Traffic Open Products and Specifications

TOPAS 2514A

Performance Specification for Light Signals for the Control of Tramcars

Revision	Date	Scope	Authorised by
A (v1)	15/01/15	Draft	Admin
A (v2)	19/03/15	Draft	Admin
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TOPAS 2514 A

PERFORMANCE SPECIFICATION FOR LIGHT SIGNALS FOR THE CONTROL OF TRAMCARS

CONTENTS

1 INTRODUCTION

1.1 This specification covers the performance requirements for light signals for the control of tramcars on public highways.

1.2 TOPAS specifications are explicitly purchasing specifications and compliance with them is not mandatory. However Local and other Purchasing Authorities may typically require that equipment purchased complies with TOPAS specifications and is TOPAS registered.

1.3 Manufacturers may register products as being compliant with this specification, using the process defined in TOPAS 0600

1.4 TOPAS registration requires manufacturers submit a Technical File to an appropriate Technical Assessor to aid compliance verification. The content requirement for the Technical File is defined in Appendix Z of this specification.

1.5 Guidance to potential users of this Product is given in Appendix B.

1.6 Within this specification, “The Product” shall mean all components necessary to provide a complete operational unit meeting the requirements of this specification and the common requirements defined in TOPAS 0600.

Implementation

1.7 This specification implements requirements as originally defined in HA specification TR 2514A. Product Approvals to TR2514A may be used to register products to this specification as defined in TOPAS 0600

1.8 This specification will be immediately implemented from the date of issue for all new TOPAS Registrations

Glossary of Terms

1.9 A comprehensive glossary of terms is given in Highways Agency document TA 84 Code of Practice for Traffic Control and Information Systems for All-purpose Roads.

2 FUNCTIONAL REQUIREMENTS

General

2.1 The specification defines the essential requirements for light signals to control tramcars that must be Self-certified as conformant with TSRGD Regulation 41 and to this standard before used on UK public highways.

Signal Assembly

2.2 The signal assembly shall be suitable for installation within an approved housing designed for a 300mm regulatory sign for mounting alongside or underneath a standard signal complying with TSRGD regulation 33.

2.3 The front screen(s) of the signal shall be designed such that specular reflection of light sources, external to the signal, is kept to a minimum. Any specular reflection from external sources (i.e. sun, headlamps and street lighting) shall be limited to a diameter of not greater than 25 mm.

Light Source

2.4 The light source shall:

i) have a life expectancy of greater than 60,000 hours under normal operational conditions;

ii) not have a failure mode which could cause malfunction of the signal control equipment.

Construction

2.5 The enclosure housing the Product shall be constructed to withstand the effects of the environment in which it is intended to operate

2.6 Optical components shall be designed so that when assembled they are in accurate alignment to one another, and means are to be provided to prevent displacement or misalignment of the emitters within the signal assembly.

Environmental

2.7 The Product shall be constructed in such a manner and from materials to meet the environmental requirements defined in TR 2130.

2.8 The housing shall meet the requirements of IP34 in accordance with BS EN 60529. The signal assembly shall be protected, either as part of the complete housing unit or as a separate unit. In either option the protection shall be to IP55.

2.9 Optical components shall be manufactured from materials which maintain the optical performance of the signal over a temperature range of -15° C to +60° C.

Electrical Requirements

2.10 The electrical supply for The Product shall be the ‘normal’ and ‘dimmed’ signal aspect voltage range output by Type Approved signal controllers.

2.11 All wiring, termination, and earthing shall be in accordance with BS 7671.

Optical Performance

Arrangement of light emitters

2.12 The Product shall conform in appearance to Diagram 1 or 2 of Appendix A.

2.13 Signals that conform to Diagram 1 shall have individual emitters to the dimensions shown.

2.14 Signals that conform to Diagram 2 shall have illuminated areas as shown.

Distribution of Light Output

2.15 The distribution of light for each emitter shall be as specified in Table 2.1 for a signal conforming to Diagram 1 of Appendix A, and Table 2.2 for a signal conforming to Diagram 2 of Appendix A.

