

BRITISH STANDARD

Code of practice for the design and manufacture of children's clothing to promote mechanical safety

ICS 61.020



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Foreword

Publishing information

This British Standard is published by BSI and came into effect on 31 December 2007. It was prepared by Technical Committee TCI/66, *Apparel and interior textiles*. A list of organizations represented on this committee can be obtained on request to its secretary.

Supersession

This British Standard supersedes BS 7907:1997, which is withdrawn.

Information about this document

This is a full revision of the standard, which has been prepared to bring the standard up to date, and in particular to take into account BS EN 14682:2004, which now covers cords and drawstrings on children's clothing.

This revision of the standard introduces the following principal changes.

- New clauses have been added on hazards and risks, and on risk assessment.
- References are made to BS EN 14682, and recommendations that are now covered by BS EN 14682 have been removed.
- Recommended performance levels, and test methods, for the security of attachment of attached components have been added.

This British Standard gives recommendations for the design and manufacture of children's clothing to promote mechanical safety. The recommendations in this standard are based on the potential risks of mechanical injury to children from their clothing which have been identified through reference to published accident statistics and discussions with retailers and manufacturers of children's clothing. The statistics are summarized in Annex A. These have been updated and are presented in a different format from that used in the previous edition of BS 7907. A table comparing accident data from 1995 and from 2000 (before and after publication of the first edition of this standard) is also included.

Test methods have been included for the measurement of the security of attachment of different types of attached components. The need to be very specific in the method of test for each component type became apparent during research into current commercial practices. Owing to the wide range of attached components they have been grouped together for the purposes of the test methods.

Grippable components have been grouped on the basis of the type of grip needed for the test, which has been closely defined for each group (see Annex B). Currently there are a variety of grip designs being used by different laboratories to measure the removal force for the same components and this can lead to variations in the results. The speed of operation of the tensile testing machine has also been closely defined as variation in test speeds can also give a variation in the results.

For testing non-grippable components a washing method is given in Annex C. The characteristics of the washing machine, the detergent and the washing and drying conditions have been closely defined, as variations in any of these can lead to variation in the test results. It should be noted that, while the test method involves a washing and drying process, the test is intended to determine the durability of attachment of the attached components, rather than the performance of the garment. For this reason the test conditions are much more aggressive than the conditions used in normal laundering.

Recommended performance levels for the security of attached components are given that have been found to be achievable on most types of garment and have been found in many years of retail practice to provide safe garments.

NOTE These are not necessarily at the same levels as those required for toys as specified in BS EN 71-1:2005.

While the majority of accidents involve younger children, this standard is intended to assist in reducing the risk of accidents to children of all ages.

This standard is intended for designers, specifiers and manufacturers of children's clothing. It is also intended to be used by importers, distributors and retailers to assist them in the selection of clothing that does not present a hazard. The standard also gives guidance for retailers on the safety aspects of the packaging and display of children's clothing.

Assessed capability. Users of this British Standard are advised to consider the desirability of sourcing materials and components from suppliers who operate quality systems that have been assessed and registered against the appropriate standard in the BS EN ISO 9000 series by an accredited third-party certification body.

Use of this document

As a code of practice, this British Standard takes the form of guidance and recommendations. It should not be quoted as if it were a specification and particular care should be taken to ensure that claims of compliance are not misleading.

Any user claiming compliance with this British Standard is expected to be able to justify any course of action that deviates from its recommendations.

Presentational conventions

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

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

Contractual and legal considerations

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.

Introduction

The General Product Safety Regulations 2005 [1] require all products placed on the market to be safe, and provide information on how the safety of products should be assessed. According to the General Product Safety Regulations 2005 [1] product safety may be assessed by reference to the following:

- a) specific product regulations;
- b) national regulations;
- c) European standards which have had their references published in the Official Journal of the European Union;
- d) other European standards;
- e) community technical specifications;
- f) national standards (i.e. British Standards that are not UK versions of European standards);
- g) industry codes of good practice;
- h) state of the art and technology, and the safety which consumers may reasonably expect.

More details on assessment of product safety are given in the Department of Trade and Industry publication *The General Product Safety Regulations 2005: Guidance for businesses, consumers and enforcement authorities* [2].

When designing children's clothing, it is essential to take into consideration the behaviour of children, whose need for exploration and challenge drives them to use items in new and different ways. One common factor children share is that they are unaware of cause and effect and are therefore substantially less cautious than adults in relation to hazards.

