

# TOPAS

## Traffic Open Products and Specifications

### **TOPAS 2509A**

#### *Performance Specification for Audible Equipment for use at Pedestrian Crossings*

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# **TOPAS 2509A**

## **PERFORMANCE SPECIFICATION FOR AUDIBLE EQUIPMENT FOR USE AT PEDESTRIAN CROSSINGS**

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# 1 INTRODUCTION

- 1.1 This specification covers the essential requirements for Audible Equipment for use at signalised crossings 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 A.
- 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 2509A. Product Approvals to TR 2509A 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 Product provides an indication to visually impaired pedestrians, at signal controlled pedestrian crossing facilities, the period during which they may use the crossing.
- 2.2 There are two types of audible products. The 'single bleep' version is for installations at single carriageway crossing sites and the 'bleep and sweep' version is specifically for use at 'staggered' crossing facilities.
- 2.3 The Product consists of an audio transducer, and control unit.

### *Performance*

- 2.4 The Product shall emit an audible signal when a steady green pedestrian signal is being displayed and the signal controller's audible/tactile drive output is present.

### *Output Sound Single Bleep*

- 2.5 The fundamental frequency of the tone shall be between 2.0 kHz and 3.5 kHz, which is pulsed at 240 pulses per minute  $\pm$  60 pulses per minute with a mark space ratio of 1.5:1  $\pm$  10%.
- 2.6 The output volume level shall be constant for the duration of the sounding period.
- 2.7 The Product shall provide a means to preset the intensity of the sound to between 47 and 83 dB(A).

### *Output Sound Bleep and Sweep*

- 2.8 The audible signal output shall commence with a pulsed tone of constant frequency followed by a continuous cycle of constant tone and swept frequency tone.
- 2.9 Both tones shall be derived from a nominal square waveform of 50:50 mark-space ratio of  $\pm$  2.5% and frequency tolerance of  $\pm$  2.5%.
- 2.10 The frequency of sound emitted by the Audible Unit shall be:
  - i) Constant Tone - 1 kHz pulsed at 5.0 Hz with 50/50 mark, space ratio  $\pm$  2.5%. The duration of this tone shall be 0.8 seconds  $\pm$  2.5%.
  - ii) Swept Tone - 1.0 kHz rising either linearly or exponentially to 2.5 kHz. The duration of this swept Tone shall be 0.8 seconds  $\pm$  2.5%.
- 2.11 The level of the Swept Tone shall not exceed  $\pm$ 5 dB(A) (electrical power) or  $\pm$ 5 dB(A) (Acoustic) relative to the Constant Tone.
- 2.12 Means shall be provided to enable an adjustment to be made to the output volume level at site.
- 2.13 The range of adjustment shall be 0 dB(A) to +12 dB(A).
- 2.14 The output volume level shall be within  $\pm$  3 dB (A) of the Running Average Level used to fix the output level plus the Output Signal Level Control setting.

- 2.15 The output volume level shall be within the limits 47 dB(A) to 83 dB(A) plus the output volume level control setting.
- 2.16 The signal to noise ratio shall be greater than 10 dB.

### ***Ambient Sound Sampling***

- 2.17 This applies to the 'bleep and sweep' output sound and is optional for the single bleep unit.
- 2.18 The Product shall be capable of continuously sampling the ambient sound at the kerbside waiting area and automatically setting the sound output level to a predetermined value above the sampled average.
- 2.19 The running Average shall be a function of the 'A' weighted indication of the ambient sound level, in accordance with Table 2.1 and shall be obtained using a 2 second  $\pm 0.5$  second time constant where the attack and decay times are equal.
- 2.20 The Ambient Sound Level Sampling shall be capable of indicating 'A' weighted Average levels of between 50 dB(A) and 80 dB(A).

### ***Sensitivity***

- 2.21 For a fixed 80 dB (A) 1 kHz source, located 1m away from, and perpendicular to the axis, the input transducer shall have a response characteristic of  $77 \pm 3$  dB(A).

### ***Output Sound Level***

- 2.22 At a distance of 1m from the perpendicular to the axis, the output sound level shall be  $76 \pm 4$  dB(A) over 360° for a fixed 1 kHz 80 dB(A) output.

### ***Construction***

- 2.23 The enclosure housing the Product's unit's electronic circuitry shall be constructed to withstand the effects of the environment in which it is intended to operate.

