PD CEN/TR 16792:2014

BSI Standards Publication

Safety of children's clothing — Recommendations for the design and manufacture of children's clothing — Mechanical safety

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National foreword

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The UK participation in its preparation was entrusted to Technical Committee TCI/66/-/2, Safety of children's clothing.

A list of organizations represented on this committee can be obtained on request to its secretary.

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Published by BSI Standards Limited 2014

ISBN 978 0 580 83900 9

ICS 61.020; 97.190

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

This Published Document was published under the authority of the Standards Policy and Strategy Committee on 31 December 2014.

Amendments/corrigenda issued since publication

Date	Text affected

TECHNICAL REPORT

RAPPORT TECHNIQUE

TECHNISCHER BERICHT

CEN/TR 16792

December 2014

ICS 61.020; 97.190

English Version

Safety of children's clothing - Recommendations for the design and manufacture of children's clothing - Mechanical safety

Sécurité des vêtements d'enfants - Recommandations pour la conception et la fabrication des vêtements d'enfants - Sécurité mécanique

Sicherheit von Kinderbekleidung - Teil 1: Mechanische Sicherheit

This Technical Report was approved by CEN on 15 December 2014. It has been drawn up by the Technical Committee CEN/TC 248.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Ref. No. CEN/TR 16792:2014 E

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Foreword

This document (CEN/TR 16792:2014) has been prepared by Technical Committee CEN/TC 248, “Textiles and textile products”, the secretariat of which is held by BSI.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

Introduction

The General Product Safety Directive 2001/95/EC [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 Directive [1] product safety may be assessed by reference to the following:

— specific product regulations;

— national regulations;

— European standards which have had their references published in the Official Journal of the European Union;

— other European standards;

— community technical specifications; national standards (i.e. national standards that are not versions of European standards);

— industry codes of good practice; European Technical Report (TR)

— 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 EU The General Product Safety Directive 2001/95/EC.

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 Technical Report 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,

1 Scope

This Technical Report gives recommendations for the design and manufacture of safe children's clothing in relation to mechanical hazards.

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

This Technical Report is applicable to clothing including bonnets, hats, gloves, scarves, socks and other clothing accessories intended for all children up to 14 years of age. It is suggested that dressing up clothes meet the recommendations of this Technical Report in addition to the requirements of EN 71.

This Technical Report 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 hazard.

This Technical Report is not applicable to:

a) child care articles, such as bibs, nappies and soother holders;

b) footwear, such as boots, shoes and slippers; or

c) toys and other items sold with the clothing;

as these articles are not within the scope of CEN/TC 248.

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

2 Normative references

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

BS 3084, *Slide fasteners (zips) - Specification*

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

EN ISO 139, *Textiles - Standard atmospheres for conditioning and testing (ISO 139)*

EN ISO 3758, *Textiles - Care labelling code using symbols (ISO 3758)*

EN ISO 6330, *Textiles - Domestic washing and drying procedures for textile testing (ISO 6330)*

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

EN ISO 10012, *Measurement management systems - Requirements for measurement processes and measuring equipment (ISO 10012)*

ISO 4915, *Textiles - Stitch types - Classification and terminology*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
baby
child from birth up to age 12 months, that is all children of height up to and including 80 cm

3.2
infant
child from age 12 months to and including 36 months, that is all children over 80 cm and up to and including 98 cm in height

3.3
child and young person
person aged over 36 months and up to 14 years (that is up to and including 13 years and 11 months), that is all children over 98 cm in height and for girls up to 176 cm and for boys 182 cm in height

3.4
babies' clothing
garments intended by design manufacture or selling route to be worn by babies

3.5
infant's clothing
garments intended by design, manufacture or selling route to be worn by infants

3.6
children's clothing
garments intended by design, manufacture or selling route to be worn by children

3.7
foreign object
object not intended to be a part of a garment, for example, broken needle, stone

3.8
ischaemic injury
injury to a part of the body resulting from a restriction of blood circulation

3.9
attached components

3.9.1
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 to entry: Press fasteners include poppers and snaps.

Note 2 to entry: Press fasteners can be attached to a garment mechanically or can be sewn on.

3.9.2
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 to entry: Tack buttons are also known as stud buttons.

Note 2 to entry: Tack buttons are widely used on denim and other casual garments.

3.9.3
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 though the fabric from the reverse side

Note 1 to entry: Rivets are usually used as reinforcements, particularly on the corners of pockets on denim and other casual garments.

3.9.4
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 to entry: An eyelet may also include a washer on the reverse side.

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

3.9.5
pom-pom
ball created either from cut lengths of thread or yarn fastened at the centre, or from a piece of fabric filled with filling material

Note 1 to entry: Pom-poms can be secured directly to a garment or attached by means of a cord.

3.9.6
tassel
bundle of lengths of yarn or other materials fastened at one end and free at the other end

Note 1 to entry: Tassels can be secured directly to a garment or attached by means of a cord.

3.9.7
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 1 to entry: These are distinct from adjusting tabs, which are defined in EN 14682.

3.9.8
button
knob or disc which is attached to a garment as a means of fastening or ornamentation

3.9.9
label
fabric, plastic or similar attached to the garment to provide instructions, information or to identify the garment brand

3.10
garment assembly
section of a garment, made under production conditions, using production equipment and the components that are to be used in production

3.11
hazard
potential source of harm to the wearer of a garment

3.12
risk
combination of the probability of occurrence of a hazard and the severity of the harm which that hazard could be expected to cause

3.13
risk assessment
thorough evaluation of the risks that a garment could present to the wearer as a result of the design, materials, components and construction of the garment

3.14
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

3.15
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

Note 1 to entry: Touch and close includes hook and loop.

3.16
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

3.17
magnet
piece of iron, steel or alloy having the properties of attracting or repelling iron

3.18
magnetic material
material capable of being attracted by, or acquiring the properties of a magnet

3.19
zip/slide fastener
moving component consisting essentially of a slider body and, normally, a puller, which opens or closes the fastener by separating or engaging the interlocking members

Note 1 to entry: The slider might incorporate a locking device. Alternative slider types are available with a flip-over puller or double pullers, to facilitate operation from both front and back sides.

3.20
appliqué
cut out design or shape attached to the face of material for ornamentation, frequently of a different type and/or shade of material

3.21
filling material
material which is encased in fabric to form part of the structure of a garment

Note 1 to entry: Filling materials include wadding, foams and feathers.

4 Mechanical hazards and associated risks

4.1 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. Entrapment of tongue or fingers is possible in large inflexible openings , in components such as buttons, press fasteners, eyelets and zip/slide fasteners. These can cause a tourniquet effect, thus restricting the blood circulation.

This is a particular concern in clothes for babies 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. The skin from these parts can become entrapped in the mesh leading to ischaemic injury.

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 baby clothing.

4.2 Entrapment of the penis in a slide fastener (zip)

All boys' trousers that have a slide fastener present a risk of entrapment of the penis in the fastener.

4.3 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 such as cutting or piercing.

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, broken needles, 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.

4.4 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.

Aspiration (where items are inhaled via the mouth or nose) is possible if detached parts are sufficiently small to pass into the trachea or lungs, for example beads, diamanté and sequins. Often these items might not be detected, as their chemical nature means they are unlikely to be identified by X-ray. The consequence is 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. This is very serious, however it is extremely rare.

4.5 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, button cell batteries and magnets.

4.6 Magnets

If more than one magnet, or one magnet and a ferromagnetic object (for example iron or nickel) is ingested, the objects can attract to each other across intestinal walls and cause perforation or blockage, which can be fatal. Other risks include magnetic interference with devices such as pacemakers or infusion pumps.

4.7 Strangulation and entrapment

Garments manufactured with cords, drawstrings or loops present a potential risk of strangulation and, entrapment. Studies of accident data indicate two distinct trends, see EN 14682:2014 Annex A **.**

4.8 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.

4.9 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.

4.10 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.

5 Risk assessment

The General Product Safety Directive [1] specifies 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 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 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 up to around age 7 years 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 to determine if a garment is safe. 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 Technical Report 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 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, for example see 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

6.2.1 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. Examples include:

a) In garments for babies, 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 4.1) should not be used.

b) Mesh fabrics, which can present a risk of entrapment if used in the lining of boys' swimming trunks (see 4.1). This risk can be reduced by using a soft handle fabric with a hole size less than 1,5 mm.

c) Imitation fur fabrics. A safety risk assessment should be carried out to assess, pile retention, position on garment and age of end user (see 4.4).

6.2.2 Fabrics which have uncut float stitches longer than 10 mm should not be used in the hand or foot area of garments designed for babies.

6.2.3 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, Note 2, 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, sharp or foreign objects. Garments which contain filling material should be designed and constructed in such a way that the filling material is inaccessible and secure.

