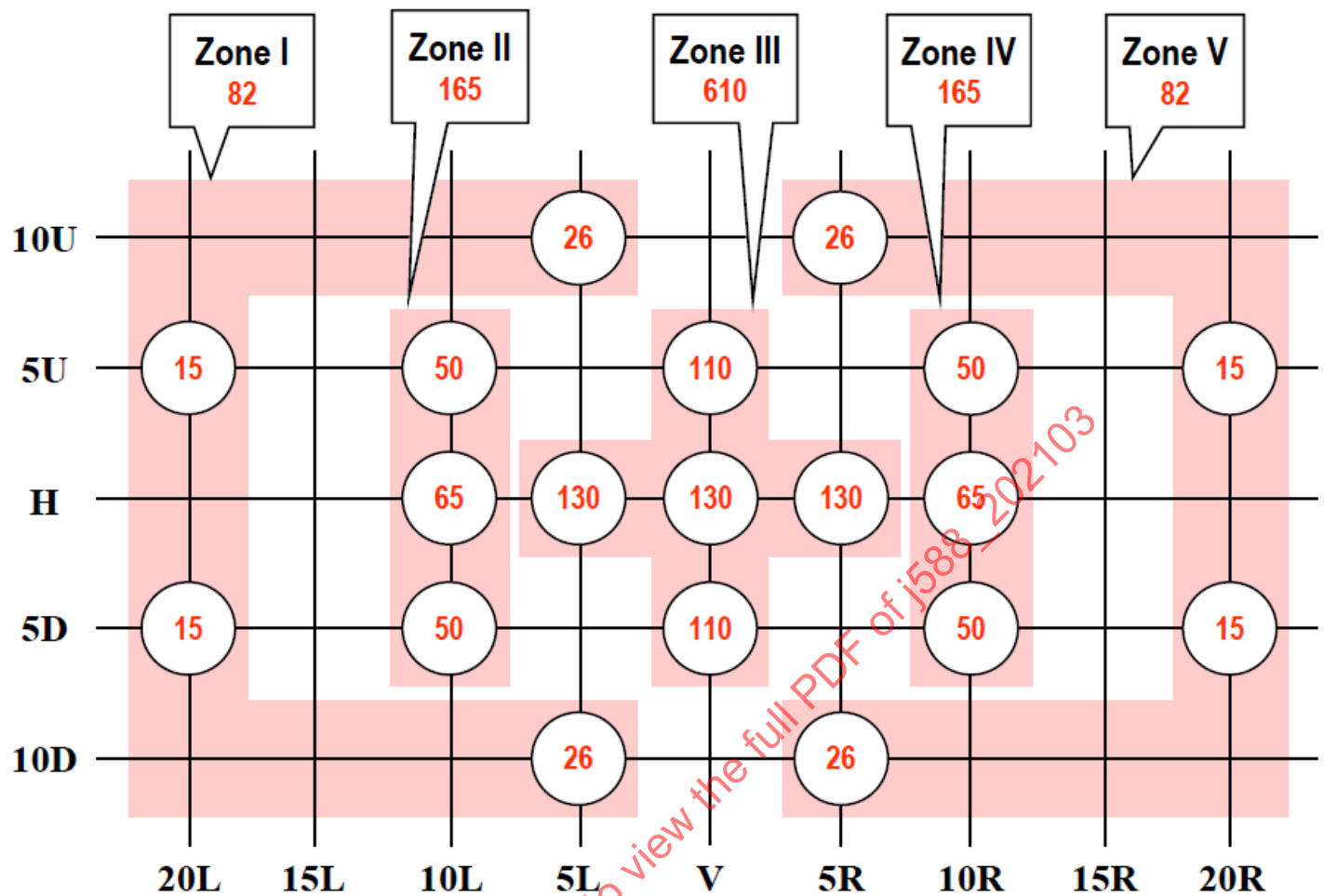
1. The measured value at each test point shall not be less than 60% of the required minimum value shown for that individual test point location.
2. The sum of the luminous intensity measurements at each test point within a zone shall not be less than the zone total shown. The luminous intensity measurements at each discrete test point shown within the corresponding zone are the values used to calculate the specified zone total.
3. Ratio requirements of 6.1.5.3 apply.
4. Multiple lamps requirements of 6.1.5.2 apply
5. Multipliers of Table 2 are applicable per 6.1.5.4

