TECHNICAL REPORT

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Footwear — Performance requirements for components for footwear — Uppers

Chaussures — Exigences de performance pour les composants des chaussures — Tiges

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Contents

Page

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

In exceptional circumstances, when a technical committee has collected data of a different kind from that which is normally published as an International Standard ("state of the art", for example), it may decide by a simple majority vote of its participating members to publish a Technical Report. A Technical Report is entirely informative in nature and does not have to be reviewed until the data it provides are considered to be no longer valid or useful.

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

ISO/TR 20879 was prepared by the European Committee for Standardization (CEN) Technical Committee CEN/TC 309, *Footwear*, in collaboration with Technical Committee ISO/TC 216, *Footwear*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

Footwear — Performance requirements for components for footwear — Uppers

1 Scope

This Technical Report establishes the performance requirements for uppers components for footwear (not for the finished footwear), irrespective of the material, in order to assess the suitability for the end use. It also establishes the test methods to be used to evaluate the compliance with the requirements.

This Technical Report applies to uppers for all kinds of footwear as defined in Clause 3.

This Technical Report is intended to be used as a reference between the footwear manufacturer and the supplier. It is not intended for third party certification of finished shoes destined for the consumer.

2 Normative references

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

ISO 31-0, *Quantities and units — Part 0: General principles*

EN 1391, *Adhesives for leather and footwear materials — A method for evaluating the bondability of materials — Minimum requirements and material classification*

EN 1392, *Adhesives for leather and footwear materials — Solvent-based and dispersion adhesives — Test methods for measuring the bond strength under specified conditions*

EN ISO 4047, *Leather — Determination of sulphated total ash and sulphated water-insoluble ash*

EN ISO 4098, *Leather — Chemical tests — Determination of water-soluble matter, water-soluble inorganic matter and water-soluble organic matter*

EN ISO 17693, *Footwear — Test methods for uppers — Resistance to damage on lasting*

ISO 17694, *Footwear — Test methods for uppers and lining — Flex resistance*

ISO 17696, *Footwear — Test methods for uppers, lining and insocks — Tear strength*

ISO 17697, *Footwear — Test methods for uppers, lining and insocks — Seam strength*

ISO 17698, *Footwear — Test methods for uppers — Delamination resistance*

ISO 17699, *Footwear — Test methods for uppers and lining — Water permeability and absorption*

EN ISO 17700, *Footwear — Test methods for uppers, linings and insocks — Colour fastness to rubbing*

ISO 17701, *Footwear — Test methods for uppers, lining and insocks — Colour migration*

ISO 17702, *Footwear — Test methods for uppers — Water resistance*

ISO 17703, *Footwear — Test methods for uppers — High temperature behaviour*

ISO 17704, *Footwear — Test methods for uppers, lining and insocks — Abrasion resistance*

ISO 17705, *Footwear — Test methods for uppers, lining and insocks — Thermal insulation*

ISO 17706, *Footwear — Test methods for uppers — Tensile strength and elongation*

ISO 17709, *Footwear — Sampling location, preparation and duration of conditioning of samples and test pieces*

EN ISO 19952, *Footwear — Vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 19952 apply.

4 Requirements

4.1 General

This Technical Report establishes two different types of performance requirement.

The essential requirements shall all be taken into account. The additional ones can be additionally agreed by the component supplier and the footwear manufacturer as indicated in 4.2 to 4.10.

The results of each single analytical determination, as well as the average values, shall be rounded off in accordance with ISO 31-0.

When taken from finished footwear, the sample shall be prepared in accordance with ISO 17709.

4.2 Performance requirements for uppers components for general purpose sports footwear

4.2.1 Essential requirements

These essential requirements shall be fulfilled in all cases. See Table 1.