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 on the inside of children's clothing owing to the risk of it causing ischaemic injury or skin abrasion.

All thread ends in the hand and foot areas of the garments for babies 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, Note 2.

6.5 Attached garment components

6.5.1 General recommendations

This sub-clause gives recommendations that apply to all attached garment 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 hand stitch (200) can be secure provided the process is strictly controlled, however this method is not recommended for garments for babies or infants. Components attached by chain stitch (100) can be prone to becoming detached and should not be used for garments for babies or infants.

The numbers in brackets refer to the stitch type classifications described in ISO 4915.

Textile components, which are small parts (tightly packed stuffed components made of fabric and/or yarns), should be assessed for security of attachment in accordance with Annex C. A stuffed component should be considered as tightly packed if it cannot be readily compressed by hand (between forefinger and thumb). Non-textile components, which are small parts, should be tested for security of attachment in accordance with Table 1.

Non-textile components which are small parts should be tested for security of attachment as described below. A small part is any component or pieces of components which fit entirely within the small parts cylinder, without compression. See Annex H.

The security of non-textile attached components on clothing should be in accordance with Table 1.

These recommendations do not apply to label, price ticket, promotional information intended to be removed before wear. These are not attached clothing components, see Clauses 8 and 9.

Attached components should not have sharp points or sharp edges.

NOTE 1 At the time of drafting this Technical Report the following standards are under development:

— *Safety of children's clothing — Security of attachment of buttons — Specifications and test methods*

— *Safety of children's clothing — Security of attachment of mechanically applied metal press fasteners, rivets and eyelets-Specifications and test methods*

Once published, these standards will supersede the conflicting clauses of this document.

Table 1 — Recommended values for security of all non-textile attached components on clothing for babies and infants

Component	**Minimum removal force** N	**Performance**	**Test method** (see Note 2)
Grippable (note A) (except sequins):			
Largest grippable dimension **≥** 6 mm	70 (note B)	—	Annex B
Largest grippable dimension >3 mm but < 6 mm	50	—	Annex B
Largest grippable dimension ≤3 mm	—	Negligible change	Annex C
Non-grippable [A)] (including sequins ,heat fused or glued components and plastic sleeving on ends of cords or laces)	—	Negligible change	Annex C
A) Grippable and non-grippable in this context refer to whether the component under test can be gripped, without deformation or other damage to fabric or component , by the apparatus described in Annex B.			
B) For code B zip fasteners (see 6.8.1) the requirement for open-end fastener single stringer slider retention is 60 N as specified in BS 3084:2006.			

In order to ensure that clothing meet the recommended levels for security of attachments given in Table 1, it is recommended that testing be carried out at a number of stages from the design stage through production, in addition to testing of the garment. If a component fails, attention should be given to the mode of failure so that corrective action can be taken.

The test method requires that 5 specimens of any specific type of component be tested.

NOTE 2 The recommended attachment strengths apply to the forces measured on each individual specimen, rather than the mean value from the 5 specimens tested.

6.5.2 Buttons

Only buttons which have passed the mechanical tensile test given in Annex F should be used on children's clothing. Buttons should be used which do not have sharp edges on the outside, and which also do not have sharp edges internally that could become exposed and present a hazard.

Particular care should be taken if multi-component buttons are to be used as these can disassemble to produce potentially hazardous small parts.

NOTE 1 For tack buttons see 6.5.8.

Buttons should not be used which bear any resemblance to food.

NOTE 2 Attention is drawn to the Food Imitations (Safety) Regulations 1989 [4].

Spare buttons on garments for babies and infants should be securely attached in accordance with 6.5.1.

6.5.3 Fabric embellishments, including bows and labels

The ends of all fabric embellishments, especially ribbons, should be adequately secured to prevent unravelling. It is essential that any heat sealed or laser cut fabric labels, badges or tabs do not have sharp edges.

The lengths of any fabric embellishments should conform to EN 14682.

6.5.4 Rubber or soft plastics embellishments, including labels, and badges

The following should be considered when selecting rubber or soft plastics embellishments for garments for babies and infants:

a) Stitch density: perforations caused by stitching can cause parts of the attachment to detach.

b) Degradation of the materials: these can be degraded by exposure to heat, laundering detergents, etc.

6.5.5 Pom-poms and tassels

Pom-poms and tassels should be constructed such that the cut length of the yarn may not easily be removed.

6.5.6 Sequins, beads and similar components

On garments designed for babies and infants, sequins, beads and similar components should not be attached by either hand sewing or chain stitching (e.g. Adda technique) owing to difficulties in achieving consistency in attachment security. Machine attached sequins are generally more secure and a minimum of 3 stitches should be used to hold each sequin flat.

Where hand-sewn sequins or beads are applied, it is recommended that the stitching is locked off after every 10th stitch.

Whichever sewing or other technique is used, manufacturers should ensure that sequins are secured to hold them flat.

6.5.7 Diamanté and heat fused components

The security of attachment of these items can be adversely affected by the following factors:

a) textured fabric surfaces, e.g. velour, velvet, ribs and other uneven surfaces;

b) highly extensible fabrics;

c) certain fabric finishes, e.g. stain repellent finishes;

d) items of garment construction, e.g. pockets and pocket bags, and embroideries, appliqués and prints. The uneven surfaces these produce can cause inconsistencies in application pressure.

It is also important to ensure consistency in the application process (see 7.4).

6.5.8 Press fasteners and similarly applied components

Selection and positioning of press fasteners (including poppers and snaps) and similarly applied components, including tack buttons, rivets, eyelets, and hooks and bars, is an important element of garment design. The designer should ensure that:

a) the correct type of fastener is selected. In particular, post-type fasteners should not be used on knitted fabrics as these can pull through the knitted structure. Prong-type fasteners are required for these fabrics;

b) fasteners are not applied over seams or on areas of uneven fabric thickness as insecure attachment can result;

c) the correct size of fastener is selected to match the compressed fabric thickness and only one size is used per garment;

d) where necessary, the fabric is reinforced, for example with a fusible interlining, to ensure adequate fabric stability for a secure attachment (see 6.2);

e) needle detector compatible fasteners are selected, i.e. fasteners made of non-magnetic material which do not trigger needle detectors (see 7.2).

It is recommended that press fastener data sheets are obtained from the fastener manufacturers and used to record the description and position of all fasteners on the garment and to check that all the above points have been acted upon. Additionally, the data sheet should be used to record the pinch setting, a measure of the attached fastener thickness at each position, at the pre-production stage. This data should then be used for checking the fasteners during manufacture (see 7.3).

6.5.9 Magnets

Magnets should not be used on children's garments.

6.6 Elastics

If elastics are to be used in a garment, an elastic should be selected that is sufficiently strong to hold the relevant part of the garment in place, but which has sufficient stretch to avoid the risk of injury to the wearer. In addition, the length of the elastic should be carefully chosen so that the elasticated part of the garment is the correct size for the intended wearer.

It is essential to indicate both the relaxed and minimum stretched measurements of any elasticated parts of a garment in the manufacturer's specification.

6.7 Touch and close fasteners

When positioning touch and close fasteners the hook component should be directed away from the child's body where possible to avoid the possibility of skin abrasion.

It is recommended that pieces of touch and close fasteners are die cut with rounded corners to minimize the risk of scratching.

6.8 Zip/slide fasteners

6.8.1 General

Zip/slide fasteners conforming to BS 3084:2006 should be used. Zip/slide fasteners conforming to performance code A, B, C or D should be used as applicable to the type of clothing in accordance with BS 3084:2006. Zip/slide fasteners conforming to performance code A (ultra-lightweight zip/slide fasteners) should not be used in clothing for babies and infants as they can disassemble at low loads.

NOTE 1 At the time of drafting this Technical Report the following standard is under development:

— *Slide fasteners (zips) — Specification*

Once published, this standard will supersede the conflicting clauses of this document.

Zip/slide fasteners conforming to Code E may be used on wet suits.

NOTE 2 In the 2006 revision of BS 3084 a requirement has been added for single stringer slider retention in open-end Zip/slide fasteners. Zip/slide fasteners which do not conform to BS 3084 in this respect can present a choking risk.

Where components of a zip/slide fastener could come into contact with the skin, the use of a plastic zip/side fastener with plastic top stops and bottom stops is recommended, in preference to a zip/slide fastener with claw-type metal stops. The tops stops and the elements (teeth) should be free from burrs and sharp edges.

The use of a fabric zip/slide fastener guard, comprising an inner flap, is recommended to reduce the risk of catching or scratching, particularly around the face and neck.