**Figure 2F - Front signal lamps (yellow) photometric requirements
minimum luminous intensity (cd) size 2 (225 to 450 cm²)**



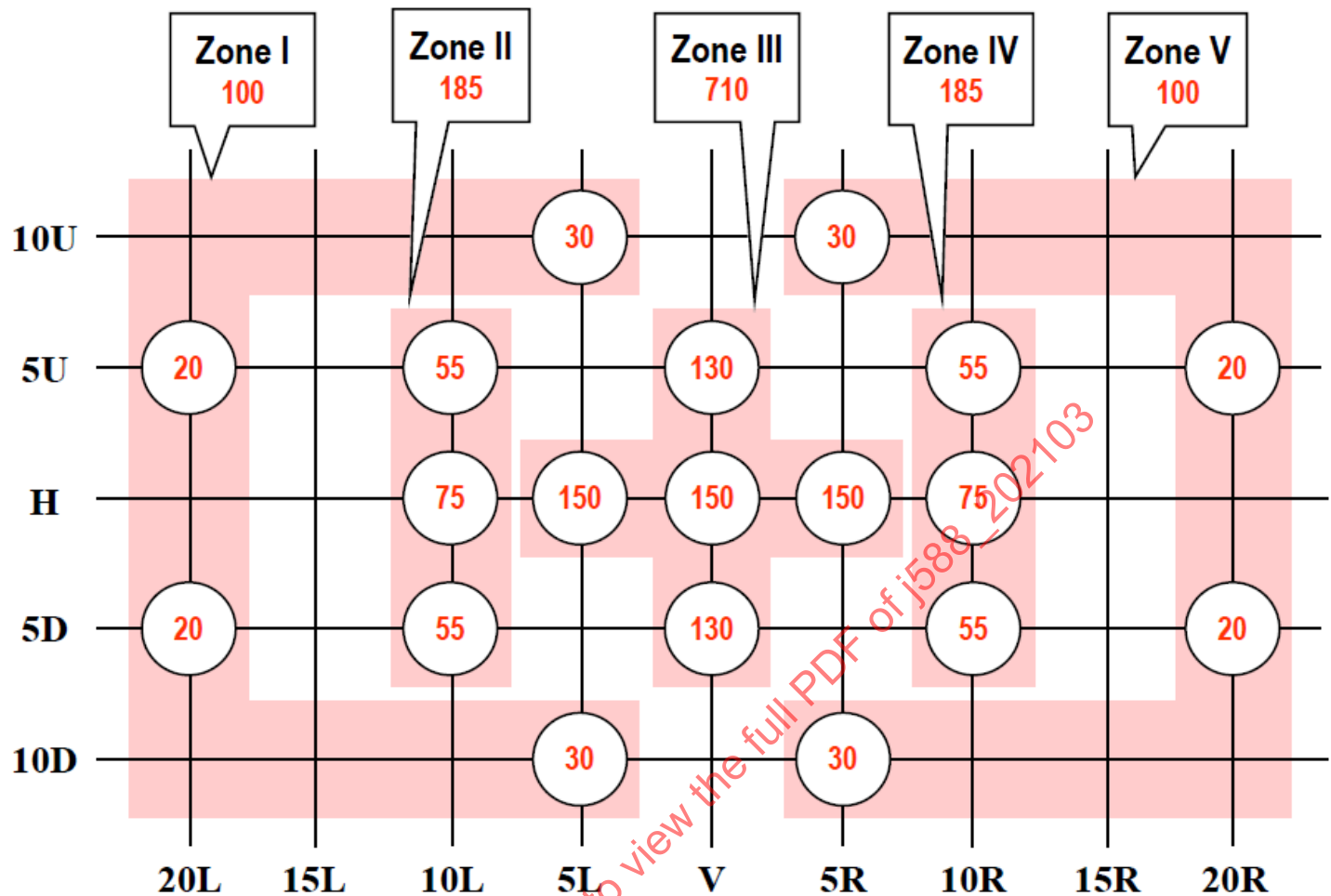
1. The measured value at each test point shall not be less than 60% of the required minimum value shown for that individual test point location.
2. The sum of the luminous intensity measurements at each test point within a zone shall not be less than the zone total shown. The luminous intensity measurements at each discrete test point shown within the corresponding zone are the values used to calculate the specified zone total.
3. Ratio requirements of 6.1.5.3 apply.
4. Multiple lamps requirements of 6.1.5.2 apply.
5. Multipliers of Table 2 are applicable per 6.1.5.4

