BS 8608:2014

BSI Standards Publication

Specification for radio telemetry systems for use with respiratory protective devices used by emergency first responders

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Publishing and copyright information

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Contents

Summary of pages

This document comprises a front cover, an inside front cover, pages i to ii, pages 1 to 8, an inside back cover and a back cover.

Foreword

Publishing information

This British Standard is published by BSI and came into effect on 30 June 2014. It was prepared by Technical Committee PH/4, *Respiratory protection*. A list of organizations represented on this committee can be obtained on request to its secretary.

Information about this document

This British Standard provides more up to date information than current Home Office documents relating to telemetry systems.

Presentational conventions

The provisions of this standard are presented in roman (i.e. upright) type. Its requirements are expressed in sentences in which the principal auxiliary verb is "shall".

Commentary, explanation and general informative material is presented in notes in smaller italic type, and does not constitute a normative element.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard cannot confer immunity from legal obligations.

In particular, attention is drawn to the following legislation.

ATEX Directives [1, 2]

R&TTE Directive [3]

PPE Directive [4]

The Noise at Work Regulations 1989 [5], as amended

The Waste Electrical and Electronic Equipment 2006 [6], as amended

Introduction

A radio telemetry system provides a real time overview of the respiratory status of individual breathing apparatus (BA) wearers to the entry control point. Such systems provide a component of a safe system of work where BA is in use, and aid the management of the health and safety of wearers and assists in the wider management of an operational incident.

BA is an essential control measure for working in toxic or irrespirable atmospheres. Such working environments are often complex, physically and psychologically demanding, and consequently careful monitoring of BA wearers is essential. A radio telemetry system provides such monitoring.

1 Scope

This British Standard specifies requirements for telemetry systems intended for use during fire fighting, rescue, evacuation, escape, hazard containment and decontamination, and similar activities by emergency first responders (e.g. fire, ambulance, police, and associated civilian agencies and workers).

This British Standard is only applicable to telemetry systems incorporated with type approved respiratory protective devices (RPD) of which breathing apparatus (BA) is a significant element used by emergency first responders.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

BS 10999, *Specification for distress signal units for the fire and rescue service*

BS EN 137:2006, *Respiratory protective devices – Self-contained open-circuit compressed air breathing apparatus with full face mask – Requirements, testing, marking*

BS EN 60079-11, *Explosive atmospheres – Part 11: Explosive atmospheres – Equipment protection by intrinsic safety "I"*

BS EN 60529, *Degrees of protection provided by enclosures (IP code)*

ETSI EN 300 220-1, *Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices (SRD); Radio equipment to be used in the 25 MHz to 1 000 MHz frequency range with power levels ranging up to 500 mW; Part 1: Technical characteristics and test methods*

3 Terms and definitions

For the purposes of this British Standard the following terms and definitions apply.

3.1 base unit
telemetry unit that is used by the entry control operative to monitor the portable telemetry units in use

3.2 co-existence
ability of multiple telemetry systems to operate normally in the same vicinity

3.3 distress signal unit (DSU)
distress signal unit that is activated automatically on immobility of the wearer or by manual actuation

NOTE See BS 10999 for further information.

3.4 elapsed time
time from when the portable unit is activated

NOTE There might be a delay between the BA set being activated and it being logged onto a base unit.

3.5 portable telemetry unit
telemetry unit that is taken into the risk area by a BA wearer

NOTE It is normally mounted on the RPD.

3.6 repeater
stand-alone unit that is taken into the vicinity by a BA wearer and repeats the telemetry signals

3.7 telemetry system
combination of portable and base telemetry units, together with any repeaters

3.8 time of whistle/warning (TOW)
calculated predicted chronological time at which the low pressure warning signal will activate

NOTE For example, 13:56 h.

3.9 time to whistle/warning (TTW)
calculated predicted time remaining until the low pressure warning signal will activate

NOTE For example, 40 min.