6.8.2 Zip/slide fasteners in boys' trousers

It is preferable that functional zip/slide fasteners are not used in the fly area of trousers designed to fit boys aged 5 years and under. Designers should consider alternative trouser constructions, for example a touch and close fastener or a non-functioning mock-fly and/or an elasticated waistband.

All boys' trousers with a zip/slide fastener fly should have a zip/slide fastener guard at least 20 mm wide, secured by stitching across the fly opening at the bottom, to provide protection against accidental entrapment of the penis in the elements (teeth) of the zip/slide fastener. Use of zip/slide fasteners with plastic elements is preferable as these are less likely to cause severe injury if entrapment does occur.

6.9 Cords, strings, ribbons and bows

Where these are used, they should conform to EN 14682.

6.10 Garments with integral feet

Consideration should be given to enhancing the slip resistance of garments with feet which are designed to be worn by walking children without footwear. An example of how this can be done is the use of a friction enhancing surface bonded to the fabric on the soles of the garment.

6.11 Hoods

Sleepwear, especially nightwear, designed for babies should not have hoods, because of the risk of overheating.

The design and materials of the hood in garments for babies should not pose a risk of suffocation. The use of interlining can reduce the risk as better airflow is encouraged due to the extra space between two fabrics and can prevent a seal forming against the face. In the case of a filled hood an appropriate filling should be used which allows air circulation. In terms of design ensure the hood is shallow and does not entirely cover the face.

Because a hood can restrict a child's vision or hearing or both (see 4.9), garments with hoods should be designed to minimize this. Particular attention should be paid to the design of hoods in garments for older children, who are more likely to undertake activities without adult supervision.

6.12 Embroidery and appliqué

When positioning embroidery and appliqué on garments, the potential of the back of the stitching to rub on the skin during wear should be taken into account. The use of a fusible interlining or full panel linings to back the embroidery is recommended where there is a risk of abrasion.

Care should be taken to ensure that the stitch lengths used on embroideries and appliqués are not long enough to form loops which could pose a risk of ischaemic injury to infants. It is recommended that there should be no float stitches on the back or front of the embroidery or appliqué in excess of 10 mm.

6.13 Stone washing

Stones or other residues left in the pockets or turn-ups of garments following stone washing can present a risk of choking to babies and infants (see 4.4) and, therefore, it is recommended that an alternative process, such as enzyme washing, be used on garments for this age group.

If stone washing is used on garments for older children, physical measures should be taken to prevent stones and other residues being retained. These include sewing up pockets prior to washing, and turning out and cleaning all pockets, turn-ups, etc. at the garment inspection stage.

7 Manufacture

7.1 Sharp objects

7.1.1 General

Sharp objects used in the manufacture of garments can cause serious injury if they are accidentally left in a garment and come into contact with the wearer.

7.1.2 Pins and staples

Pins and staples are sometimes used in cloth spreading, cutting, position marking and the identification of faults. However, it is not essential to use such items during the manufacturing process. Manufacturers should eliminate their use, for example by use of self-adhesive labels to mark garment faults, self-adhesive markers, and clamps to hold fabric lays.

Metal staples should not be used anywhere in the manufacturing environment. This includes their use to fasten paperwork and paper patterns.

7.1.3 Sewing needles (hand and machine)

Sewing needles carry the same risk as other sharp objects but cannot be eliminated from the manufacturing process. Therefore, manufacturers should have a documented needle control system to ensure that garments are not contaminated with sewing needles or needle fragments.

The system should include documented procedures for the following:

— designating a particular person to be responsible for the issue of needles;

— ensuring that only the designated person has access to needle supplies;

— ensuring that a new needle is only issued on receipt of all parts of the old needle;

— ensuring that if a needle breaks all the broken pieces are retrieved. If all the parts cannot be found then all potentially affected garments should be quarantined for individual metal detection;

— ensuring that all incidents of broken needles are recorded, together with details of the actions taken;

— ensuring, for hand sewing needles, that the issue and return of every needle, at the beginning and end of every shift, is recorded.

7.1.4 Knitting machine needles and linking points, and tagging gun needles

Knitting machine needles and linking points, and tagging gun needles, can present the same risks as sewing needles so, if these are used, the manufacturer should have a documented control system that is in accordance with the recommendations given in 7.1.3.

7.1.5 Scissors, clippers and other sharp tools

These should be secured to the workstation, where possible, and/or subject to a documented control system that is in accordance with the recommendations given in 7.1.3.

7.2 Metal detection (including needle detection)

Use of metal detectors during garment manufacture is an important measure against metal contamination. However, metal detection should always be used in addition to control procedures for needles and other sharp objects (see 7.1), and not in place of them.

There are two main types of metal detectors, those which detect all metallic materials and those which detect magnetic materials only. The latter are usually referred to as “needle detectors” and are designed for use with garments that include non-magnetic metal components.

Static conveyor metal detectors are recommended. Hand held metal detectors may be used to help locate metal fragments, but are not as effective in ensuring that garments are free from metal contamination.

It is essential that metal detectors are calibrated daily in accordance with the manufacturer’s instructions, and records of the calibration kept.

Metal detection can be used for several purposes, at different stages in manufacture, including broken needle detection, inspection of garment parts sourced from elsewhere and as part of garment inspection. Final metal detection should be carried out on finished garments, after packing, wherever possible.

In the following cases it might not be possible to carry out final metal detection on finished garments.

— If components such as belt buckles or brace clips made of magnetic materials (e.g. certain ferrous metals) are to be used, metal detection needs to be carried out prior to their attachment, but at the latest possible stage of manufacture.

— Some qualities of pumice used in stone washing can leave a residue on garments which might activate the metal detector. In this case, it might be necessary to perform metal detection prior to this process.

Inspected garments should be clearly identified to distinguish them from those not yet inspected and from rejected garments.

Garments which trigger the metal detectors should be quarantined for detailed examination. If the contaminant can be located and removed, the garment should then be put through the metal detection procedure again. If the contaminant cannot be located and removed, the garment should be destroyed.

Any metal contamination found, and subsequent action(s) taken, should be recorded.

7.3 Machine applied fasteners

The manufacturer should arrange for staff who will be attaching fasteners to garments to be trained in attachment techniques by the supplier of the fasteners.

The manufacturer should have a system to control the security of attachment of fasteners, which should include documented procedures for the following:

a) ensuring that suitable fasteners are selected (see 6.5.8);

b) ensuring machines, dies and settings are correct for the particular type of fastener and the substrate;

c) machine inspections, including inspection routines and frequencies;

d) inspection and testing of fastener application.

Pinch settings on fastener attaching machines should be recorded and checked against those measured at the pre-production stage, at least twice per shift. This can provide an indication of correct fastener application.

All fasteners should be subjected to a visual inspection after attachment to detect any defective attachments, such as those with deformed prongs.

Subjecting garments to wash processes such as stone washing, enzyme washing or garment dyeing can lead to mechanical damage and/or leave chemical residues, which might affect the security of the attachments. It is recommended that, in these cases, fasteners should be attached after the washing or dyeing process.

7.4 Application of glued and heat fused components

It is recommended that garment manufacturers should have a documented procedure to control the consistency of attachment for diamanté and heat fused components. It is essential that the component supplier's guidelines for attachment of these items with regard to temperature, time and pressure are followed and that these conditions are closely monitored.

7.5 Elasticated garments

If elastics are used in a garment, it is essential to have control procedures in place to ensure that the relaxed and the minimum stretched measurements, as given in the manufacturer's specification, are maintained throughout the manufacturing process.

7.6 Inspection

It is essential that personnel involved in inspection are supplied with all relevant information to enable them to perform their task effectively. This should include relevant technical specifications and work instructions relating to the garment.

Inspection of garments should be carried out at intermediate stages during the construction of the garment and after completion of the garment, for conformity to the garment specification.

In addition, all completed garments should be inspected for foreign objects. Particular attention should be paid to areas of the garment which could conceal foreign objects, such as pockets, turn-ups, linings and hems. Garments with feet should be turned inside out to enable a proper inspection to be performed. Any foreign objects found should be removed or, if this is not possible, the garment should be destroyed.

7.7 Testing for security of attached components

Testing for the security of attached components should be in accordance with Table 1 and 6.5.1, Note 2.

Additional testing for process control purposes is recommended for production runs extending over more than one shift and/or involving more than one production line. This may be done using the procedure given in Annex E.

Garments that have been tested for security of attached components should only be released for sale after they have been corrected. If this is not possible the garments should be destroyed so that they cannot be used.

7.8 Rejected garments

Rejected garments should be clearly identified and quarantined. Garments which have been rejected for safety reasons should only be released for sale after they have been corrected. If this is not possible the garments should be destroyed so that they cannot be used.