### ***Degrees of protection provided by enclosures (IP Code)***

- 2.24 The Product housing located within the signal head shall be to BS EN 60529 IP 55.
- 2.25 The input and output transducers shall be to BS EN 60529 IP 55.

### ***Electrical Requirements***

- 2.26 The supply for the Product shall be the 'normal' and 'dimmed' signal aspect voltage range.
- 2.27 The signal controller's audible/tactile derive supply shall be as defined in TOPAS 2523.
- 2.28 "All wiring, termination, earthing and labelling shall be in accordance with BS 7671.
- 2.29 Where is Product is intended for installation within the Pedestrian Push Button box it should be noted that no voltage in excess of Extra Low Voltage supply shall be permitted in the Pedestrian push button box.

### ***Reliability***

- 2.30 The Product shall be designed and manufactured to deliver an MTBF prediction figure of 12000 hours or greater, continuous operation.

Nominal Frequency (Hz)	A Weighting (dB)	Tolerance (dB)
200	-10.9	+2 - infinity
250	-8.6	+2 - infinity
315	-6.6	+2 - infinity
400	-4.8	+2 - infinity
500	-3.2	+2 - infinity
630	-1.9	+2 - infinity
800	-0.8	+2 - infinity
1000	0	0
1250	+0.6	±2.5
1600	+1.0	±3
2000	+1.2	±3
2500	+1.3	±4
3150	+1.2	±4.5
4000	+1.0	±5
>4000	0	+6 - infinity

**Table 2.1 A-Weighting**  
**(Bleep & Sweep Only)**  
**Reference sound pressure level: 1kHz at 0dB attenuation**

## 3 REFERENCES

### *General*

3.1 Where undated references are listed, the latest edition of the publication applies.

### *British Standards*

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

BS 7671	Requirements for Electrical Installations
BS 7987	Road Traffic Signal Systems
BS EN 50293	Electromagnetic Compatibility – Road Traffic Signal Systems Product Standard
BS EN 60529	Specification for degrees of protection provided by enclosures (IP Code).

### *Specifications*

3.3 TOPAS Limited specifications are available from [www.topasgroup.org.uk](http://www.topasgroup.org.uk)

TOPAS 0600	Self-Certification Procedures for Statutory Approval of Traffic Signal Control Equipment
TOPAS 2500	Specification for Traffic Signal Controller
TOPAS 2523	Traffic Control Equipment Interfacing Specification
TOPAS 2130	Environmental Tests for Motorway Communications Equipment and Portable and Permanent Traffic Control Equipment

### *Other Publications.*

TSRGD	Traffic Signs Regulations and General Directions
ZPPRGD	The Zebra, Pelican and Puffin Pedestrian Crossings Regulations and General Directions.
TAL 4/91	Audible and Tactile Signals at Pelican Crossings
TAL 5/91	Audible and Tactile Signals at Signal Controlled Crossings
Directive 89/336/EEC	EMC Regulations 1992, (Statutory Instrument 1992 No 2372)



## APPENDIX A      INFORMATIVE GUIDE

### *General*

- A1 This Appendix is an informative guide to Systems Integrators and Highway Authorities who wish to purchase / hire and use Audible Equipment that has been declared conformant to this specification. Prospective purchasers/hirers should ensure that the procurement contract address the following issues.
- A2 The procurement contract should specify that the enclosure housing the Product's electronic circuitry is constructed of materials that will withstand the rigours of the environment in which it is intended to operate.
- A3 The procurement contract should specify that the enclosure is capable of being installed within any signal head of an approved type.
- A4 The procurement contract should specify that the sound output transducer and microphone are of weatherproof construction capable of mounting externally to the signal head.
- A5 The procurement contract should specify that the microphone is capable of being securely mounted to the base of the signal head and shielded to reduce the effects of vibration and wind noise.

### *Connections*

- A6 The procurement contract should specify that the connections to the Product be such that the unit is easily removed from its installed position.

### *Earthing*

- A7 The procurement contract should specify that all external metal parts of the audible signal, are bonded together and connected to earth.

### *Marking and Labelling*

- A8 The procurement contract should specify that all connections are clearly identified and that a label is fitted which displays the following:
- i) The unique product identifier and serial number;
  - ii) The Specification and associated Appendix against which it has been declared compliant;
  - 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 2509A.

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 certificates, 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 2509A 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.	N/A
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