**Figure 3F - Front signal lamps (yellow) photometric requirements
minimum luminous intensity (cd) size 3 (greater than 450 cm²)**



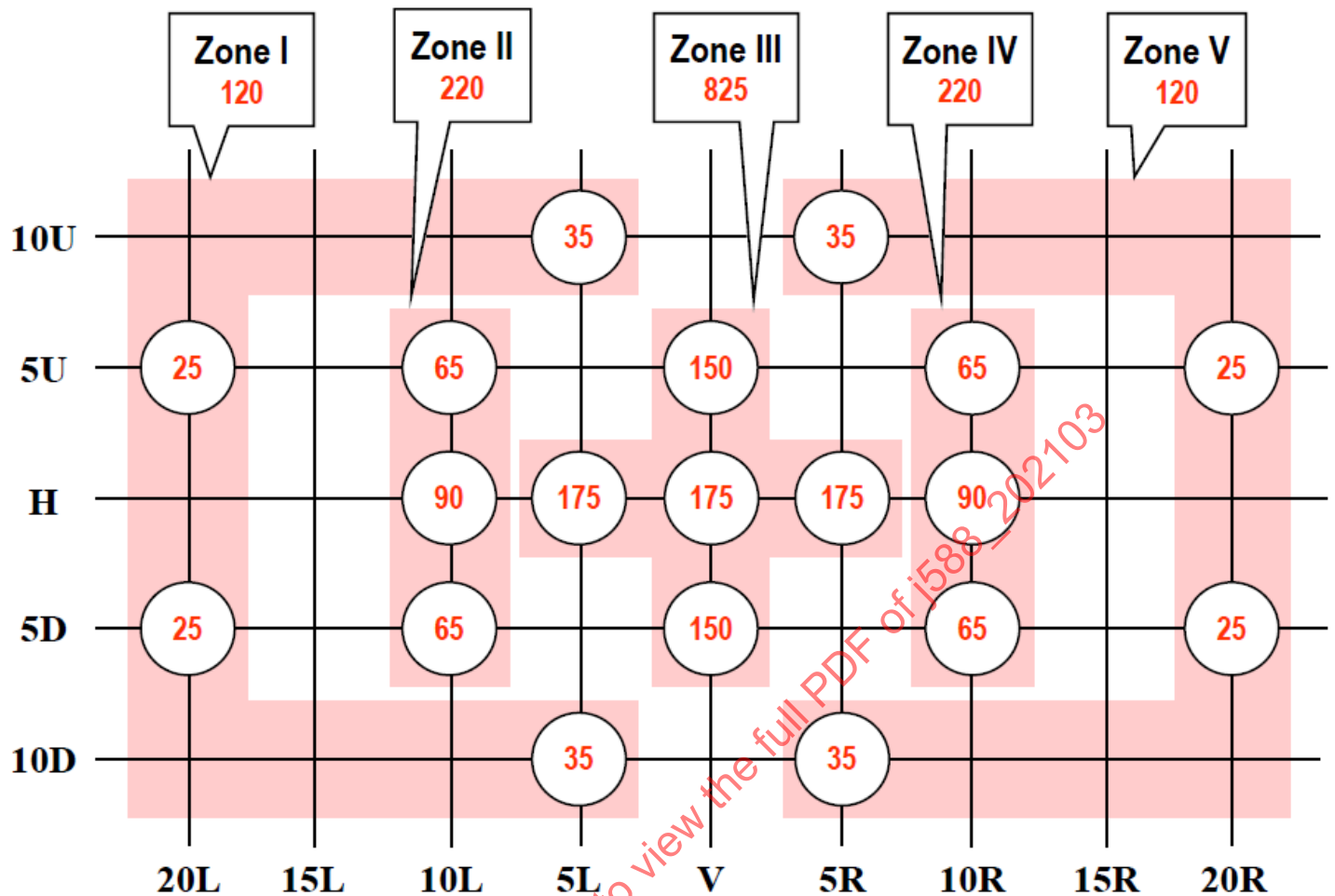
1. The maximum luminous intensity is 750 cd within the photometric pattern shown.
2. The measured value at each test point shall not be less than 60% of the required minimum value shown for that individual test point location.
3. The sum of the luminous intensity measurements at each test point within a zone shall not be less than the zone total shown. The luminous intensity measurements at each discrete test point shown within the corresponding zone are the values used to calculate the specified zone total.
4. The listed maximum shall not be exceeded over any area larger than that generated by a 0.5 degree radius within the solid angle defined by the test points.
5. Ratio requirements of 6.1.5.3 apply.
6. Multiple lamps requirements of 6.1.5.2 apply.