Table 1 — Test methods and properties for general sports footwear — Essential requirements

Test method	Property	Requirement		
ISO 17694	Flex resistance	For leather, dry 100 000 cycles (w.v.d.) [a] wet 20 000 cycles (w.v.d.)	For coated leather, dry 100 000 cycles (w.v.d.) wet 20 000 cycles (w.v.d.) at − 5 °C 20 000 cycles (w.v.d.)	For other materials, dry 100 000 cycles (w.v.d.) at − 5 °C 20 000 cycles (w.v.d.)
ISO 17696	Tear strength	⩾ 40 N average tear force		
EN ISO 17700	Colour fastness	Inside staining: method A: if unlined footwear, must comply ⩾ 2/3 after 50 cycles with perspiration solution Outside surface colour change and staining: method A: ⩾ 3 (grey scale) after 150 cycles dry and 50 cycles wet. method B: ⩾ 3 to 4 (grey scale) after 512 cycles dry and 128 cycles wet.		

[a] w.v.d. = without visible damage.

4.2.2 Additional requirements

These additional requirements should be agreed upon by both component supplier and footwear manufacturer. See Table 2.

Table 2 — Test methods and properties for general sports footwear — Additional requirements

Subclause	Test method	Property	Requirement	
4.2.2.1	EN ISO 17693	Lastability	These figures will be influenced by the shape of the footwear $\geqslant$ 7,0 mm (for leather grain crack) $\geqslant$ 6,0 mm (for other materials first damage) NOTE This test method is only applicable for component before lasting.	
4.2.2.2	ISO 17697	Seam strength	$\geqslant$ 10 N/mm (method A)	
4.2.2.3	EN 1392	Bondability [a, b]	$\geqslant$ 4 N/mm	
4.2.2.4	ISO 17699	WVP and WVA	WVP $\geqslant$ 0,8 mg/cm^2.h If WVP < 2,0 mg/cm^2.h then WVA $\geqslant$ 8,0 mg/cm^2	
4.2.2.5	ISO 17701	Colour migration	24 h, colour change and staining $\geqslant$ 4 (grey scale)	
4.2.2.6	ISO 17702	Water resistance	Penetration time $\geqslant$ 60 min, absorption after 60 min $\leqslant$ 20 % (water resistant) Penetration time $\geqslant$ 180 min, absorption after 180 min $\leqslant$ 25 % (highly water resistant)	
4.2.2.7	ISO 17703	High temperature resistance	The material must keep $\geqslant$ 80 % of its original tensile strength and elongation	
4.2.2.8	ISO 17704	Abrasion resistance	dry 25 600 / wet 12 800	No worse than moderate abrasion degree
4.2.2.9	EN ISO 4098 EN ISO 4047	Water soluble substance content	$\leqslant$ 3 % sulfated ashed water soluble (SAWS) $\leqslant$ 18 % total water soluble (TWS)	
4.2.2.10	ISO 17706	Breaking strength and elongation	$\geqslant$ 10 N/mm, elongation $\geqslant$ 15 % (across) and $\geqslant$ 7 % (along)	
4.2.2.11	ISO 17698	Delamination resistance	dry $\geqslant$ 0,5 N/mm (for leather) wet $\geqslant$ 0,3 N/mm (for leather) dry $\geqslant$ 1,0 N/mm (for other materials) wet $\geqslant$ 0,7 N/mm (for other materials)	

[a] Reference adhesives and reference material shall comply with EN 1391.

[b] The dimensions and number of test pieces for this test method shall be those included in ISO 17709.

4.3 Performance requirements for uppers components for school footwear

4.3.1 Essential requirements

These essential requirements shall be fulfilled in all cases. See Table 3.