If a garment from a batch fails a test in accordance with Annex B or Annex C, the batch from which that garment came should be identified and quarantined. The cause of the failure should be identified and appropriate action taken.

7.9 Documentation and traceability

Manufacturers should document their manufacturing practices and procedures and keep records of all activities relating to product safety. Records should be kept in a form which allows traceability of particular batches of garments should this become necessary.

Retailers, distributors and import agents should have documented records of their supply chain.

8 Packaging

Pins and staples should not be used in packaging. Alternative methods should be used where it is necessary to secure garments in packaging, e.g. shirts. Care should be taken that the packaging does not include items that could present a hazard, for example small plastics clips that could present a choking hazard to infants.

9 Security tagging and display of garments for retail

9.1 Security tags

It is essential that security tags used in retail are carefully controlled to ensure that pins are not left in garments when they are sold to the customer as they can present a risk, particularly to younger children.

9.2 Store display

Pins put into garments used for display in retail can present a risk to the wearer if they are left in the garment. It is recommended that other methods be used to hold display garments in position. If pins are necessary it is important to ensure that they are all removed from the garment before it is sold to the purchaser.

9.3 Hanger loops and labels

Hanger loops should not protrude outside the garment and should be sewn-in weakly so that they will break if trapped. A warning label may be used to inform the consumer to remove the loop before wear. A functional or informative label should be risk assessed to ensure it does not present any hazard.

Annex A
(informative)

Accident data

Accident databases used in the development of this Technical Report are national or anecdotal. All have required detailed analysis. The following websites, databases and publications all have been help to the working group.

European:

The Susy Safe project (research on suffocation due to foreign bodies in children) http://www.susysafe.org/index.php?lang=en

UK:

Department Of Trade And Industry. Home Accident Surveillance System.

Department Of Trade And Industry. Leisure Accident Surveillance System.

Government consumer safety research : Choking risks for children under 4 from toys and other objects http://www.bis.gov.uk/files/file25392.pdf

USA:

US Consumer Product Safety Commission National Electronic Injury Surveillance System (NEISS) http://www.cpsc.gov/en/research--statistics/neiss-injury-data/

Annex B
(normative)

Method for determination of removal force of attached components

B.1 General

This is a laboratory based method designed for testing of finished garments. However, it may also be used to test garments and/or garment assemblies at the relevant stages of garment design and production.

NOTE At the time of drafting this Technical Report the following standards are under development

— *Safety of children's clothing - Security of attachments - Part 1: Sewn on buttons*

— *Safety of children's clothing - Security of attachments - Part 2: Metal press fasteners, rivets, eyelets and similarly applied components*

Once published the standards will supersede the conflicting clauses of this document

B.2 Principle

An attached component is held in the upper grip of a constant rate of extension (CRE) tensile testing machine and the garment to which it is attached is held in the lower grip. The grips are separated at a constant rate until the component is removed from the garment. The removal force and the mode of failure are recorded.

B.3 Apparatus

NOTE In all cases the dimensions provided are considered to be critical dimensions, which will influence the reliability of testing.

B.3.1 Constant rate of extension (CRE) tensile-testing machine, provided with means for indicating and recording the force applied to the test specimen in stretching it to rupture. The metrological confirmation system for the tensile testing machine should be in accordance with EN ISO 10012. Under conditions of use, the accuracy of the machine should be Class 1 in accordance with EN ISO 7500-1:2004. The error of the indicated or recorded maximum force at any point in the range in which the machine is used should not exceed ±1 %. The machine should be capable of maintaining a constant rate of extension of 100 mm/min, with an accuracy of ± 10 % The machine should be such that it is possible to set the gauge length to any value between 1,0 mm and 75 mm, to within ± 0,5 mm.

B.3.2 Button box with a slotted plate, for testing of buttons, tack buttons, pom-poms and beads. Examples of different types of button box are shown in Figure B.1a) and Figure B.1b). The box should be of sufficient size to accommodate the attachment to be tested but the shape and dimensions of the box are not critical.

The slotted plate should be as shown in Figure B.2 made from gauge plate metal (1,65 ± 0,15) mm thick. The slot width, *W* in Figure B.2, should be such that the attachment being tested can slide onto the plate without damaging the means of attachment (e.g. sewing thread or shank).

The slotted plate may be an integral part of the button box, or be interchangeable to allow the testing of attachments of different sizes or types.

NOTE Slot widths of (3 ± 0,2) mm, (5 ± 0,2) mm and (7 ± 0,2) mm have been found to be suitable to test the majority of attachments used on children’s garments.

It is recommended that the button box attachment to the load cell be articulated to make it easier to slide in the component under test.

Other devices may be used to grip the test specimen, provided comparable results are obtained.

B.3.3 Press fastener upper grip, for testing of press fasteners, including poppers, comprising a multi-pronged claw, with a minimum of three prongs and able to grasp a minimum of 70 % of the circumference of the outer rim of the fastener. The prongs should be evenly spaced. The profile of the claw should be such that it is capable of gripping the fastener and can be tightened to grip it firmly without causing deformation of, or damage to the integrity of, the fastener rim. An example of a suitable grip for the testing of 13, 14 and 15 ligne (8,25 mm, 8,5 mm and 9,5 mm) poppers is shown in Figure B.3.

The three-pronged claw used for tension testing in accordance with EN 71-1 should not be used as this does not have a suitable profile for testing fasteners and could exert a shearing force rather than a direct pull.

For male press fastener components, only the outer rim should be gripped. Gripping of the centre post can damage the integrity of the component which not reflected in normal use. The results can be variable.

Other devices may be used to grip the test specimen, provided comparable results are obtained.

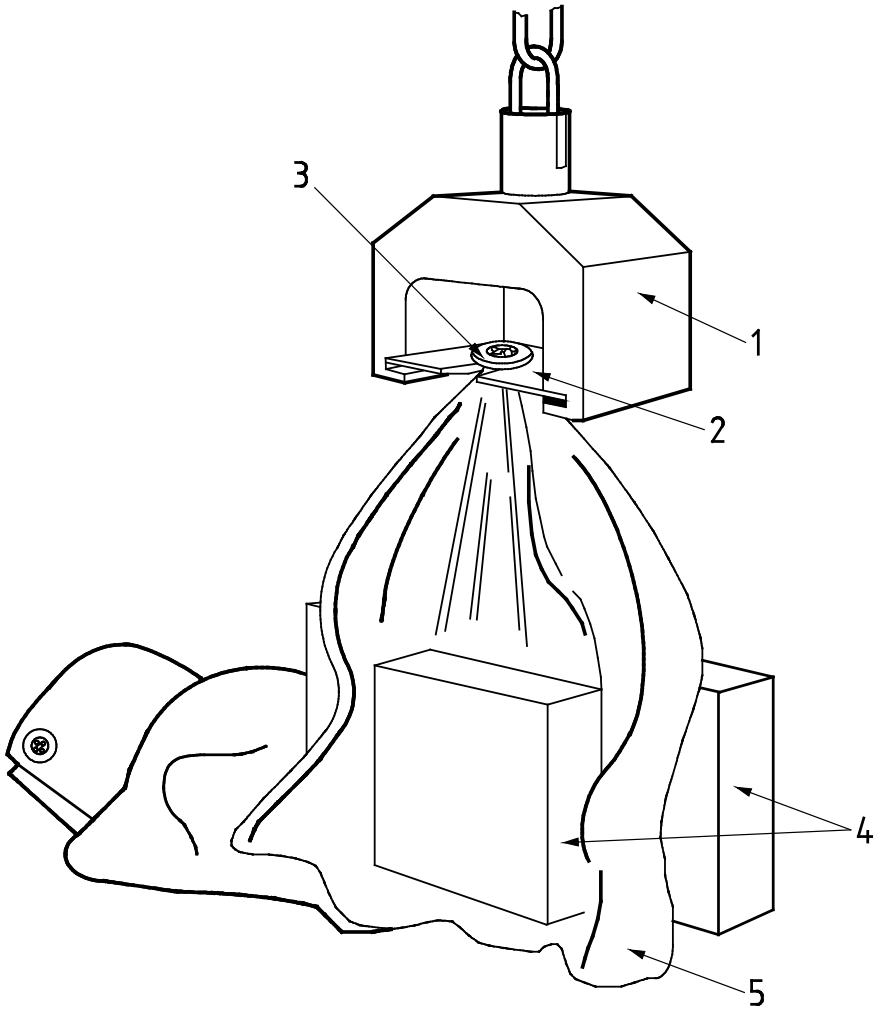
B.3.4 Press fastener lower grip, for testing of press fasteners including poppers, an example is given in Figure B.4.

NOTE The dimensions of this grip have been found to be suitable to test the majority of press fasteners used on children's garments.