**Figure 1RY - Rear signal lamps (yellow) photometric requirements
minimum luminous intensity (cd) size 1 (less than 225 cm²)**



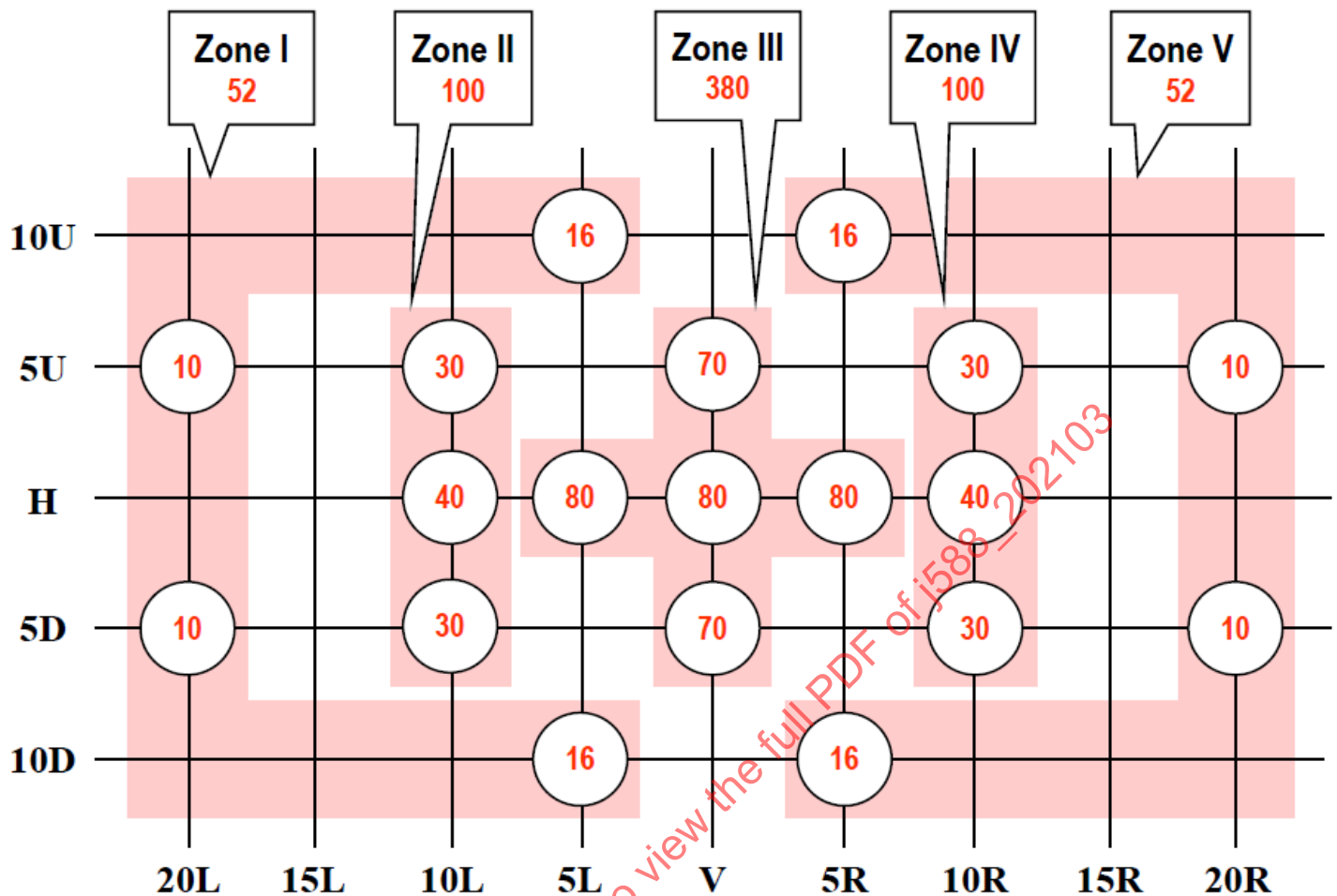
1. The maximum luminous intensity is 900 cd within the photometric pattern shown.
2. The measured value at each test point shall not be less than 60% of the required minimum value shown for that individual test point location.
3. The sum of the luminous intensity measurements at each test point within a zone shall not be less than the zone total shown. The luminous intensity measurements at each discrete test point shown within the corresponding zone are the values used to calculate the specified zone total.
4. The listed maximum shall not be exceeded over any area larger than that generated by a 0.5 degree radius within the solid angle defined by the test points.
5. Ratio requirements of 6.1.5.3 apply.
6. Multiple lamps requirements of 6.1.5.2 apply.

