

Specification for

**Model steam engines  
and internal  
combustion engines for  
models**

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# Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Textiles and Clothing Standards Policy Committee (TCM/-) to Technical Committee TCM/15, upon which the following bodies were represented:

Association for Consumer Research (ACRE)  
 Association of Consulting Scientists  
 Association of Public Analysts  
 British Colour Makers Association  
 British Importers Confederation  
 British Paediatric Association  
 British Paper and Board Industry Federation  
 British Plastics Federation  
 British Retailers Association  
 British Toy and Hobby Manufacturers Association Ltd.  
 British Toymakers Guild  
 Child Accident Prevention Trust  
 Consumer Policy Committee of BSI  
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 Department of Trade and Industry (Consumer Safety Unit, CA Division)  
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 Mail Order Traders' Association  
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 National Association of Toy Retailers  
 National Fillings Trades Association  
 Paintmakers' Association of Great Britain Ltd.  
 Pressed Felt Manufacturers' Association  
 Royal Society for the Prevention of Accidents  
 Society of British Printing Ink Manufacturers  
 Toy and Giftware Importers' Association

The following bodies were also represented in the drafting of the standard, through subcommittees and panels:

Auto (Cycle Union)  
 Automobile Association  
 Model Hobby Trades Federation  
 Motor Cycle Industry's Association of Great Britain Ltd.

This British Standard, having been prepared under the direction of the Textiles and Clothing Standards Policy Committee, was published under the authority of the Board of BSI and comes into effect on 31 August 1990

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The following BSI references relate to the work on this standard:  
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## Foreword

This British Standard has been prepared under the direction of the Textiles and Clothing Standards Policy Committee.

There are some articles which, by virtue of their risks, are not suitable for inclusion in a communal toy box. As these articles have considerable educational value and are accepted as equipment necessary for some hobbies, they have been excluded from the scope of BS 5665-1. The articles included in this standard are those which require adult guidance. This does not necessarily imply that the articles should be used directly under adult supervision but that a responsible adult should know when this type is being used, in what circumstances and whether other younger children are likely to be present.

The products covered in this standard are not toys for the purpose of the Toys (Safety) Regulations (S1 1275/1989) although this standard may be approved under section 10 of the Consumer Protection Act 1987.

In deciding which categories of equipment to include in this standard, the list of products not regarded as toys for use in the toy safety directive has been reviewed. This standard applies to steam engines for models and internal combustion engines for models.

Consideration has been given to model rockets and wheeled vehicles powered by an internal combustion engine. However, requirements have not been included in this British Standard, but may be included in a subsequent edition or in a separate British Standard.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

**Compliance with a British Standard does not of itself confer immunity from legal obligations.**

### Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 4, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

## 1 Scope

This British Standard specifies requirements for certain fuel — using equipment intended for children of less than 14 years of age and includes requirements for the following types of fuel — using equipment which are considered to present particular hazards:

- a) steam engines for models;
- b) internal combustion engines for models.

The requirements do not apply to detailed models intended for use by adults.

NOTE The titles of the publications referred to in this standard are listed on the inside back cover.

## 2 Definition

For the purposes of this British Standard the following definition applies.

### 2.1

#### safety release valve

a non-adjustable spring loaded device designed to release steam at a predetermined pressure

## 3 Steam engines for models (stationary and self-propelled)

### 3.1 General

The construction of steam engines shall comply with **3.2.1.1**, **3.2.1.2**, **3.2.1.3**, **3.2.1.9** and **3.2.2.9** of BS 5665-1:1989.

### 3.2 Materials

All parts of the boiler, steam distribution system, valves, pistons and cylinders shall be constructed from corrosion resistant materials.

The means of assembly of all components shall be capable of maintaining the integrity of the item when tested in accordance with **A.2**. The equipment shall not catch fire.

### 3.3 Handling

Either a means shall be provided for lifting the engine safely and shall be described in the instructions for use, or a safe handling point shall be described in the instructions (see **3.8**).

### 3.4 Fuel

The fuel shall be solid, supplied in shapes that can be inserted into the furnace in a carrier, such that the maximum amount of fuel that can be used will not evaporate more than 80 % of the water in the boiler.

### 3.5 Furnace and boiler

The furnace shall not be accessible when tested according to **4.17** of BS 5665-1:1989 using probe B. The closure shall be retained so that accidental access cannot be gained to the furnace.

The boiler shall be provided with means of indicating minimum water levels. The boiler shall also be provided either with means of indicating maximum water levels, or an overflow plug shall be fitted.

### 3.6 Safety release valve

At least one safety release valve (**2.1**) shall be provided. The service pressure shall not exceed  $1.5 \times 10^5$  Pa (1.5 bar) when tested in accordance with **A.3**. The release pressure shall not exceed  $2 \times 10^5$  Pa (2 bar) when tested in accordance with **A.4**. There shall be no failures of any component or the boiler when tested in accordance with **A.5**.

### 3.7 Marking

Each article shall carry the following information:

a) the number and date of this British Standard, i.e. BS 7328:1990<sup>1)</sup>;

b) the name or trade name of the manufacturer;

NOTE The particulars may be abbreviated provided that the abbreviation enables the manufacturer, his authorized representative or the importer to be identified.

c) additionally the packaging, or a leaflet accompanying the article shall bear the name and/or trade name and/or mark and address of the manufacturer or his authorized representative or the importer in a visible, easily legible and indelible form. The consumer's attention shall be drawn to the advisability of retaining the information;

d) the minimum age of child from which the article is considered to be suitable.

### 3.8 Instructions

A complete set of working and maintenance instructions shall be supplied. It shall state that the product should be used strictly in accordance with these instructions which should be retained for reference. The following points shall be specified.

a) Only solid fuel which is supplied with the engine or recommended by the manufacturer should be used.