4 Functionality

The telemetry system shall be capable of providing the following functionality:

a) displaying the time of day on the base unit;

b) time of whistle/warning;

c) time to whistle/warning;

d) elapsed time;

e) remaining cylinder pressure measured in bar, and updated at intervals of not more than 20 s for up to 20 portable telemetry units and two base units, and, for larger systems, intervals of not more than 60 s;

f) notification to related base unit of any actuated distress signal;

g) team and individual emergency evacuation of BA with acknowledgement;

h) BA wearer withdrawal with acknowledgement;

i) automatic indication of the status of communication link between the portable and base units and repeaters;

j) identification of individual portable units on the base unit display;

k) low battery indication; and

l) data recording.

5 Signals and acknowledgement

The telemetry system shall be capable of the following:

a) receipt and acknowledgment of distress signals from related portable units;

b) team and individual emergency evacuation of BA with acknowledgement;

c) BA wearer withdrawal with acknowledgement;

d) transmission of a distress alarm signal (manual and/or automatic) from the portable telemetry unit to the base unit that the BA wearer is logged onto, indicating if they withdraw from an incident for reasons of personal safety; and

e) transmission of a confirmation signal to the initiating portable unit in response to a distress alarm signal being received and acknowledged by the entry control board/base unit.

In the event of a total evacuation, the system shall transmit a telemetry signal from the base unit to all logged on portable telemetry radio units. This telemetry signal shall trigger an audible alarm that is capable of being heard by the BA wearers. The audible alarm shall be clearly identifiable or analogous to the standard evacuation signal (e.g. the Acme Thunderer whistle [1)]).

In the event of partial or individual BA wearer evacuation, the system shall transmit a telemetry signal from a base unit to selected logged on portable telemetry radio units and cause an audible alarm.

Distress alarm signals, BA wearer evacuation and withdrawal requests shall be indicated at their respective destinations within 5 s of initiation. In the event of communication failure, the portable/base unit shall repeat the original request at randomised intervals until it is successful.

6 Identification

Portable telemetry units shall have unique electronic identities that enable them to be individually logged on to a base unit at an incident.

7 Data recording

7.1 General

Telemetry systems shall be capable of recording data and this data shall be downloadable.

The downloaded information shall include a timestamp (date and time) with a resolution of not more than 1 s.

The data storage medium shall be non-volatile and able to record at least 8 h of data for every BA telemetry unit logged on.

7.2 Data recorded

The following data shall be recorded:

a) activation of base unit;

[1)] Acme Thunderer is a trademark owned by J. Hudson and Co. (Whistles) Ltd., 244 Barr Street, Birmingham, B19 3AH, UK. This information is given for the convenience of users of this standard and does not constitute an endorsement by BSI of the product named. Equivalent products may be used if they can be shown to lead to the same results.

b) logon of portable unit;

c) cylinder pressure of BA set every 60 s or 5 bar pressure drop, as well as at every DSU alarm and additional alert signals alarm;

d) DSU alarm events of BA set;

e) any additional alerts/signals exchanged between base and portable units (e.g. evacuation, withdraw);

f) logoff of portable unit;

g) self-check error codes/messages;

h) low battery warnings; and

i) deactivation of base unit.

8 Co-existence

The telemetry system shall conform to ETSI EN 300 220-1. The type of receiver shall be ETSI EN 300 220-1, Category 1.

The telemetry system shall ensure co-existence such that the system does not suffer any reduced functionality or cause interference to any other telemetry systems that conform to this British Standard.

The total transmission duty cycle of an individual device shall not exceed 10% per channel in a period of 1 h.

Fifty portable telemetry units and five base units shall be able to operate simultaneously.

9 Operating temperature and flame engulfment

9.1 Portable and repeater units

9.1.1 Operating temperature

Portable and repeater units shall operate in accordance with this British Standard when subjected to the following temperatures for 4 h ±15 min:

a) –30 °C ±3 °C; and

b) 60 °C ±3 °C.