**Figure 2RY - Rear signal lamps (yellow) photometric requirements
minimum luminous intensity (cd) size 2 (225 to 450 cm²)**



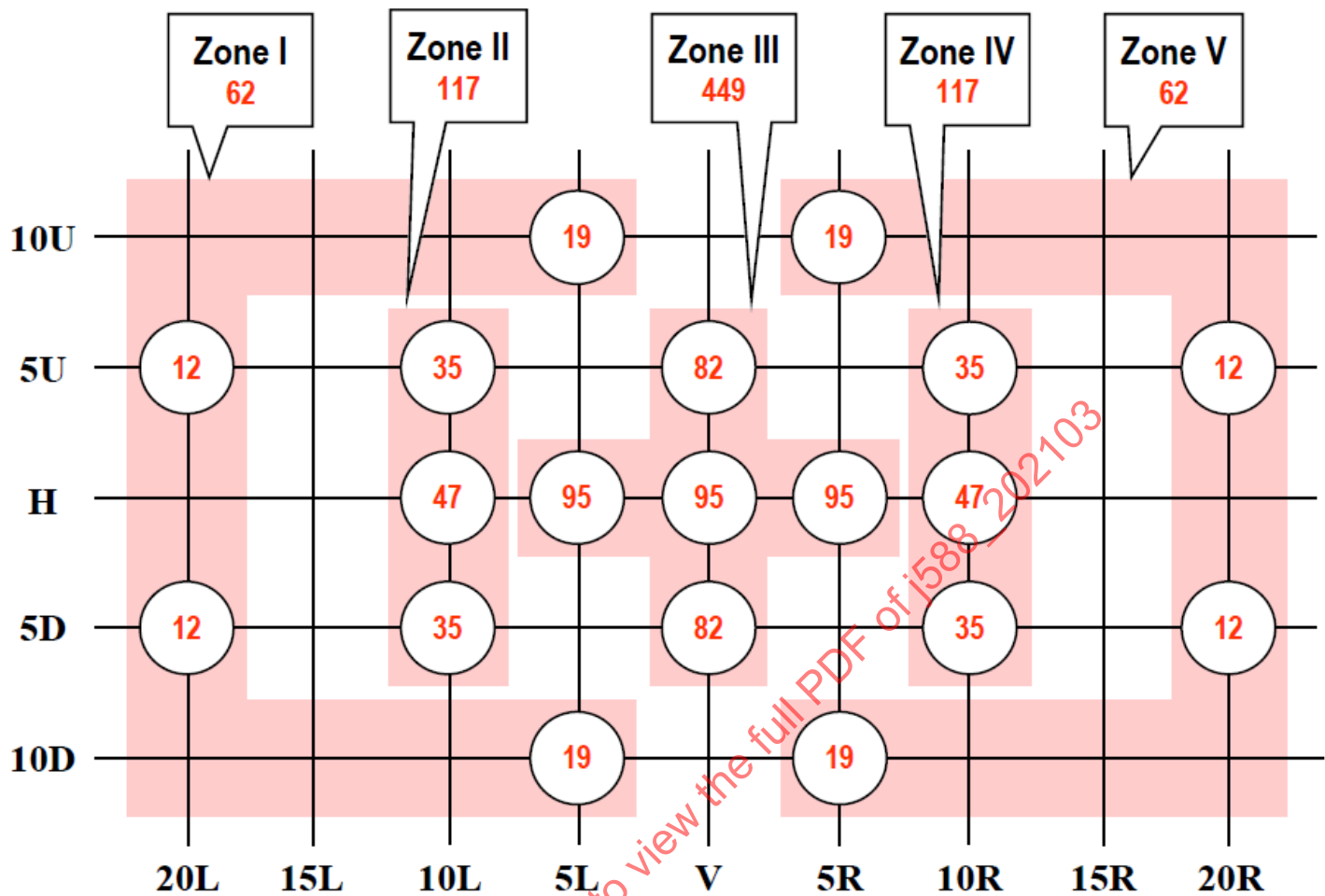
1. The maximum luminous intensity is 1050 cd within the photometric pattern shown.
2. The measured value at each test point shall not be less than 60% of the required minimum value shown for that individual test point location.
3. The sum of the luminous intensity measurements at each test point within a zone shall not be less than the zone total shown. The luminous intensity measurements at each discrete test point shown within the corresponding zone are the values used to calculate the specified zone total.
4. The listed maximum shall not be exceeded over any area larger than that generated by a 0.5 degree radius within the solid angle defined by the test points.
5. Ratio requirements of 6.1.5.3 apply.
6. Multiple lamps requirements of 6.1.5.2 apply.