It should be emphasized that consideration of the recommendations given in this standard from the earliest possible stage, i.e. the design stage, is of prime importance.

Recommendations on risk assessment are given in Clause 5. The recommendations given relate only to mechanical safety. There are many other safety aspects relating to children's clothing that need to be considered when carrying out a full risk assessment, including chemical safety, thermal protection (against heat or cold), avoidance of overheating, flammability, and protection against solar radiation (protection against sunburn).

1 Scope

This British Standard gives recommendations for the design and manufacture of children's clothing to promote mechanical safety.

The standard also gives recommendations on safety aspects of the packaging and display of children's clothing, including guidance for retailers.

This standard is applicable to clothing intended for children up to 14 years of age.

This standard is intended for use at all stages of the clothing supply chain, including use by designers, specifiers and manufacturers of children's clothing. It is also intended to be used by importers, distributors and retailers to assist them in the selection of clothing that does not present a mechanical hazard.

This standard is not applicable to:

- a) child care articles, such as bibs, nappies and soother holders;
- b) footwear, such as boots, shoes and slippers;
- c) toys and other items sold with the clothing.

The standard does not include recommendations on any clothing features that might be necessary to cater for children with special needs.

The standard does not include recommendations on the following:

- 1) chemical safety;
- 2) protection against allergic reactions, e.g. to nickel released from metal components, rubber and feathers;
- 3) thermal protection (against heat or cold);
- 4) avoidance of overheating in children under 12 months;
- 5) flammability;
- 6) protection against solar radiation (protection against sunburn).

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 1903:1981, *Glossary of terms used by the clothing industry*

BS 3084:2006, *Slide fasteners (Zips) – Specification*

BS 4162, *Methods of test for buttons*

BS EN 14682, *Safety of children's clothing – Cords and drawstrings on children's clothing – Specifications*

BS EN ISO 139, *Textiles – Standard atmospheres for conditioning and testing*

BS EN ISO 3758, *Textiles – Care labelling code using symbols*

BS EN ISO 6330:2001, *Textiles – Domestic washing and drying procedures for textile testing*

BS EN ISO 7500-1:2004, *Metallic materials – Verification of static uniaxial testing machines – Part 1: Tension/compression testing machines – Verification and calibration of the force-measuring system*

BS EN ISO 10012, *Measurement management systems – Requirements for measurement processes and measuring equipment*

3 Terms and definitions

For the purposes of this British Standard, the terms and definitions given in BS 1903:1981 and the following apply.

3.1 children's clothing

garments intended by design, manufacture or selling route to be worn by children up to 14 years of age

NOTE The guidance notes to the VAT Regulations [3] give garment measurements for children up to the eve of their 14th birthday.

3.2 filling material

material which is encased in fabric to form part of the structure of a garment

NOTE Filling materials include waddings, foams and feathers.

3.3 foreign object

object not intended to be a part of a garment

3.4 ischaemic injury

injury to a part of the body resulting from a restriction of blood circulation

3.5 attached components

3.5.1 press fastener

fastening device consisting of a male component and a female component that are attached to different parts of a garment and which is fastened by aligning the two components and pressing them together

NOTE 1 Press fasteners include poppers and snaps.

NOTE 2 Press fasteners can be attached to a garment mechanically or can be sewn on.

3.5.2 tack button

fastening device comprising a button with a hollow shank on the back and a separate sharp tack, which is attached to a garment by pushing the sharp end of the tack through the fabric from the reverse side into the shank of the button

NOTE 1 Tack buttons are also known as jeans buttons or stud buttons.

NOTE 2 Tack buttons are widely used on denim and other casual garments.

3.5.3 rivet

two part assembly, comprising a part (referred to as a burr) which is attached to the outer surface of the garment by a tack which passes through the fabric from the reverse side

NOTE Rivets are usually used as reinforcements, particularly on the corners of pockets on denim and other casual garments.

3.5.4 eyelet

item used to reinforce a hole through a garment, comprising a short metal tube with a flange at one end which is fastened to the garment by pushing it through the hole and compressing it against a die

NOTE 1 An eyelet may also include a washer on the reverse side.

NOTE 2 Eyelets are used to facilitate lacing or the insertion of a drawstring, to drain pockets or to provide ventilation.

3.5.5 pom-pom

ball created either from cut lengths of thread or yarn fastened at the centre, or from a piece of fabric filled with wadding

NOTE Pom-poms can be secured directly to a garment or attached by means of a cord.

3.5.6 tassel

bundle of lengths of yarn or other materials fastened at one end and free at the other end

NOTE Tassels can be secured directly to a garment or attached by means of a cord.