B.3.5 Flat-faced clamping device, for use as the lower grip for testing of all attachments other than press fasteners, and slide fastener puller attachments, comprising a clamping device fitted with a front jaw face (25 ± 1) mm x (25 ± 1) mm, and a back jaw face not less than (25 ± 1) mm x (50 ± 1) mm.

B.3.6 Clamping device with hook, as shown in BS 3084:2006, Figure B.1, for testing of embellishments attached to slide fastener pullers.

B.3.7 Masking plate, as described in BS 3084:2006, B.2.2, for testing of embellishments attached to slide fastener pullers.



Key

1 Button box

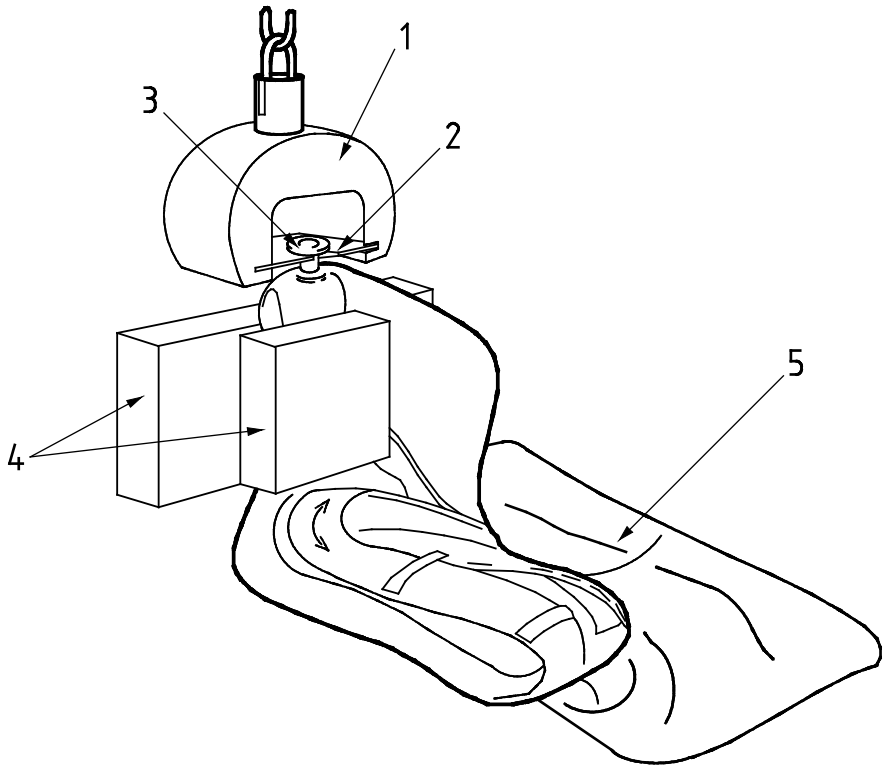
2 Slotted plate

3 Button under test

4 Flat faced clamping device

5 Garment fabric

a) Example of a button box showing a sewn-on button under test

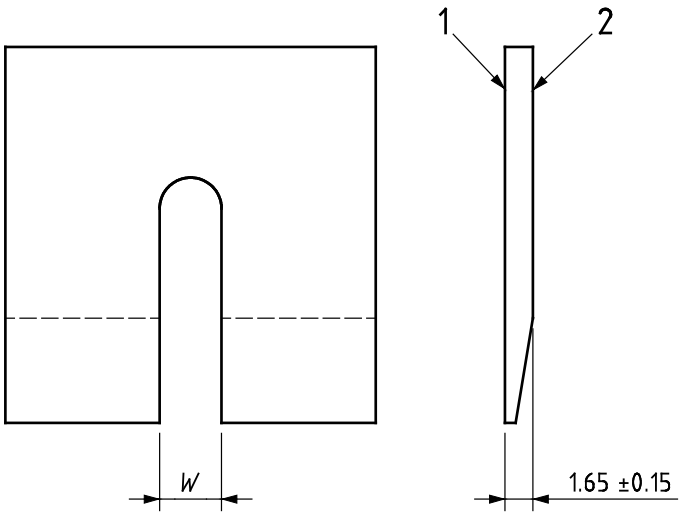


Key

1 Button box
2 Slotted plate
3 Button under test
4 Flat faced clamping device
5 Garment fabric

b) Example of a tack button under test

Figure B.1 — Examples of buttons under test

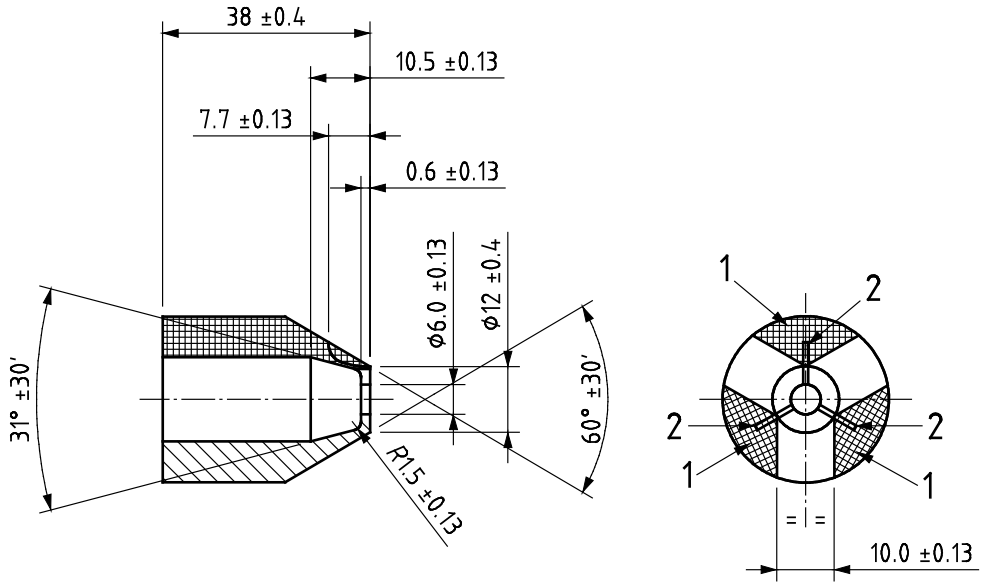


Key

1 Upper surface
2 Lower surface

Figure B.2 — Plate for use in button box

Linear dimensions are in millimetres



Key

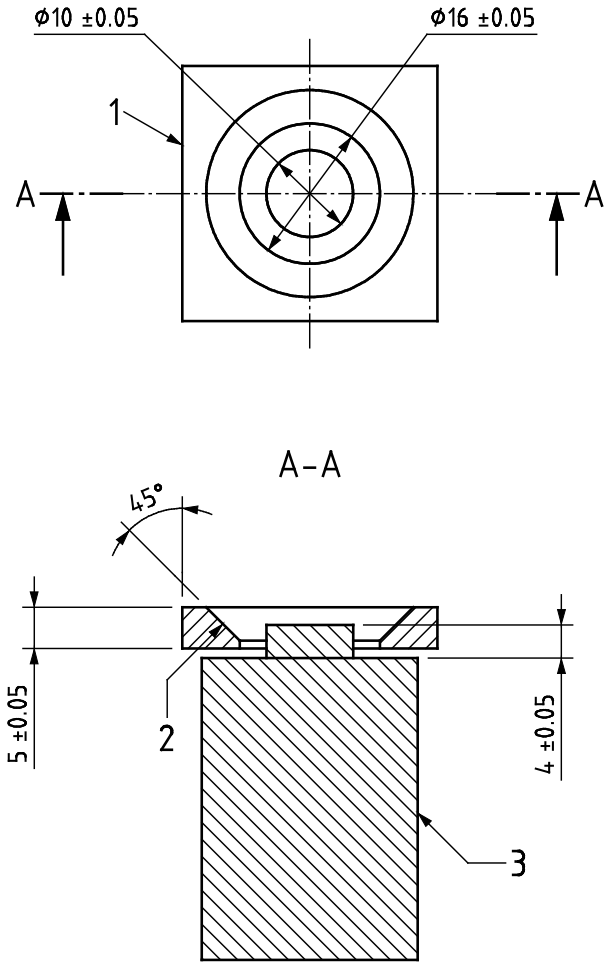
1 Areas to be machined away to produce blank jaw segments

2 Slots produced by a 0,4 mm wide slitting saw

NOTE The dimensions given above are for engineering purposes.

