

TOPAS

Traffic Open Products and Specifications

TOPAS 2509B

Performance Specification for Audible Equipment for use at Pedestrian Crossings

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B	05/02/20	Final	Board
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TOPAS 2509B

PERFORMANCE SPECIFICATION FOR AUDIBLE EQUIPMENT FOR USE AT PEDESTRIAN CROSSINGS

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CHANGE LOG

The following outlines significant changes to this specification, from its previous issue, which do not impact on currently Registered products:

- a. Some layout and minor text changes including material from the informative guide (Appendix A) moved into the main body of the specification and the removal of Appendix A.
- b. Section 1.1 now clarifies that this specification covers audible equipment at permanent, temporary and portable signalised crossings on public highways, where permitted.
- c. Section 2.3 now clarifies that the Product may be a single device or be a separate audible transducer and control unit.
- d. Section 2.35 updates the reliability requirements to align with those of similar equipment mounted in pedestrian push buttons or signal heads.
- e. References aligned to other TOPAS specifications.

The following outlines significant changes to this specification, from its previous issue, which may impact on currently Registered products:

- a. Sections 2.33 and 2.34 now requires that the product shall meet the environmental requirements of TOPAS 2130 and the EMC requirements defined in BS EN50293.
- b. The requirements for power supply, sense and gating signals for Bleep and Sweep units have been clarified. (Section 2.29 onwards).
- c. Removal of the labelling information from the informative guide (Appendix A) and its inclusion in section 2.36 as a clear requirement.

The requirements for re-registration of existing products are defined in section 1.7.

1. INTRODUCTION

1.1 This specification covers the essential requirements for Audible Equipment for use at permanent, temporary and portable signalised crossings on public highways where permitted.

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 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

1.6 This specification will be immediately implemented from the date of issue for all new TOPAS registrations.

1.7 For Products previously Registered against TOPAS 2509A which are compliant with this amended specification, manufacturers are simply required to confirm in writing that the Products remain compliant. Once confirmed Product Registration information will be migrated on the TOPAS website.

Glossary of Terms

1.8 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.

1.9 TOPAS terms are defined in TOPAS 0600 and TOPAS 0601

1.10 Other definitions:

i) **Pedestrian Push Button Box:**
Any on-street mounted equipment used to register demands from pedestrians and other users. Typically, these will be indicators which may also include Do Not Cross and Right Of Way signalisation. And more particularly identified in TSRGD Schedule 14 Sign Table Part 2 diagrams 4003; 4003.1; 4003.3; 4003.4; 4003.6; 4003.7; 4003.8.

ii) **A-weighting:**
The most commonly used of a family of curves defined in the International standard IEC 61672:2003 and other national standards relating to the measurement of sound pressure level. A-weighting is applied to instrument-measured sound levels to account for the relative loudness perceived by the human ear, as the ear is less sensitive to low audio frequencies.

2. FUNCTIONAL REQUIREMENTS

General

2.1. The Product provides an indication to visually impaired pedestrians at signal controlled pedestrian crossing facilities, of the period during which they may use the crossing.

2.2. This specification covers two types of audible Products. The 'Single Bleep' version is for installations at single carriageway crossing sites and the 'Bleep and Sweep' version is an option, specifically for use at 'staggered' crossing facilities.

2.3. The Bleep and Sweep Product consists of an audio transducer, and control unit. These may be separate devices or integrated into a single unit. (Typically, Single Bleep units are single units).

Performance

2.4. The Product shall emit an audible signal when a steady green pedestrian signal is being displayed indicated by the presence of an Audible Drive Signal from the signal controller.

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 ± 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 start 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 $50:50 \pm 2.5\%$ mark-space ratio of 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 $\pm 2.5\%$, pulsed at 5.0 Hz, with 50/50 mark, space ratio. The duration of this tone shall be 0.8 seconds $\pm 2.5\%$.
- ii) Swept Tone - 1 kHz $\pm 2.5\%$, rising either linearly or exponentially to 2.5 kHz $\pm 2.5\%$. 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 ± 5 dB (electrical power) or ± 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 ± 3 dB (A) of the Running Average Level (section 2.18) 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 continuously sample the ambient sound at the kerbside waiting area and automatically set the sound output level to a predetermined value above the sampled Running Average.

2.19. The Running Average shall be a function of the 'A' weighted indication of the ambient sound level, in accordance with Table 2.19 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).

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 ± 3 dB(A).

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

Construction

2.23. The enclosure(s) housing the Product shall be constructed to withstand the effects of the environment in which it is intended to operate.

2.24. For Bleep and Sweep Products the Product should be capable of being installed within commonly available signal heads. Compatible signal heads are to be defined by the manufacturer.

2.25. For Bleep and Sweep Products the ambient sound sensing microphone shall be capable of being securely mounted to the base of the signal head and shielded to reduce the effects of vibration and wind noise.

Electrical Requirements

2.26. Where the Product is intended for installation within the Pedestrian Push Button box it should be noted that no voltage in excess of Extra Low Voltage shall be permitted in the Pedestrian push button box.

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

Single Bleep Products

2.28. The Product shall perform as specified in this specification when directly driven from a signal controllers audible drive, as defined in TOPAS 2523, and have a maximum current consumption of 25mA.

Bleep and Sweep Products

2.29. Because the Product is continuously powered (see section 2.32), it shall provide a safety interlock system so that it cannot sound the Audible device unless the associated green man is active. The interlock system shall utilise at least one of the following:

- i) A direct input from the audible drive provided by the signal controller as defined in TOPAS 2523, which has a maximum input current consumption of 25mA.
- ii) A sense input from the signal controller's pedestrian green man drive (and optionally the pedestrian red man drive), compatible with the Signal Aspect output drive voltages, defined in TOPAS 2523.