3.5.7 tab

piece of textile or other material, of flat or looped construction, attached to the outside of a garment either for identification or for decorative purposes

NOTE These are distinct from adjusting tabs, which are defined in BS EN 14682.

3.6 garment assembly

section of a garment, made under production conditions, using production equipment and the components that are to be used in production

3.7 hazard

potential source of harm to the wearer of a garment

3.8 risk

combination of the probability of occurrence of a hazard and the severity of the harm which that hazard could be expected to cause

3.9 risk assessment

thorough evaluation of the mechanical risks that a garment could present to the wearer as a result of the design, materials, components and construction of the garment

3.10 sharp object

object with one or more edges or points which are exposed, or which could become exposed, and which are likely to cause a cutting or piercing injury to the wearer of a garment

3.11 touch and close fastener

fastener consisting of two pile fabric tapes that are attached to different parts of a garment which is fastened by pressing the pile sides of the two tapes together and which can be unfastened by peeling apart the two tapes starting at either end

3.12 wear trial

trial of a garment involving wear by intended users in order to obtain information on the wear performance and characteristics of the garment

3.13 magnet

piece of iron, steel or alloy having the properties of attracting or repelling iron

3.14 magnetic material

material capable of being attracted by, or acquiring the properties of, a magnet

4 Hazards and associated risks

4.1 General

Details of some of the mechanical hazards constituted by children's clothing, or parts of it, and the risks associated with these hazards are given in 4.2 to 4.11.

4.2 Ischaemic injuries

Ischaemic injuries can be caused by loose or untrimmed threads on the foot or hand area of garments becoming wrapped around fingers or toes, or by entrapment of fingers or toes in open fabrics (e.g. crochet) or in fabrics with long float stitches. This causes a tourniquet effect, thus restricting the blood circulation. This is a particular concern in babywear as the source of distress cannot be communicated by the baby and might go undetected for some time.

In addition, areas of skin or parts of the genitalia can protrude through a mesh fabric used as a lining for swimming trunks when the parts are cold. As the body warms up these parts expand and can become entrapped in the mesh leading to ischaemic injury. Several incidents of this kind have been recorded.

Elasticated cuffs can also cause a reduction in blood flow to the hands or feet if the elastic is too tight or too strong; this is a particular concern in babywear.

4.3 Entrapment of the penis in a slide fastener

All boys' trousers that have a slide fastener present a risk of entrapment of the penis in the fastener. There have been a number of reports of accidents in which this has happened.

4.4 Injuries from sharp objects

Injuries to children can be caused by clothing which contains sharp objects. The severity of the injury can range from a scratch or irritation to a more serious injury.

Injuries can be caused by components with sharp edges, which are sometimes found on buttons, slide fasteners and decorative features, or by sharp edges which are produced through the deterioration of components during the wear and aftercare lifecycle of the garment. For example, components of press fasteners can become detached from the garment leaving sharp prongs exposed, and buttons can break, or covered buttons can come apart, leaving a sharp edge.

Pins, staples and other sharp objects used in the manufacture and packaging of clothing can also cause serious injury if they are left in the garment.

4.5 Choking and aspiration

Buttons, toggles and many other garment attachments (including rubber and soft plastics items, such as badges) can be a potential hazard, particularly to children under 36 months, if the item becomes detached from the garment. As young children are known to place such items in their mouth, and might also insert them into their nose or ears, any foreign object found in a child's garment can present a risk of either choking or aspiration. Stones left as a residue from a stone-washing process can present the same risks.

Although most textile materials, being air permeable and flexible, are not considered to present a risk of choking in themselves, if a young child sucks and partly swallows a textile item this could cause induced vomiting which can lead to choking and/or serious illness. Examples of such textile items are bows and ribbons, particularly where these could unravel, and other attachments that become detached from a garment. Loose fibres from pile fabrics are not generally considered to present a risk of choking owing to their short length and small quantity. However, if a garment sheds a significant quantity of pile which gets into a child's mouth this can also cause induced vomiting, leading to choking and/or serious illness. Babies up to 12 months old are most at risk.

Aspiration (where items are inhaled via the mouth or nose) is possible if detached parts are sufficiently small to pass into the trachea, for example beads, diamantés and sequins. Often these items might not be detected, as their chemical nature means they are unlikely to be identified by X-ray. The foreign body can cause toxic shock or lead to an infection, the source of which might not be readily identified. This can result in rapid and unexplained weight loss requiring hospitalization.