9.1.2 Flame engulfment

Portable units shall remain attached where applicable and continuously operate in accordance with Clause **4** when tested in accordance with BS EN 137:2006**, 7.4.1.3**.

9.2 Base unit operating temperature

Base units shall operate in accordance with this British Standard when subjected to the following temperatures for 4 h ±15 min:

a) –15 °C ±3 °C; and

b) 55 °C ±3 °C.

10 Warning alerts

Audio and visual warning alerts shall be distinguishable from one another and those described in BS 10999.

11 Low battery warning

The telemetry system shall have an audible and visual low battery warning facility. This shall utilize a different noise characteristic to other warnings in the RPD.

The telemetry system shall be capable of being fully functional in its highest power drain condition (e.g. a DSU as defined by BS 10999, if integrated) for a minimum of 2 h from the point at which the low battery signal activates.

12 Function indicators

The telemetry system shall incorporate an indicator that operates while the telemetry system is switched on and ready to communicate and/or is communicating.

13 Intrinsic safety (portable and repeaters only)

When tested in accordance with BS EN 60079-11 at –30 °C and 60°C, the unit shall have an intrinsic safety level of EEx ia IIC T4.

14 Ingress protection

The base unit shall provide ingress protection at IP 56 in accordance with BS EN 60529.

The portable unit shall provide ingress protection at IP 67 in accordance with BS EN 60529.

15 Marking

Telemetry units shall be permanently marked with the following information:

a) the name, trademark, code or other means of identification of the producer, supplier or importer;

b) the number and date of this British Standard, i.e. BS 8608:2014 [2)];

c) a serial number;

d) year of manufacture;

e) intrinsic safety classification; and

f) the type of batteries to be used.

16 Information supplied by manufacturer

The following information shall be supplied with a telemetry system, in the official language(s) of the country of destination:

a) application/limitation;

b) checks required prior to use;

c) instructions for donning and fitting;

[2)] Marking BS 8608:2014 on or in relation to a product represents a manufacturer's declaration of conformity, i.e. a claim by or on behalf of the manufacturer that the product meets the requirements of the standard. The accuracy of the claim is solely the claimant's responsibility. Such a declaration is not to be confused with third-party certification of conformity.

d) instructions for use;

e) instructions for maintenance (preferably in the form of separate printed instructions, containing references to any relevant standards and including periodic inspection and testing);

f) storage;

g) the availability of spare parts;

h) the type of battery to be used; and

i) the charging system to be used, if applicable.

Bibliography

[1] HEALTH AND SAFETY EXECUTIVE. Directive 94/9/EC of the European Parliament and the Council of 23 March 1994 on the approximation of the laws of the Member States concerning equipment and protective systems intended for use in potentially explosive atmospheres (OJ L 100, 19.4.1994), Brussels.

[2] HEALTH AND SAFETY EXECUTIVE Directive 1999/92/EC of the European Parliament and of the Council of 16 December 1999 on minimum requirements for improving the safety and health protection of workers potentially at risk from explosive atmospheres (15th individual Directive within the meaning of Article 16(1) of Directive 89/391/EEC); (OJ L 023, 28.01.2000), Brussels.

[3] EUROPEAN COMMUNITY. Directive 1999/5/EC of the European Parliament and of the Council of 9 March 1999 on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity (OJ L 91 of 7 April 1999), Brussels.

[4] EUROPEAN COMMUNITY. Directive 89/686/EEC on personal protective equipment (OJ L 399, 30.12.1989, p. 18), Brussels.

[5] GREAT BRITAIN. The Noise at Work Regulations 1989, SI 1790, as amended, London: The Stationery Office.

[6] GREAT BRITAIN. The Waste Electrical and Electronic Equipment Regulations 2006, as amended, London: The Stationery Office.

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