2.16 When multiple light sources are used, they shall present a uniform appearance, free from excessively bright spots when viewed from any direction within that specified in Table 2.1 and Table 2.2.

2.17 The ratio of the maximum and minimum intensity between any 2 adjacent emitters shall not exceed 4:1 on adjacent emitters and 6:1 on non-adjacent emitters.

Dimming

2.18 When driven from the dimmed signal aspect voltage, the intensity It should be noted that he intensity of the light source shall be between ¼ and 1/12 of full intensity.

Signal Chromaticity

2.19 The colour of light emitted from each light emitting element (Diagram 1 of Appendix A) or area (Diagram 2 of Appendix A) of the Product, for both the normal and dimmed conditions shall meet the requirements of BS 1376 Class C.

Contrast Ratio

2.20 The contrast ratio between an illuminated light emitting element or area and a non-illuminated light-emitting element shall be not less than 18:1.

Horizontal / Vertical	On Geometric Axis	3° on either side of Geometric Axis	6° on either side of Geometric Axis	12° on either side of Geometric Axis
On Geometric Axis	20	10	5	2
3° below Geometric Axis	10	7	4	2
6° below Geometric Axis	5	4	3	2

Table 2.1 Minimum value of luminous intensity (cd) in 'bright' condition

(refer to Diagram 1 Appendix A)

Horizontal / Vertical	On Geometric Axis	3° on either side of Geometric Axis	6° on either side of Geometric Axis	12° on either side of Geometric Axis
On Geometric Axis	10,000	5,000	2,500	1,000
3° below Geometric Axis	5,000	3,500	2,000	750
6° below Geometric Axis	2,500	2,000	1,500	750

Table 2.2 Minimum value of daytime luminance (cd/m2) in bright condition

(refer to Diagram 2 Appendix A)

Note: Where the "Stop" legend has dual light sources, the values in Table 2.2 may be reduced by 50% for single light source operation.

3 REFERENCES

3.1 Where undated references are listed, the latest issue of the publication shall apply.

British Standards

3.2 The British Standards Institution, London, publishes British Standards.

BS 1376	Colour of Light Signals
BS 7671	Requirements for Electrical Installations
BS EN 12368	Traffic Control Equipment - Signal Heads
BS EN 60529	Specifications for degrees of protection by enclosures (IP Code)

