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Textiles and textile products

Part 3: Safety of children's clothing — Security of attachment of metal mechanically applied press fasteners — Test method

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Textiles et produits textile - Partie 3 : Sécurité des vêtements d'enfant - Sécurité d'attache des boutons-pression métalliques appliqués mécaniquement - Méthode d'essai

Textilien und textile Produkte - Teil 3: Sicherheit von Kinderbekleidung - Sicherheit der Befestigung von mechanisch befestigten Druckknöpfen - Prüfverfahren

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European foreword

This document (CEN/TS 17394-3:2021) has been prepared by Technical Committee CEN/TC 248 "Textiles and Textile Products", the secretariat of which is held by BSI.

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Introduction

The aim of this document is to assess the attachment strength of metal mechanically applied press fasteners.

This document provides a method of test. A document providing a technical specification for security of attachment of applied components for infant's clothing is under development.

This document has been developed from Annex B of CEN/TR 16792:2014.

1 Scope

This document defines a test method for security of attachment of functional and decorative metal mechanically applied press fasteners to children's clothing including for example gloves, hats, scarves, hosiery, ties, and textile belts.

IMPORTANT: Eyelets and rivets cannot be tested by this method as the integrity of the component when attached to textile fabrics is destroyed in the gripping action. Eyelets and rivets are assessed as described in CEN/TS 17394-4:2021.

This document does not apply to:

- a) child care articles;
- b) shoes, boots and similar footwear;
- c) toys (see NOTE 2);
- d) other articles sold with clothing.

NOTE 1 The above items are covered by other CEN Technical Committees and as such are out of the scope of this document.

NOTE 2 Disguise costumes including carnival costumes are examples of clothing which are also toys and fall within the scope of the Toy Safety Directive.

The scope of this document is limited to metal mechanically applied components. Work is in progress to develop standards for other garment components.

- EN 17394-2:2020, *Textiles and textile products — Part 2: Safety of children's clothing — Security of attachment of buttons — Test method*
- CEN/TS 17394-4:2021, *Textiles and textile products — Part 4: Safety of children's clothing — Security of attachment of components except buttons and metal mechanically applied press fasteners — Test method*

Performance requirements are provided in CEN/TS 17394-1:2021.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

CEN/TS 17394-4:2021, *Textiles and textile products — Part 4: Safety of children's clothing — Security of attachment of components except buttons and metal mechanically applied press fasteners — Test method*

EN ISO 7500-1:2018, *Metallic materials - Calibration and verification of static uniaxial testing machines - Part 1: Tension/compression testing machines - Calibration and verification of the force-measuring system (ISO 7500-1:2018)*

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

3.1

press fastener

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

Note 1 to entry: Press fasteners include poppers and snaps.

Note 2 to entry: These may be functional or decorative.

3.2

rivet

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

Note 2 to entry: These may be functional or decorative.

3.3

eyelet

component used for example to reinforce a hole through a part of 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 the fabric

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 ventilate a garment.

Note 3 to entry: Eyelets may be functional or decorative.

3.4

child or young person

person aged from birth up to age 14 years (that is up to and including 13 years and 11 months) which includes all boys of height up to 187 cm and all girls of height up to 176 cm

[SOURCE: EN 14682:2014, modified — merged Clauses 2.1 and 2.2]

3.5 children's clothing

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

[SOURCE: EN 14682:2014, 2.3]

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

[SOURCE: CEN/TR 16752:2014, 3.10]

3.7 ligne

unit of measurement of components used by the textile industry indicating the largest dimension of the diameter

Note to entry: 1 ligne = 0.635mm

4 Sampling and selection of test specimens

A minimum of five replicate specimens of representative garments or garment assemblies shall be selected to ensure:

- each type of attached component;
- each size of attached component;
- each component, fabric/substrate combination, including interlining

is tested.

IMPORTANT: Eyelets and rivets cannot be assessed by this method as the integrity of the component when attached to textile fabrics is destroyed in the gripping action. Eyelets and rivets shall be assessed in accordance with CEN/TS 17394-4:2021.

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.

5 Procedure

5.1 General

This is a laboratory-based method designed for testing of the security of attachment of press fasteners, both functional and decorative. It may be used to test finished garments or garment assemblies at the relevant stages of garment design and production.