<sup>1)</sup> Marking BS 7328:1990 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 therefore solely the responsibility of the person making the claim. Such a declaration is not to be confused with third party certification of conformity, which may also be desirable.

b) During operation, only those parts of the boiler which instructions state are necessary to be touched are safe to do so. Other parts of the steam engine can attain temperatures high enough to inflict injury.

c) No attempt should be made to adjust or modify the safety valve and the steam engine should not be used if there is any indication that the safety valve will not function correctly.

d) The location of the safe points for use in cases of emergency.

e) Articles intended to be assembled shall be accompanied by detailed assembly instructions. If the article is intended to be assembled by an adult this shall be clearly stated.

f) The following warnings shall be included:

1) "This item should be used only under the supervision of an adult. This does not imply that there should be direct supervision but that an adult should know where it is being used and the circumstances and should also have control over other children who might be present."

2) "Not suitable for children under 11 years, since this product contains parts which get hot", together with a statement that use of a steam engine presents certain hazards and that parents should consider the competence of the child for whom the steam engine is intended.

## 4 Models with internal combustion engines

### 4.1 General requirements

The maximum capacity of internal combustion engines (including high speed miniature diesel engines) suitable for model, aircraft, boats and cars shall be the following:

- a) for children of up to 12 years of age: 5 mL for 2-stroke engines and 8 mL for 4-stroke engines;
- b) for children of up to 14 years of age: 8 mL for 2-stroke engines and 10 mL for 4-stroke engines.

Any accessible edges having a thickness of less than 0.5 mm shall comply with **3.2.1.1** of BS 5665-1:1989. The fuel adjustment needle is considered as a functional sharp point. Accessible points shall comply with **3.2.1.4** of BS 5665-1:1989.

NOTE 1 Controls should be positioned so that they are accessible and minimize the risk of injury from moving parts such as propellers and fly wheels.

NOTE 2 Components should be designed so that if they are over-stressed as the result of excessive speed all broken parts should be contained except for water screws, air screws and propellers.

NOTE 3 It is recommended that users belong to a responsible organization that can give guidance on use of these articles. It is also recommended that third party insurance be taken out.

### 4.2 Marking

The following shall be marked either on the packaging or on a leaflet accompanying the article:

- a) the name and/or trade name and/or mark and address of the manufacturer or his authorized representative or the importer in a visible, easily legible and indelible form;

NOTE The particulars may be abbreviated provided that the abbreviation enables the manufacturer, his authorized representative or the importer to be identified.

- b) the number and date of this British Standard. i.e. BS 7328:1990<sup>2)</sup>;

- c) the minimum age of child from which the article is considered to be suitable.

The consumer's attention shall be drawn to the advisability of retaining the information.

### 4.3 Instructions

The packaging or a leaflet accompanying the article shall bear clear and adequate instructions on the use of the engine and of its limitations. These shall include a statement that the product should be used strictly in accordance with the instructions which should be retained for future reference. The instructions shall cover the following points:

- a) the risks of high temperatures and of possible over-stressing due to excessive speed of rotating parts such as fly wheels, clutches and propellers;
- b) that only the recommended fuel should be used;
- c) that the engine should be stopped before refuelling;
- d) that any adjustments to the engine should be made as far from any moving parts as possible;
- e) that mechanical starters are recommended whenever possible;
- f) that it is essential not to fly near overhead power cables, particularly with control line models;

<sup>2)</sup> Marking BS 7328:1990 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 therefore solely the responsibility of the person making the claim. Such a declaration is not to be confused with third party certification of conformity, which may also be desirable.

g) that it is essential to keep well clear of propellers and discard them as soon as they are damaged;

h) that it is not recommended that pusher power plants are used. If used, extra care should be taken on launching the model to keep hands away from the propellers;

NOTE Pusher power plants are those where the engine is mounted at the rear with the propeller pointing backwards.

i) articles intended to be assembled shall be accompanied by detailed assembly instructions. If the article is intended to be assembled by an adult this shall be clearly stated;

j) the following warning shall be included: "This item should be used only under the supervision of an adult. This does not imply that there should be direct supervision but that an adult should know where it is being used and the circumstances and should also have control over other children who might be present."

## Appendix A Methods of test for steam engines

### A.1 Caution

Attention is drawn to the need to take appropriate safety precautions during these tests.

### A.2 Determination of integrity

Subject the model steam engine to the consumption of 10 charges of fuel with minimum interruption between charges, replenishing the boiler with water as required to ensure that the boiler does not boil dry. Record whether the integrity of the item has been affected and whether the item caught fire.

### A.3 Determination of service pressure

Fill the boiler with water according to the manufacturer's instructions. Attach a T-piece to the safety release port with a safety valve on one side of the T-piece, and a manometer to the other side. Run under no load conditions.

NOTE No load conditions means that all drives are disconnected.

Record the pressure in Pa registered on the manometer as the service pressure.

### A.4 Determination of release pressure

Fill the boiler with water according to the manufacturer's instructions. Attach a T-piece to the safety release port with a safety valve on one side of the T-piece and a manometer on the other side. Block steam outlets and fire the boiler in accordance with the manufacturer's instructions. Run the steam engine until the safety valve opens. Record this pressure in Pa as the release pressure.

### A.5 Determination of failure of components

Fill the boiler with water according to the manufacturer's instructions. Attach a manometer to the release valve port. Block all steam outlets, including safety valves and whistle ports. Fire the boiler in accordance with the manufacturer's instructions and run until the internal pressure reaches the higher of either three times the service pressure or twice the release pressure.



## Publication(s) referred to

BS 5665, *Safety of toys.*

BS 5665-1, *Specification for mechanical and physical properties.*

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