Figure B.3 — Example of a suitable grip for testing 13, 14 and 15 ligne (8,25 mm, 8,5 mm and 9,5 mm) poppers

Linear dimensions are in millimetres



Key

1 Clamping ring

2 Chamfer to allow for upper head grip

3 Central post

Figure B.4 — Example of lower grip for testing 13,14 and 15 ligne (8,25 mm, 8,5 mm and 9,5 mm) press fasteners

B.4 Atmosphere for conditioning and testing

The atmosphere for conditioning and testing should be as specified in EN ISO 139. All test specimens should be conditioned in this atmosphere for 4 h before testing.

B.5 Sampling and selection of test specimens

B.5.1 Sampling

A sufficient number of representative garments or garment assemblies should be taken to provide the number of test specimens recommended in B.5.2. In the case of testing at the production stage the garments or garment assemblies should be taken from the production line(s).

B.5.2 Selection of test specimens

Testing should be carried out on 5 specimens of the following:

— each type of attached component;

— each size of attached component; and

— each component/substrate combination.

It is recognized that this number of specimens might not always be available for testing at the design/development stage. In such circumstances a smaller number may be taken but the test results obtained should be interpreted with caution.

B.6 Procedure

B.6.1 Rate of extension or elongation

Set the rate of extension or elongation of the tensile testing machine to 100 mm/min.

B.6.1.1 Machine set-up and test specimen mounting

B.6.1.1.1 General

Set up the machine and mount the test specimens as described in B.6.1.1 to B.6.1.1.5.

Ensure that the grips are positioned so that the vertical centre lines of the upper and lower grips correspond, and are aligned with the direction of the applied force.

Ensure that the test specimens are mounted centrally so that the longitudinal centre-line of the test specimen passes vertically through the centres of the upper and the lower grips.

Ensure that the garment or fabric assembly is mounted in the lower grip in such a way that no damage or slippage occurs during testing.

B.6.1.1.2 Buttons and tack buttons

Mount the button box, with the appropriate slotted plate (B.3.2) in the top of the machine and the flat-faced clamping device (B.3.7) in the base of the machine. Set the gauge length to (20 ± 0,5) mm.

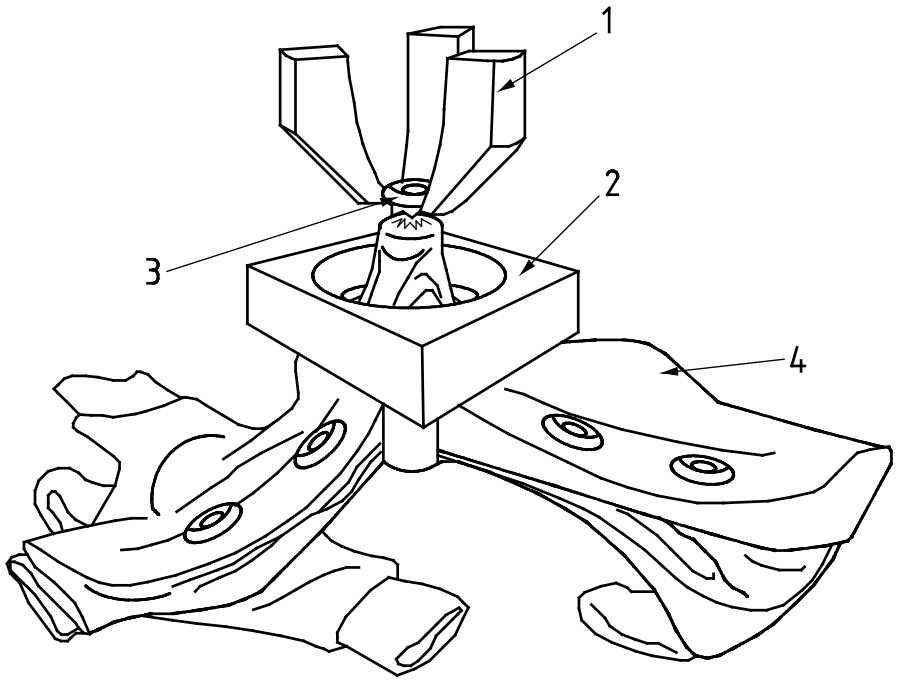
Slide the button or tack button onto the plate, taking care not to stress or damage any of the sewing threads or the shank of the button or tack button.

Fold the main body of the garment below the button to give a double thickness of fabric and clamp this in the lower grip.

B.6.1.1.3 Press fasteners including poppers

Mount the press fastener lower grip (B.3.4) in the base of the machine and the press fastener upper grip (B.3.3) in the top of the machine, so that it is just clear of the lower grip surface. An example of the arrangement is shown in Figure B.5.

Move the upper grip to one side and place main body of the garment over the lower grip; centralize the fastener onto the central post and close the clamping ring. Locate the upper grip onto the outer rim of the fastener and tighten (taking care not to over-tighten).



Key

1 Upper grip

2 Lower grip

3 Press fastener under test

4 Garment fabric

Figure B.5 — Example of the arrangement for testing press fasteners

B.6.1.1.4 Beads and similar sewn on components >3 mm

Mount the button box, with the appropriate slotted plate (B.3.2) in the top of the machine and the flat-faced clamping device (B.3.7) in the base of the machine. Set the gauge length to (20 ± 0,5) mm.

Slide the bead or other component onto the plate, taking care not to stress or damage any of the sewing threads.

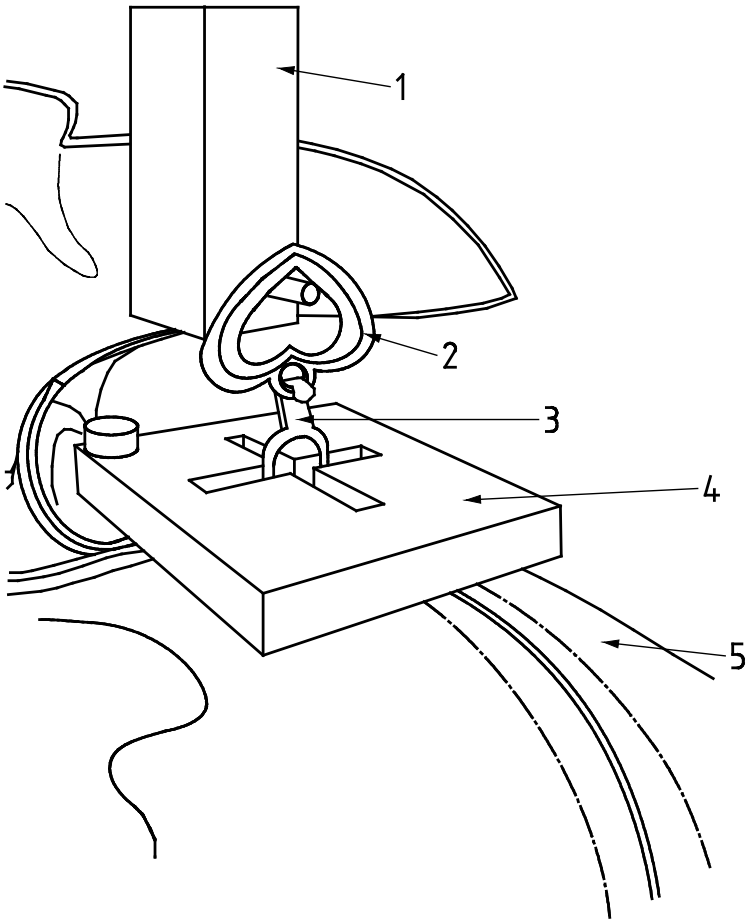
Fold the main body of the garment below the bead or other component to give a double thickness of fabric and clamp this in the lower grip.

B.6.1.1.5 Embellishments attached to zip/ slide fastener pullers

Mount the masking plate (B.3.7) in the base of the machine. Mount either the clamping device with hook (B.3.6) or the wedge-type clamping device (B.3.5) into the top of the machine, as appropriate to the type of embellishment being tested. An example of the arrangement is shown in Figure B.6.

NOTE The gauge length required will depend on the length of the slider puller and its embellishment.

Pass the puller with its embellishment through the hole in the masking plate and secure the embellishment into or onto the upper grip so that it is secure but without pre-tension.



Key

1 Clamping device with hook

2 Embellishment

3 Slide fastener puller

4 Masking plate

5 Garment fabric

Figure B.6 — Example of the arrangement for testing embellishments attached to slide fastener pullers

B.6.2 Operation of the tensile testing machine

Set the machine to record the maximum force. Start the movable grip in motion until the component becomes detached from the garment or fails.

Record the maximum force in Newton's to the nearest 0,1 N and the mode of failure as follows:

— breakdown of the component;

— breakdown of the means of attachment;

— breakdown of the fabric.