5.2 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 detachment is recorded.

Annex B provides additional comment on gripping of specimens.

A method for in-line factory process monitoring is described in Annex A.

5.3 Apparatus

5.3.1 Constant rate of extension (CRE) tensile-testing machine

The device should have a 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 shall be Class 1 in accordance with EN ISO 7500-1:2018. The error of the indicated or recorded maximum force at any point in the range in which the machine is used shall not exceed 1 %. The machine shall be capable of maintaining a constant rate of extension of 100 mm/min, with an accuracy of 10 %.

The machine shall 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.

5.3.2 Upper grip

For testing of press fasteners, the upper grip shall comprise 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 shall be evenly spaced. The profile of the claw shall be such that it is capable of gripping the fastener and can be tightened to grip it firmly without causing deformation or damage to the integrity of the fastener rim. An example of a suitable upper grip for the testing of 12, 14 and 15 ligne (8,25 mm, 8,89 mm and 9,52 mm) press fastener is shown in Figure 1 and Figure 2.

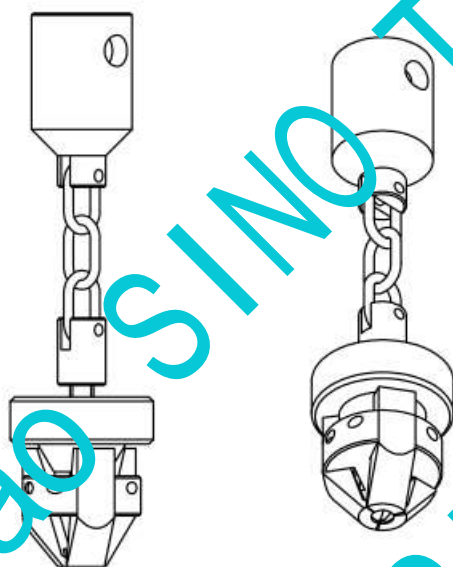
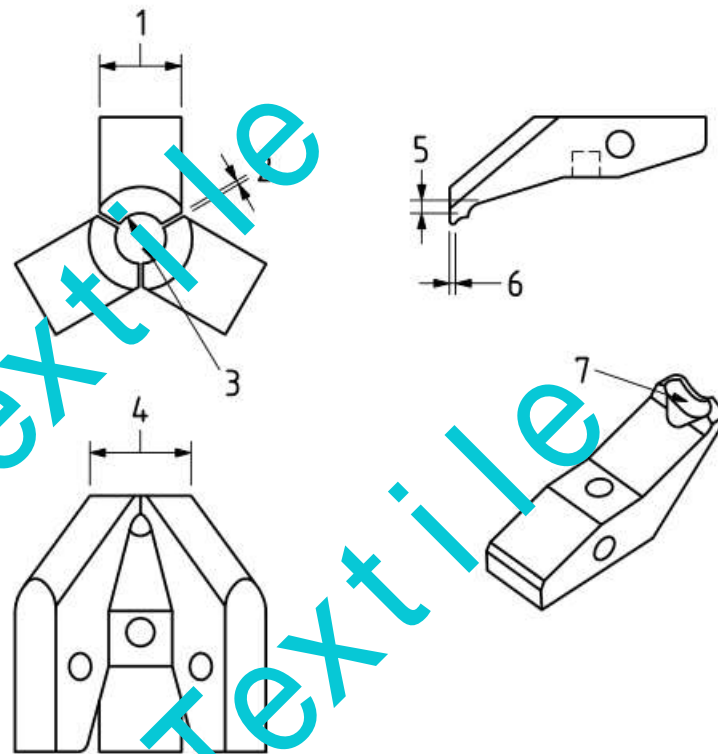


Figure 1 — Example of upper grip

All measurements in mm



Key

- 1 $10,0 \pm 0,5$
- 2 nominally 0,4
- 3 diameter $6,00 \pm 0,15$
- 4 $12,0 \pm 1,0$
- 5 clearance 1,5 with $+1,0 - 0,0$
- 6 $0,60 \pm 0,15$
- 7 clearance

Figure 2 — Engineering diagrams with critical shapes and dimensions

5.3.3 Lower grip

The lower grip shall allow for sufficient clamping pressure in order to prevent slippage of the fabric of the garment or garment assembly. An example is shown in Figure 3 and Figure 4.