**Figure 3RY - Rear signal lamps (yellow) photometric requirements
minimum luminous intensity (cd) size 3 (greater than 450 cm²)**



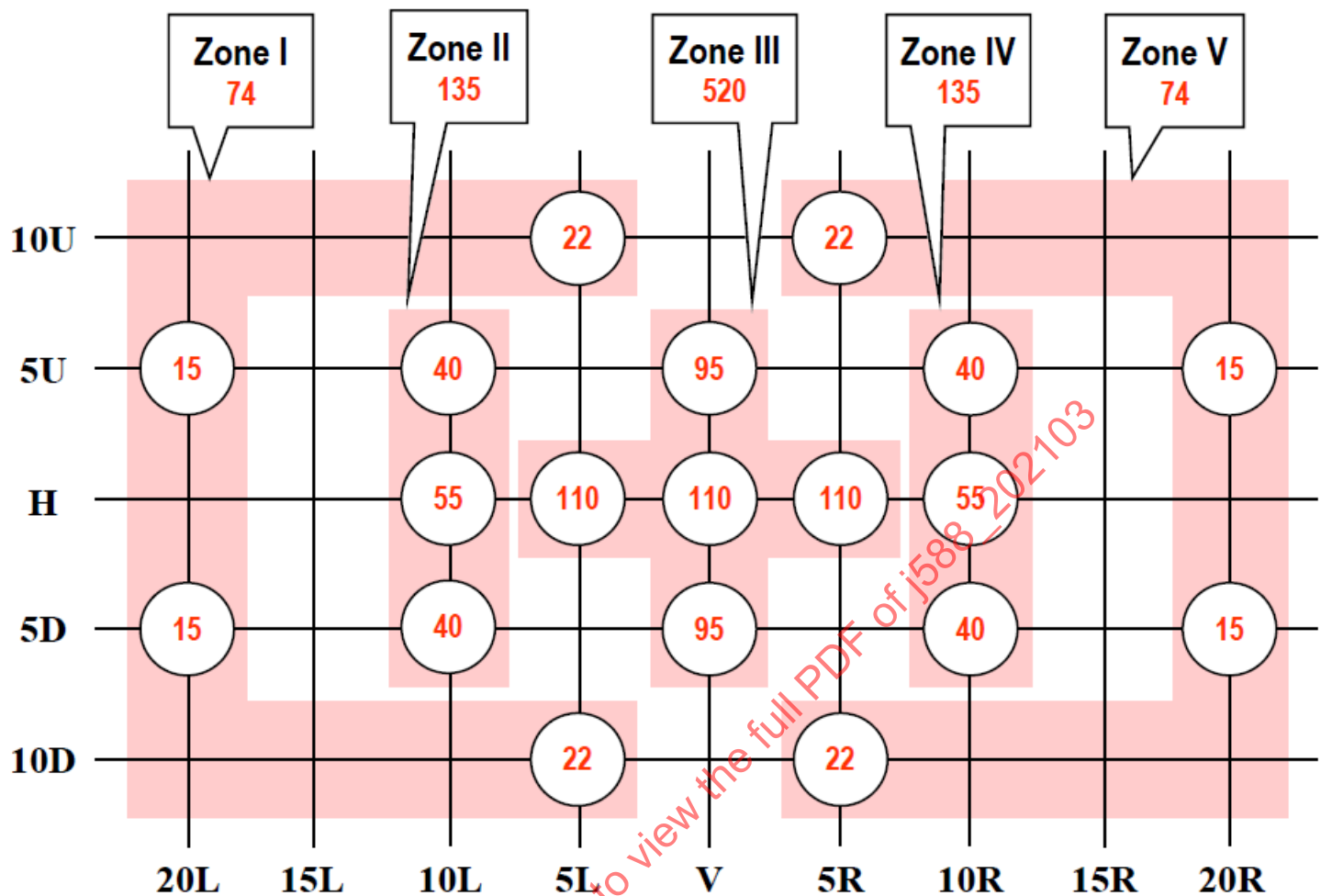
1. The maximum luminous intensity is 300 cd within the photometric pattern shown.
2. The measured value at each test point shall not be less than 60% of the required minimum value shown for that individual test point location.
3. The sum of the luminous intensity measurements at each test point within a zone shall not be less than the zone total shown. The luminous intensity measurements at each discrete test point shown within the corresponding zone are the values used to calculate the specified zone total.
4. The listed maximum shall not be exceeded over any area larger than that generated by a 0.5 degree radius within the solid angle defined by the test points.
5. Ratio requirements of 6.1.5.3 apply.
6. Multiple lamps requirements of 6.1.5.2 apply.

**Figure 1RR - Rear signal lamps (red) photometric requirements
minimum luminous intensity (cd) size 1 (less than 225 cm²)**



1. The maximum luminous intensity is 360 cd within the photometric pattern shown.
2. The measured value at each test point shall not be less than 60% of the required minimum value shown for that individual test point location.