4.6 Swallowing

In most cases a detached item that has been swallowed will pass into the stomach and should eventually pass through the body with food without causing harm. Notable exceptions are sharp objects and magnets.

4.7 Strangulation, entrapment and tripping

Garments manufactured with cords, drawstrings or loops present a potential risk of strangulation, entrapment or tripping. Studies of accident data indicate two distinct trends.

- For children aged 2 to 8 years the risk of entrapment of hood or neck cords in climbing or playground equipment such as slides, resulting in strangulation, is most common.
- For children aged 10 to 14 years data indicate severe injury or even death caused by entrapment of cords and strings from waists and lower hems of garments in various moving vehicles. Children of this age not only play without supervision, but also are encouraged to become independent and travel to and from school unsupervised. Instances are reported of loops and cords being trapped in doors of buses or trains, etc., while long strings from lower hems of garments can become tangled in bicycle wheels and chains resulting in the rider falling in the path of other road traffic, or simply tripping the wearer. The presence of any rigid toggle or a knot can increase the risk of these accidents.

4.8 Restriction of vision and hearing

Hoods and certain types of headwear can restrict a child's vision or hearing, or both. Garments with hoods, and certain types of headwear, have the potential to increase the risk of the child being involved in an accident. Particular concern has been raised regarding an increased risk of playground and of road traffic accidents.

4.9 Suffocation

Accident statistics suggest that suffocation accidents involving children's clothing are rare. However, there remains a risk of suffocation in babies under 12 months if a garment has a hood constructed from materials which are impermeable to air.

4.10 Overheating

Research on sudden infant death syndrome (SIDS) has identified overheating to be a major contributory factor in unexplained or sudden death in sleeping babies under 12 months.

Evidence suggests that babies are put down to sleep wearing thermally resistant clothing or too many layers of clothing and/or have excessive bedding, possibly in overheated bedrooms.

As babies lose 85% of their excess heat through the head, the best way to avoid overheating is to have no hood on sleepwear, especially nightwear.

4.11 Slipping, tripping and falling

Accident statistics show that the majority of tripping and falling accidents are caused by poorly fitting garments. It is unclear whether this is due to inappropriate garment selection by the parent or carer or to the garment itself being incorrectly sized. Examples of the latter could be a skirt or a trouser leg being too long in relation to the waist and hip measurements. A belt or cord which is too long might also put the wearer at risk of tripping. Some slipping accidents can be attributed to children of walking age wearing socks or footed garments without wearing additional footwear.

5 Risk assessment

COMMENTARY ON CLAUSE 5

The recommendations given in Clause 5 relate only to mechanical safety. There are many other safety aspects relating to children's clothing that need to be considered when carrying out a full risk assessment, including chemical safety, thermal protection (against heat or cold), avoidance of overheating, flammability, and protection against solar radiation (protection against sunburn).

The General Product Safety Regulations [1] specify that all consumer products have to be safe or reasonably safe in normal and foreseeable use.

Risk assessments should be carried out so as to cover every stage of the garment production process, from the design stage, through manufacturing to retailing. This should include an exchange of information between all those concerned with the design, manufacturing, buying and retailing of the garments to ensure that garments put on sale to the public are mechanically safe.

The main stages that need to be carried out in a risk assessment are as follows:

- a) identification of the hazards;
- b) identification of the risks associated with each of the hazards;
- c) removal of the hazards wherever possible;
- d) for those hazards that cannot be removed, taking action to reduce the risks associated with them to an acceptable level.

NOTE 1 To assist in the assessment of risks associated with particular hazards, some recorded accident statistics are given in Annex A.

If a particular aspect of a garment design is found to present a risk, consideration should be given to removing the feature and/or obtaining the same effect using a safer technique.

Measures to remove hazards and reduce risks at the manufacturing stage should include the following:

- 1) adapting to technical progress and using safer technology;
- 2) developing a coherent overall prevention policy which covers technology, organization of work, and control of factors relating to the working environment, e.g. introducing a broken needle policy in a factory, and control of hand sewing procedures and the use of pins and staples;
- 3) implementing manufacturing management procedures to avoid or minimize risk including giving appropriate instructions to employees, for example on correct broken needle procedures.

Risk assessments should be done on all garments, covering the complete range of sizes.