Where the Product is not compatible with all the Signal Aspect voltage ranges defined in TOPAS 2523, this must be clearly identified in the product documentation and labelling (see also section 2.36).

Note. ELV Signal Aspect drive voltages may be either 'Positive or Negative' with respect to 0V / earth.

2.30. If the Product only uses sense inputs (section 2.29) as interlock signals, the Product shall also provide a 'gating' signal input (compatible with the gating signal defined in TOPAS 2523), so that the audible sound may be restricted, for example to prevent activation during a flashing green man period (if present), or at night, or to allow activation only for a reduced period, at the start of the steady pedestrian green man.

2.31. The maximum current consumption of this input shall be 25mA.

2.32. The Product may be powered from the sense signals (section 2.29) or a separate power supply. If a separate power supply is required, the Product shall be compatible with the normal detector power supplies as defined in TOPAS 2523.

Note. For maximum flexibility the Product should be compatible with both AC and DC supplies and be polarity insensitive.

Environmental and EMC

2.33. The Product shall operate as required by this specification when tested to the environmental requirements of TOPAS 2130.

2.34. The Product shall meet the EMC requirements defined in BS EN50293.

Reliability

2.35. The Product shall be designed to have an operational design life of at least 10 years under normal operating conditions.

Marking & Labelling

2.36. The Product shall be fitted with a durable label in English or international symbols which identifies:

- i) The unique identifier (part number) and serial number of the product.
- ii) The electrical supply requirements of the Product.
 - Operating voltage range, clearly identifying which type of TOPAS 2523 ELV or LV supplies are accommodated by the Product.
 - Maximum normal operating current consumption taken from the power supply and (if used) the Green Man and Red Man sense circuits.
- iii) The function of all terminations and connections on the Product.

Note. For Single Bleep units, intended to be mounted inside Pedestrian Push Button Boxes, these labelling requirements may be addressed in documentation shipped with the units, rather than being applied to the units themselves.

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 2.19 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 EN 50293	Electromagnetic Compatibility – Road Traffic Signal Systems Product Standard

Specifications

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

TOPAS 0600	TOPAS Registration process.
TOPAS 0601	TOPAS specification review process.
TOPAS 2500	Specification for Traffic Signal Controller.
TOPAS 2523	Traffic Control Equipment Interface Specification.
TOPAS 2130	Environmental Tests for Road Traffic Control Equipment.

Other Publications.

TSRGD	Traffic Signs Regulations and General Directions
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APPENDIX Z TECHNICAL FILE CONTENT

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

The 'ticked' items are required to be present in a Technical File used to support TOPAS Registration against TOPAS 2509B. **Please read the description criteria carefully.**

<i>Ref</i>	<i>Item</i>	<i>Description</i>	<i>Required</i>
1	Overview document	<p>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.</p> <p>Where external certificates or documents are referred to these shall be included either:</p> <p>(a) within this overview document; or</p> <p>(b) supplied separately as part of this Technical File.</p>	✓
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 required standards and regulations including CE/CA requirements that apply to the Product	<p>A list of all standards to be complied with.</p> <p>Including explicit CE/CA declarations of performance/conformity for those standards, including all certificates, shall be included in this Technical File.</p>	✓
4	A functional design description of the product	Title, document number, version and date of the overall System Design Document for the Product.	✓
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	Statement of Compliance	A clause-by-clause statement of compliance against TOPAS 2509B confirming compliance or non-compliance and referencing	✓

		<p>supporting evidence.</p> <p>(An example template can be found on the TOPAS website)</p>	
7	Functional test procedures and results	A list of all functional test schedules and test result documents (by document number and issue) that substantiate the Statement of Compliance.	✓
8	BS EN 50293 EMC test procedures and results	<p>(a) Title, document number, version and date of the EMC test performance requirement document.</p> <p>Copies of the results of EMC testing undertaken by an appropriately qualified independent approved test house <u>must</u> be included in the Technical File.</p>	✓
9	Optical test procedures and results required by this specification	<p>For all products which have any defined optical performance requirements</p> <p>(a) Title, document number, version and date of the optical test performance requirement document.</p> <p>Copies of the results of optical testing undertaken by an appropriately qualified independent approved test house <u>must</u> be included in the Technical File.</p>	N/A
10	Environmental test results	<p>(a) A list of relevant Environmental tests performance requirements defined in TOPAS 2130.</p> <p>Copies of the results of the Environmental testing undertaken by an appropriately qualified independent approved test house <u>must</u> be included in the Technical File.</p>	✓
11	Radio Equipment Regulations test results	<p>For all products which include any transmitting and/or receiving radio equipment</p> <p>(a) A copy of the RER Declaration Of Conformity</p> <p>(b) Reference to the RER Technical Documentation for the product (by title, document number and</p>	N/A

		<p>version).</p> <p>(c) Copies of the results of radio testing, undertaken by an appropriately qualified independent approved test house <u>must</u> be included in the Technical File. The test results should be those identified in the RER Technical Documentation and should cover any specific IR2030 requirements for the type of radio used.</p> <p>A copy of the Type Examination Certificate for radio equipment not covered by a Designated EN standard.</p>	
12	Primary Safety Test procedure and results	<p>For Traffic signal Control equipment only:</p> <p>(a) The title, document number, version and date of the Primary Safety Test schedule.</p> <p>(b) A copy of the test results must be included as part of the Technical File.</p>	N/A
13	Failure Mode Analysis	<p>For Traffic signal Control equipment only</p> <p>Title, document number, version and date of the product failure mode analysis requirements and results.</p>	✓