3. The sum of the luminous intensity measurements at each test point within a zone shall not be less than the zone total shown. The luminous intensity measurements at each discrete test point shown within the corresponding zone are the values used to calculate the specified zone total.
4. The listed maximum shall not be exceeded over any area larger than that generated by a 0.5 degree radius within the solid angle defined by the test points.
5. Ratio requirements of 6.1.5.3 apply.
6. Multiple lamps requirements of 6.1.5.2 apply.

**Figure 2RR - Rear signal lamps (red) photometric requirements
minimum luminous intensity (cd) size 2 (225 to 450 cm²)**



1. The maximum luminous intensity is 420 cd within the photometric pattern shown.
2. The measured value at each test point shall not be less than 60% of the required minimum value shown for that individual test point location.
3. The sum of the luminous intensity measurements at each test point within a zone shall not be less than the zone total shown. The luminous intensity measurements at each discrete test point shown within the corresponding zone are the values used to calculate the specified zone total.
4. The listed maximum shall not be exceeded over any area larger than that generated by a 0.5 degree radius within the solid angle defined by the test points.
5. Ratio requirements of 6.1.5.3 apply.
6. Multiple lamps requirements of 6.1.5.2 apply.

**Figure 3RR - Rear signal lamps (red) photometric requirements
minimum luminous intensity (cd) size 3 (greater than 450 cm²)**