Specifications

3.3 TOPAS Limited specifications are available from www.topasgroup.org.uk

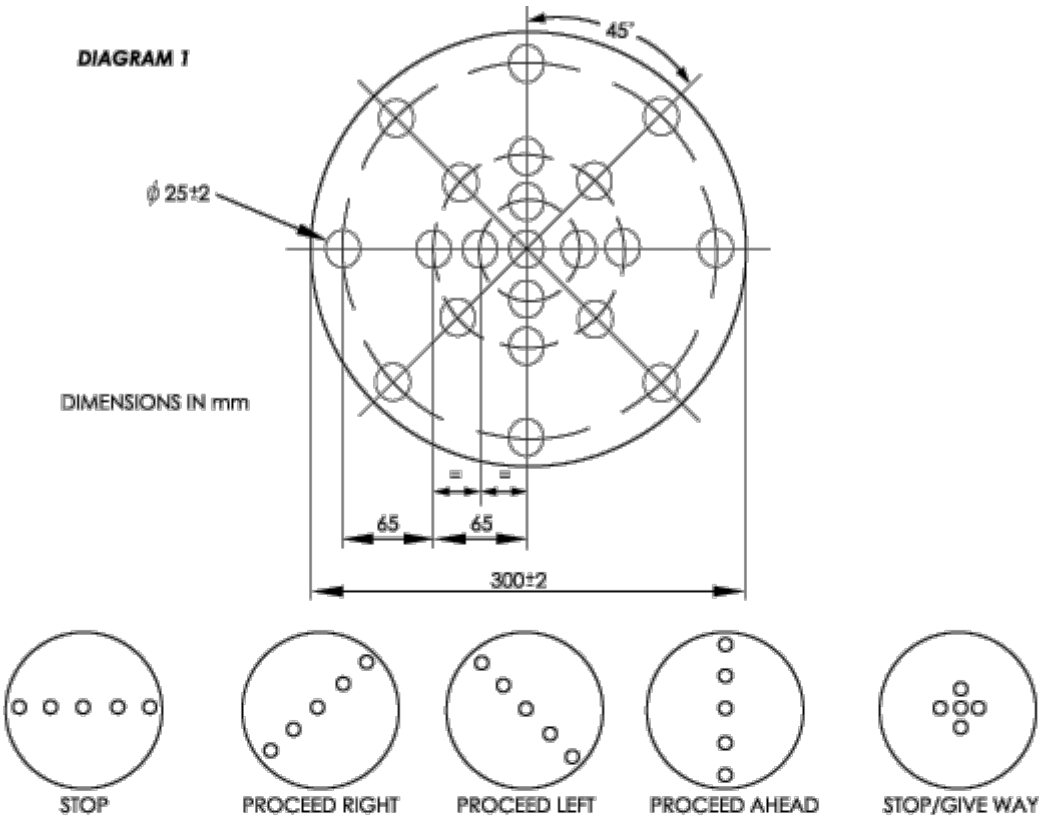
TR 2130	Environmental Tests for Motorway Communications Equipment and Portable and Permanent Traffic Control Equipment
TOPAS 0600	Self-Certification and Approval of Equipments for the Control of Vehicular and Pedestrian Traffic on Roads