B.7 Test report

The test report should include the following information:

a) number and date of this Technical Report, i.e. CEN/TR 16792:2014;

b) date of the test;

c) garment description, and style number where applicable;

d) name of supplier and name of factory, as applicable;

e) gauge length used, in millimetres (mm);

f) condition of test specimens (including any pre-treatment applied);

g) number of test specimens;

h) component type(s) and size(s), substrate(s) and, where applicable, location of the components tested;

i) for each specimen tested, the removal force in Newtons to the nearest 0,1 N, and the mode of failure;

j) any deviation from the procedure including use of alternative gripping devices.

k) type clamping device or pinch grip.

Annex C
(informative)

Method for determination of the security of attachment of non-grippable attached components

C.1 General

COMMENTARY ON ANNEX C

The method given in this annex involves a washing and drying process and provides an example of a wash to assess the durability of attachment of components It is not to assess the performance of the garment. For this reason the test conditions are much more aggressive than the conditions used in normal laundering.

The following is an example of suitable a wash test which gives a very aggressive wash action. At the time of drafting this Technical Report, an equivalent wash programme for the Wascator washing machine, as specified in EN ISO 6330, is not available.

C.2 Principle

A set of test specimens, and a reference specimen, are examined and a detailed record made of the location, means of attachment and condition of all attached components. The test specimens are washed and dried, while the reference specimen is retained without treatment. The attached components on the test specimens are re-examined with reference to the records from the initial examination, and compared with the reference specimen, and any changes recorded.

C.3 Materials

C.3.1 Phosphate reference detergent, with the composition given in Table C.1.

Table C.1 — Composition of non-phosphate reference detergent

Composition	**Reference detergent** %
Linear sodium alkylbenzene sulfonate (mean length of alkane chain C11,5)	7,5 (± 0,5)
Ethyloxylated fatty alcohol C_{12-18} (7EO)	4,0 (± 0,3)
Sodium soap (chain length C_{12-17} 46%; C_{18-20} 54%)	2,8 (± 0,2)
Foam inhibitor (DC-42485)	5,0 (± 0,3)
Sodium aluminium silicate zeolite 4A	25,0 (± 1,0)
Sodium carbonate	9,1 (± 1,0)
Sodium salt of a copolymer from acrylic and maleic acid	4,0 (0 ±,2)
Sodium silicate (SiO_2:Na_2O = 3,3:1	2,6 (0 ± 2)
Carboxymethylcellulose (CMC)	1,0 (± 0,1)
Diethylene-triamine penta (methylene phosphoric acid)	0,6

Sodium sulfate	6,0 (± 0,5)
Water	9,4
Sodium perborate tetrahydrate (as separate addition)	20,0
Tetra-acetylethylenediamine (TAED) (100 % active) (as separate addition)	3,0
Total	100,0 %

C.3.2 Sodium perborate

C.4 Apparatus

C.4.1 Washing machine, single bath, with a process tank of (55 ± 2) litres capacity, fitted with a side impeller with a diameter of 150 mm and a rotation speed of 560 ± 30 rev/min, allowing for a continuous wash action, fitted with a temperature controller capable of maintaining wash temperatures of (40 ± 2) °C, (50 ± 2) °C and (60 ± 2) °C . Normal operating capacity is (40 ± 2) litres[1].

C.4.2 Spin dryer.

C.4.3 Tumble dryer, conforming to EN ISO 6330 type A.

C.4.4 Mesh drying trays, with a non-rusting finish, large enough for the test specimens to be laid out flat.

C.4.5 Balance, capable of weighing up to at least 2 kg with an accuracy of ± 25 g.

C.4.6 Ballast pieces, made of 100% knitted polyester texturized filament fabric having a mass per unit area of 310 g/m² ± 20 g/m². Ballast pieces should consist of four thicknesses of fabric, overlocked together on all four sides and bar tacked at the corners. The pieces should measure 20cm ± 4 cm x 20 cm ± 4 cm. Each ballast piece should weigh (50 ± 50 g. (Conforming to EN ISO 6330 type III 100 % polyester.)

C.4.7 Thermometer, with an accuracy of ± 2 C.

C.4.8 Timer, capable of measuring 15 min with an accuracy of ± 30 sec.

C.5 Selection of test specimens and reference specimen

A sufficient number of garments or garment assemblies should be selected to enable testing of 5 specimens of the following:

— each type of attached component;

— each size of attached component; and

— each component/substrate combination.

It is recognized that this number of specimens might not always be available for testing at the design/development stage. In such circumstances a smaller number may be taken but the test results obtained should be interpreted with caution.

[1] A Durawash machine is an example of a suitable machine. Durawash is a trade name owned by Advanced Dyeing Solutions Ltd., Bretfield Court, Dewsbury, West Yorkshire, WF12 9DB, UK, and is an example of a suitable product available commercially. This information is given for the convenience of users of this document and does not constitute an endorsement by CEN of this product.

In addition, a further complete garment or garment assembly should be retained, untreated, for use as a reference specimen.

C.6 Wash temperature and drying method

C.6.1 Wash temperature

The wash temperature used for testing should be (10 ± 2) °C above the maximum recommended wash temperature for the garment. For hand wash only garments a wash temperature of (40 ± 2) °C should be used.

C.6.2 Drying method for garments with fused or glued on components

Garments with fused or glued on components, including garments labelled as “Do not tumble dry” by means of a care symbol or words, should be tumble dried at the hottest setting for 90 min.

C.6.3 Drying method for garments without fused or glued on components

For garments without fused or glued on components, if the care instructions indicate that the garment may be tumble dried the garment should be tumble dried at the recommended setting until dry. If the care instructions indicate that the garment is not to be tumble dried, it should be dried flat on a mesh drying tray (C.3.4).

C.7 Procedure

C.7.1 Initial assessment of test specimens

Examine each attached component on each of the test specimens and record its location and means of attachment, and condition. Compare all the test specimens with each other and with the reference specimen and record any differences.

C.7.2 Preparation of the washing machine

Fill the washing machine with 40 litre of water. Heat the water to the relevant temperature in accordance with C.6.1 and maintain it at this temperature, checking the temperature using the thermometer (C.3.7).

C.7.3 Wash load

Weigh the test specimens and make the load up to a total of 1,0 kg ± 50 g with the ballast pieces (C.3.6).

C.7.4 Detergent

Weigh out (40 ± 1) g of detergent (C.3.1) and (10 ± 1) g of sodium perborate.

C.7.5 Wash cycle

Place the ballast pieces, detergent and sodium perborate into the machine and run the machine for approximately 1 min to dissolve the powders. Then add the test specimens and run the machine for a further (15 ± 1) min, ensuring that the test specimens remain moving in the water for the duration of the test.

C.7.6 Rinsing and spinning

At the end of the 15 min wash cycle remove the test specimens from the machine and rinse thoroughly in cold water to ensure the removal of all the detergent. Spin dry for a maximum of 1 min to remove excess water.

C.7.7 Drying

Dry the test specimens in accordance with C.6.2 or C.6.3, as applicable.

C.7.8 Final assessment

Re-examine each test specimen with reference to the records of the initial examination (see C.7.1) and compare it with the reference specimen. For each attached component recorded in the initial assessment, record any changes as follows:

a) no change;

b) negligible change, i.e. visible change, but component remains securely attached;

c) slight change, i.e. detectable loosening of component;

d) distinct change, i.e. visibly obvious breakdown of the means of attachment and/or fabric breakdown;

e) complete failure, i.e. the component has come off.

For any component showing changes, record the mode of failure, e.g. breakdown of fusing or glue (delamination), breakage of sewing threads, sewing threads coming undone, breakdown of the attached component, breakdown of the fabric.

C.8 Test report

The test report should include the following information:

a) the number and date of this Technical Report, i.e. CEN/TR 16792:2014;

b) the date of the test;

c) garment description, and style number where applicable;

d) name of supplier and/or name of factory, as applicable;

e) number and description of test specimens;

f) wash temperature used;

g) drying procedure;

h) results of the assessment in accordance with C.7.8;

i) any deviations from the test method.

Annex D
(informative)

Information to be supplied by the designer to the manufacturer

For every garment design, the designer should provide the manufacturer with the following information, as applicable:

a) description of the garment;

b) the intended use of the garment;

c) the age group for which the garment is intended;

d) full details of the garment including at least the following:

   1) the size specification;

   2) the fabric(s), including the weight and construction;

   3) sewing threads and garment construction;

   4) any filling materials;

   5) any elasticated areas;

   6) description, details, position and method of attachment of any attached components and/or embellishments. This may include the following:

      i) buttons;

      ii) press fasteners;

      iii) slide fasteners;

      iv) touch and close fasteners;

      v) pom-poms;

      vi) bows;

      vii) cords and/or ribbons;

   7) any garment washing or other treatment that is part of the manufacturing process, e.g. stone washing .