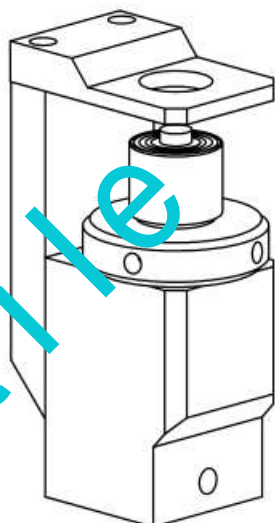
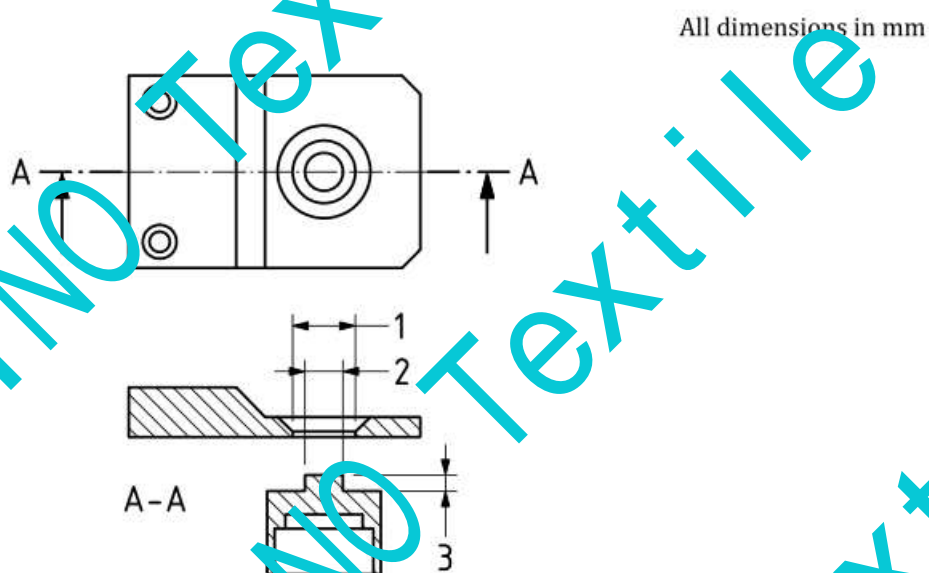


Figure 3 — Example of lower clamp and post ring grip



Key

- A-A section
- 1 diameter $10,00 \pm 0,05$
- 2 diameter $16,00 \pm 0,05$
- 3 height $4,00 \pm 0,05$

Figure 4 — Engineering diagrams in plan and elevation with critical dimensions

5.4 Atmosphere for conditioning and testing

The atmosphere for conditioning and testing should be as defined in EN ISO 139:2005, 3.1

All test specimens shall be conditioned in this atmosphere for at least 4 h before testing.

5.5 Procedure

5.5.1 Rate of extension or elongation

Set the rate of extension or elongation of the tensile testing machine to (100 ± 10) mm/min.

5.5.2 Machine set-up and test specimen mounting

5.5.2.1 Attachment and alignment of grips

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 lower grips.

Align the upper grip down to the top of the lower grip in the machine so that it is just clear of the lower grip surface. Take off the machine.

5.5.2.2 Mounting of specimen

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, no slippage of the specimen shall occur during testing. See Figure 5.

Locate the upper grip onto the outer rim of the fastener, taking care not to over-tighten.