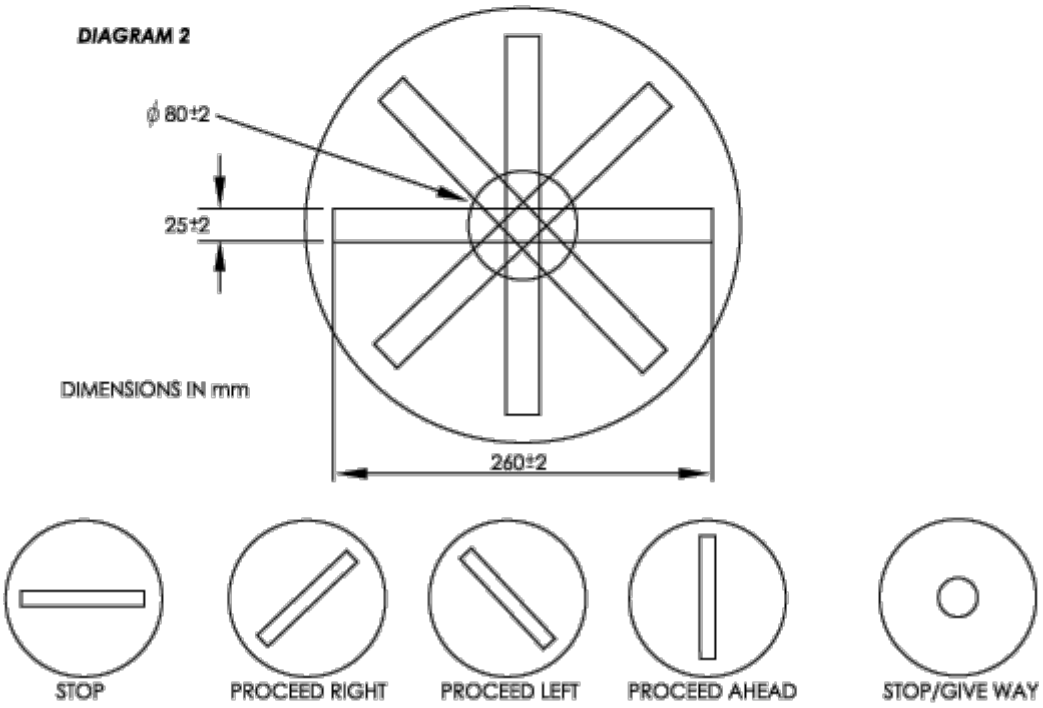
Other Publications

3.4 Other publications can be obtained from the Stationary Office:

TSR&GD	Traffic Signs Regulations and General Directions
Directive 89/336/EEC	EMC Regulations 1992, (Statutory Instrument 1992 No 2372)

APPENDIX A GENERAL ARRANGEMENT OF SIGNAL FACE





APPENDIX B INFORMATIVE GUIDE

General

B1 This Appendix is an informative guide to Highways Authorities who wish to purchase and use “Light Signals for the control of Tram Cars”, that has been declared conformant to this specification. It is recommended that the purchasers request the Design Authority to produce copies of the certification issued by accredited test houses confirming that the Product meets the optical performance requirements of this specification.

B2 The purchase contract should ensure that each Tramcar Light Signal head has been self certified as conformant to the TSRGD Regulation together with this standard and is fitted with a label displaying the following:

i) A conformity symbol identifying this HA specification number;

ii) The unique product identifier and serial number;

iii) The electrical supply requirements of the product.

APPENDIX Z -TECHNICAL FILE CONTENT

This appendix defines the necessary content for a Technical File Pack (a collection of relevant documents) which must be reviewed by an appropriate Technical Assessor as part of the TOPAS Registration process (See TOPAS 0600).

Only the 'ticked' items are required to be present in a Technical File Pack used to support TOPAS Registration against TOPAS 2514A.

Ref	Item	Description	Required
1	Technical File overview document.	A summary document outlining the product, specifying which TOPAS and other relevant specification(s) the product has been designed to comply with, together with a detailed table of contents for the Technical File Pack. Where copies of external certificates or documents are referred to these may be included within the Technical File overview document or supplied separately as part of the Technical File Pack.	✓
2	QA accreditation certificate(s).	A copy of the Quality Management Registration Certificates for the organisation applying for TOPAS Product Registration.	✓
3	Details of all CE markings that apply to the product.	A list of all directives complied with and how achieved. Typically this would be references to explicit CE Technical Files and certificate's, copies of which would be included in the Technical File Pack.	✓
4	A functional design description of the product.	A reference to the overall System Design Documentation for the product (by document part number and issue).	✓
5	Product part numbers	A list of top level assembly part numbers and their issue states including all firmware / software part numbers and issues.	✓
6	Test procedures and results	A reference to all test schedules and test result documents (by document part number and issue).	✓

7	Statement of compliance	A clause by clause statement of compliance against TOPAS 2581A confirming compliance and/or listing caveats or deviations.	✓
8	EMC test results	A reference to EMC test performance requirements. Copies of the results of EMC testing undertaken by an appropriately qualified independent approved test house must be included in the Technical File Pack.	✓
9	Optical test results	A reference to Optical tests performance requirements. Copies of the results of Optical testing undertaken by an appropriately qualified independent approved test house must be included in the Technical File Pack.	✓
10	Environmental test results	A reference to Environmental tests performance requirements. Copies of the results of the Environmental testing undertaken by an appropriately qualified independent approved test house must be included in the Technical File Pack.	✓
11	Radio Agency test results	A reference to Radio Agency tests performance requirements. Copies of the results of Radio Agency testing undertaken by an appropriately qualified independent approved test house must be included in the Technical File Pack.	N/A
12	Primary Safety Test results	For Traffic Control equipment specifically a reference to the Primary Safety Test schedule and test results by part number and issue. A copy of the test results should be included as part of the Technical File Pack.	N/A
13	Failure Mode Analysis	A reference to the product failure mode analysis requirements and results by document part number and issue.	N/A