The descriptions may be provided in writing or in the form of a drawing, a template and/or a sample garment.

Annex E
(informative)

Rational for age definitions

It is well documented that children of similar ages exhibit similar behaviours and have similar development stages. But children of the same age can vary in height. The definitions in this standard have been selected to ensure the tallest children in Europe are not exposed to hazards from unsuitable garment features.

In the definitions, age provides the typical behaviours, while height gives the size of child the garment is intended to fit.

Annex F
(informative)

Test method for tensile strength of buttons and recommended minimum strength.

F.1 General

This method describes a test method to determine the resistance to strain imposed on buttons during both the manufacture and normal wear of clothing. It is applicable for all types of buttons for fastening or decoration. It provides a minimum tensile strength for buttons suitable for use on clothing on infants.

It is intended this method will assist garment makers to select buttons appropriate buttons, and button suppliers to manufacture buttons of suitable quality

F.2 Principle

The buttons are subjected to a tension test where by the load is steadily increased until a point of breakage occurs.

F.3 References

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

EN ISO 7500, *Metallic materials. Verification of static uniaxial testing machines. Tension/compression testing machines. Verification and calibration of the force-measuring system*

EN ISO 2062, *Textiles. Yarns from packages. Determination of single-end breaking force and elongation at break using constant rate of extension (CRE) tester*

F.4 Definitions

F.4.1 Button knob or disc which is attached to garments as a means of fastening or decoration (definition from BS 1903).

F.5 Apparatus

F.5.1 Constant rate of extension (CRE) tensile-testing machine, provided with means for indicating and recording the force applied to the test specimen in stretching it to rupture. The metrological confirmation system for the tensile testing machine should be in accordance with EN ISO 10012. Under conditions of use, the accuracy of the machine should be Class 1 in accordance with EN ISO 7500-1:2004. The error of the indicated or recorded maximum force at any point in the range in which the machine is used should not exceed 1%.

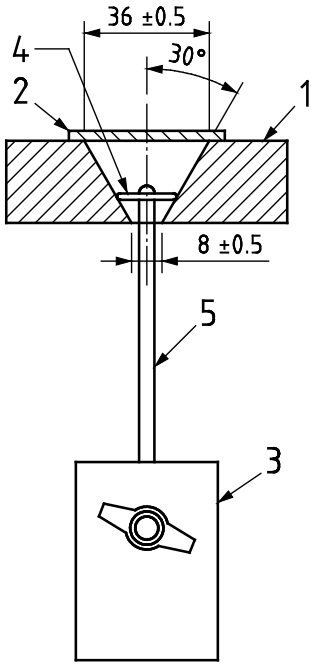
F.5.2 The machine should be capable of maintaining a constant rate of extension of 100 mm/min, with an accuracy of 10 %.

F.5.3 The machine should be such that it is possible to set the lower surface of the upper grip and the clamping point of the lower grip 75 mm, to within 1 mm.

F.5.4 Upper grip should be designed to evenly support the outer rim of the button (see Figure F.1).

F.5.5 Braided cord with a minimum breaking force of 300 N when tested in accordance with EN ISO 2062[2].

F.5.6 Lower grip should be able to grip the 2 ends of the braided cord without slippage as the tension is applied.



Key

1 Button Holder Clamp

2 Safety cover

3 Lower clamp for gripping the braided cord

4 Button

5 Braided cord

Figure F.1 — Example of a suitable grip assembly

F.6 Sampling

Ten buttons of each colour, style and size to be attached to the garment.

F.7 Procedure

F.7.1 Record the button type, number of holes or shank type and maximum dimension of the button in mm to the nearest 0,5 mm.

F.7.2 Pass the looped braided cord through the holes in a test button (through two holes diagonally opposite each other for a four hole button or through the hole in the shank of the button).

F.7.3 Pass the two ends of the cord through the hole in the upper grip and the button and secure in the lower grip without applying tension.

2 An example of a suitable braided aramid cord is TON-UP fishing line by Kryston. This information is given for the convenience of users of this document and does not constitute an endorsement by CEN of the product.

F.7.4 Set the machine in motion at a rate of extension of 100 mm/min and record the breaking force for each button in Newtons to the nearest 0,1 N.

F.8 Recommended performance

When subjected to the above test method, all buttons to be used on all babies and infant's clothing should meet a minimum breaking force of 70 N.

F.9 Test report

The test report should include the following information:

a) number and date of this Technical Report, i.e. CEN/TR 16792:2014;

b) date of the test;

c) button description, maximum dimension in mm and style number where applicable;

d) name of supplier and name of factory, as applicable;

e) condition of test specimens;

f) number of test specimens;

g) for each specimen tested, the removal force in Newtons to the nearest 0,1 N;

h) any deviation from the procedure.

Annex G
(normative)

Slide/zip fastener specification

At time of drafting this Technical Report, no European Standard has been published. Various national standards are available with different scopes and different requirements. The most recent and comprehensive performance requirements for children's clothing are provided by BS 3084:2006. It is recommended BS 3084:2006 is used until a European Standard is published, when this recommendation will be superseded.

NOTE At the time of drafting this Technical Report the following standard is under development:

— *Slide fasteners (zips) — Specification*

Once published, this standard will supersede the conflicting clauses of this document.

British Standard *BS 3084:2006 Slide fasteners (Zips) – Specification*
The standard states test methods and performance specifications for all types of zips in general use. Requirements are designated by performance codes A-E (ultra-light to heavy) according to suggested end-use. The 2006 edition includes a new test in annex J for single stringer slider retention which was added to consider safety of children's clothing.

Turkish Standard TS 11516 *Tekstil Mamulleri – Fermuar / Textiles - Zipper (Slide Fastener)*
This is very similar to BS 3084 in many respects, including most of the figures but there is one significant difference, which is a table defining the performance codes A to E according to chain width, rather than suggested end-use.

French Standards *NF G91-005:1984 Slide fasteners - Methods of Testing, Mechanical Characteristics*
This standard describes 9 test methods, most of which are similar to other standards except for "tensile strength of slider" which uses a different gripping method and "Endurance" which specifies a chain lateral strength test to be performed after reciprocation.

NF G91-006:1984 *Slide fasteners - Classification, Mechanical Characteristics*
This standard sets out performance specifications for metal fasteners and coil fasteners, both with either cotton or synthetic tapes. The specifications are assigned according to the chain width of the zippers. A significant problem in adopting these standards is that they do not cover plastic injection moulded zippers, which are widely used in children's clothing, particularly baby wear.

German Standards

DIN 3416:1998-05 *Slide fasteners - Concepts*

DIN 3417:1998-05 *Metallic slide fasteners - Design types, dimensions, materials*

DIN 3418:1998-05 *Plastic slide fasteners - Design types, dimensions, materials*

DIN 3419-1:1998-05 *Slide fasteners - Part 1: Technical delivery conditions*

DIN 3419-2:1998-05 *Slide fasteners - Part 2: Labelling for consumers*

DIN 3419-1 sets out the performance specifications for all types of zips in general use. Performance requirements are designated according to zip type (metal, coil, moulded) and chain width.

Annex H
(normative)

Small parts assessment

Small non-textile parts which might become detached from a child's garment can present a choking hazard**.** These can be whole components or pieces of components**.**

A small part is defined as one which when dropped, without compression into the cylinder in any orientation, fits totally within the cylinder (Figure H 1).

Dimensions in millimetres

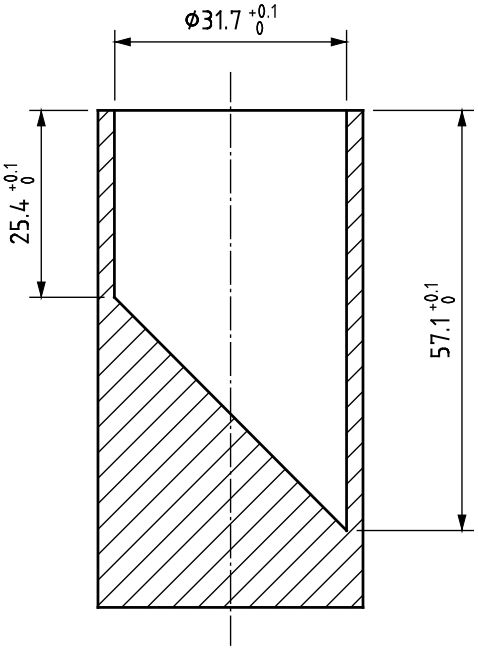


Figure H.1 — Small parts assessment

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[23] DIN 3418:1998-05 *Plastic slide fasteners - Design types, dimensions, materials*

[24] DIN 3419-1:1998-05 *Slide fasteners - Part 1: Technical delivery conditions*

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