The following factors should be taken into account:

- the age of the intended wearer;
- the expected characteristics of a child that age, and the situation in which they are likely to be wearing the garment, including the following:
 - weight and height of the child;
 - body measurements relevant to specific potential hazards, e.g. wrist size in the case of a garment with elasticated cuffs;
 - the age-related abilities of the child;
 - the normal behaviour of the child;
 - the situation(s) in which the garment is intended to be worn;
 - the normal levels of supervision of the child while they are wearing the garment. For example, not only is a sleeping baby very unlikely to be supervised, but it might also continue to be unsupervised when it wakes.

When carrying out a risk assessment, it should be borne in mind that young children cannot be expected to appreciate risks and that their behaviour can be unpredictable.

Risk assessments should be documented. The documentation should be dated and identified so that it is traceable, and should include a record of the name and position of the individual(s) who carried out the assessment. Risk assessments should be reviewed at least annually for long-running styles and further action taken to reduce risks if necessary.

Wear trials should never be carried out as part of a risk assessment.

NOTE 2 Guidance on wear trials is given in BS 7754. If a previously unidentified safety issue, or perceived safety issue, becomes apparent during a wear trial then the wear trial should be stopped immediately and the risk assessment should be reviewed.

6 Garment design, materials and construction

6.1 General

Assessed capability. *Users of this British Standard are advised to consider the desirability of sourcing materials and components from suppliers who operate quality systems that have been assessed and registered against the appropriate standard in the BS EN ISO 9000 series by an accredited third-party certification body.*

Garment designs and sizing should be based on anthropometric data for children in the relevant age group.

The performance of materials and components can be greatly reduced by aftercare processes. It is important therefore that the type and likely frequency of aftercare processes are taken into consideration when assessing the materials and components in the garments.

Appropriate care instructions should be provided with each garment using the symbols specified in BS EN ISO 3758.

For each garment design, the designer should provide the manufacturer with a full product specification which should include, as a minimum, the information listed in Annex D.

6.2 Selection of fabrics

Fabrics should be used which do not present a mechanical risk to the wearer when forming part of a garment. If necessary, the construction of the garment should be altered so that the fabrics used do not present a mechanical risk.

Particular consideration should be given to the position of the fabric on the garment, the age of the intended wearer and the type of end use of the garment, if any of the following fabric types are to be used.

- Fabrics with integral holes or open construction, e.g. crochet and lace, which can cause entrapment of fingers or other body parts leading to ischaemic injury (see 4.2).
- Mesh fabrics, which can present a risk of entrapment if used in the lining of boys' swimming trunks (see 4.2). This risk can be reduced by using a soft handle fabric with a hole size less than 1.5 mm.
- Pile fabrics. Consideration should be given to pile length, pile retention, position on garment and age of end user, particularly in garments for children under 12 months (see 4.5).
- Jacquard fabrics. Jacquard fabrics which have uncut float stitches longer than 10 mm should not be used in the hand or foot area of garments designed for children under 12 months.

Fabric used to support a sewn-on component, for example a button, should be sufficiently strong that when the attachment of the component is tested in accordance with Table 1 and 6.5.1 Notes 2 and 3 the fabric does not tear. If necessary, reinforcing material should be used in areas where components are attached.

6.3 Filling materials

Filling materials should not contain any hard or sharp objects.

Garments which contain filling material should be designed and constructed in such a way that the filling material is inaccessible and secure.

NOTE Particular care should be taken when using feathers/down as a filling material, as the quills could present a hazard to the wearer.

6.4 Sewing thread

Monofilament sewing thread should not be used in the construction of children's garments owing to the risk of it causing ischaemic injury or skin abrasion.

All thread ends in the hand and foot areas of the garment should be trimmed off to a maximum of 10 mm.

Thread used to support a sewn-on component, for example a button, should be sufficiently strong that the security of attachment of the component is in accordance with Table 1 and 6.5.1 Notes 2 and 3.

6.5 Attached components

6.5.1 General

This subclause gives recommendations that apply to all attached components. Specific additional recommendations for individual types of attached components are given in 6.5.2 to 6.5.9.

It is essential that all components attached to clothing for children under 36 months are securely attached and remain attached throughout the normal or reasonably foreseeable period of use of the garment.

Components attached by lockstitch (301) (see Note 1) are generally the most secure and should be used where possible. Components attached by handstitch (200) can be secure provided the process is strictly controlled, however this method is not recommended for garments for children aged under 36 months. Components attached by chainstitch (100) can be prone to becoming detached and should not be used for garments for children aged under 36 months.

NOTE 1 The numbers in brackets refer to the stitch type classifications described in BS 3870-1:1991.

The security of attached components on finished garments should be in accordance with Table 1.