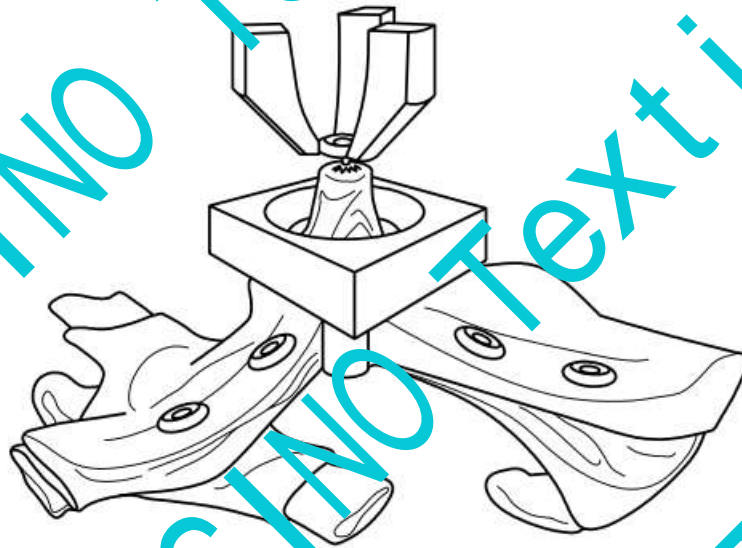


Figure 5 — Example of grips and garment arrangement during testing

5.5.2.3 Operation of the Constant rate of extension (CRE) machine

Record position of the component on the garment, type and size.

Apply a take-up load of 25 N before recording the stress strain curve (this allows for the straightening and alignment of the specimen at the start of the test).

Set the machine to record the maximum force. Start the movable grip in motion until the component becomes detached from the garment or breaks (disassembles). For each component, record

- i. the maximum force in Newtons to the nearest 0,1 N; and
- ii. the mode of detachment (use of a photograph may assist) as follows:
 - component separates
 - breakdown of the fabric
 - component breaks.

NOTE Where the force for removal is lower than the performance requirement, the mode of detachment can provide guidance on the corrective action for the garment maker.

6 Test report

The test report should include the following information:

- a) number and date of this document, i.e. CEN/TS 17394-3:2021;
- b) date of the test;
- c) garment description, and style number where applicable;
- d) identification or name of supplier and name of factory, as applicable;
- e) attached component description and location;
- f) number of test specimens of each type;
- g) any deviation from the procedure;
- h) for each specimen tested, the removal force in Newtons to the nearest 0,1 N, and the mode of detachment for each component part (male and female). The inclusion of a photograph may assist.

Annex A (informative)

Method of test for in-line production process control

The test method described in this document is a laboratory-based method designed for testing of the security attachment of metal mechanically applied press fasteners for compliance with CEN/TS 17394-1. It may be desirable for manufacturers to use alternative test methods using cheaper manual equipment for in-line production process control and continuity of performance, especially for long production runs. Some manufacturers have informally adopted different performance requirements in their factories, noting the equipment may be different and less reliable, to ensure final production always meets the specification.

Suitable equipment for in-line production testing may include manually operated tensile testing equipment, which are considerably cheaper, but lack accuracy for compliance assessment. In that case, manufacturer should set appropriate limits and performance criteria to ensure compliance of final article with this document. Due to this variability, it is highly recommended to set an in-line higher limit for the removal force.

Annex B (informative)

Interlaboratory trial

The CEN working group has undertaken two separate interlaboratory trials to determine the reliability and reproducibility of this method, which has previously been well established in the UK, where some success had been achieved in reducing incidence of garments where these kinds of components had failed.

For the purposes of an interlaboratory trials, reliable specimens are essential. But production of test specimens which within each set are consistent but between sets are variable is extremely difficult.

The CEN working group trials concluded that while within a laboratory it was possible to achieve reasonably consistent data, between laboratories produced inconsistent results. This suggested that the equipment used may not be consistent.

Gripping of the male part of a press fastener, for example is known to deform the component and result in release of the part from a garment. It is critical that the correct gripping methods are followed.

Bibliography

- [1] CEN/TR 16792:2014, *Safety of children's clothing — Recommendations for the design and manufacture of children's clothing — Mechanical safety*
- [2] BS 7907:2007, *Code of practice for the design and manufacture of children's clothing to promote mechanical safety*
- [3] UNE 40902:2008, *Safety of baby garments physical and mechanical properties*
- [4] EN 71-1:2014+A1:2013, *Safety of toys. Mechanical and physical properties Safety of toys: Part 1 Mechanical and physical properties*
- [5] EN ISO 139, *Textiles — Standard atmospheres for conditioning and testing (ISO 139)*
- [6] EN ISO 10012, *Measurement management systems — Requirements for measurement processes and measuring equipment (ISO 10012)*

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