Table 3 — Test methods and properties for uppers components for school footwear — Essential requirements

Test method	Property	Requirement		
ISO 17694	Flex resistance	For leather, dry 100 000 cycles (w.v.d.) [a] wet 20 000 cycles (w.v.d.)	For coated leather, dry 100 000 cycles (w.v.d.) wet 20 000 cycles (w.v.d.) at − 5 °C 20 000 cycles (w.v.d.)	For other materials, dry 100 000 cycles (w.v.d.) at − 5 °C 20 000 cycles (w.v.d.)
ISO 17696	Tear strength	⩾ 40 N average tear force		
EN ISO 17700	Colour fastness	Inside staining method A: if unlined footwear, must comply ⩾ 2/3 after 50 cycles with perspiration solution Outside surface colour change and staining method A: ⩾ 3 (grey scale) after 150 cycles dry and 50 cycles wet method B: ⩾ 3 to 4 (grey scale) after 512 cycles dry and 128 cycles wet		

[a] w.v.d. = without visible damage.

4.3.2 Additional requirements

These additional requirements should be agreed by both component supplier and footwear manufacturer. See Table 4.

Table 4 — Test methods and properties for uppers components for school footwear — Additional requirements

Subclause	Test method	Property	Requirement	
4.3.2.1	EN ISO 17693	Lastability	These figures will be influenced by the shape of the footwear $\geqslant$ 7,0 mm (for leather grain crack) $\geqslant$ 6,0 mm (for other materials first damage) NOTE This test method is only applicable for component before lasting.	
4.3.2.2	ISO 17697	Seam strength	$\geqslant$ 10 N/mm (method A)	
4.3.2.3	EN 1392	Bondability [a, b]	$\geqslant$ 4 N/mm	
4.3.2.4	ISO 17699	WVP and WVA	WVP $\geqslant$ 0,8 mg/cm^2.h If 0,8 mg/cm^2.h $\leqslant$ WVP $<$ 2,0 mg/cm^2.h then WVA $\geqslant$ 8,0 mg/cm^2	
4.3.2.5	ISO 17701	Colour migration	4 h, colour change and staining $\geqslant$ 4 (grey scale)	
4.3.2.6	ISO 17702	Water resistance	Penetration time $\geqslant$ 60 min, absorption after 60 min $\leqslant$ 20 % (water resistant) Penetration time $\geqslant$ 180 min, absorption after 180 min $\leqslant$ 25 % (highly water resistant)	
4.3.2.7	ISO 17703	High temperature resistance	The material must keep $\geqslant$ 80 % of its original tensile strength and elongation	
4.3.2.8	ISO 17704	Abrasion resistance	dry 25 600 wet 12 800	No worse than moderate abrasion degree
4.3.2.9	ISO 17706	Breaking strength and elongation	$\geqslant$ 10 N/mm, elongation $\geqslant$ 15 % (across) and $\geqslant$ 7 % (along)	
4.3.2.10	EN ISO 4098 EN ISO 4047	Water soluble substance content	$\leqslant$ 3 % sulfated ashed water soluble (SAWS) $\leqslant$ 18 % total water soluble (TWS)	
4.3.2.11	ISO 17698	Delamination resistance	dry $\geqslant$ 0,5 N/mm (for leather) wet $\geqslant$ 0,3 N/mm (for leather)	
			dry $\geqslant$ 1,0 N/mm (for other materials) wet $\geqslant$ 0,7 N/mm (for other materials)	No worse than moderate abrasion degree

[a] Reference adhesives and reference material shall comply with EN 1391.

[b] The dimensions and number of test pieces for this test method shall be those included in ISO 17709.

4.4 Performance requirements for uppers components for casual footwear

4.4.1 Essential requirements

These essential requirements shall be fulfilled in all cases. See Table 5.

Table 5 — Test methods and properties for uppers components for casual footwear — Essential requirements

Test method	Property	Requirement		
ISO 17694	Flex resistance	For leather, dry 80 000 cycles (w.v.d.) [a] wet 20 000 cycles (w.v.d.)	For coated leather, dry 80 000 cycles (w.v.d.) wet 20 000 cycles (w.v.d.) at − 5 °C 20 000 cycles (w.v.d.)	For other materials, dry 80 000 cycles (w.v.d.) at − 5 °C 20 000 cycles (w.v.d.)
ISO 17696	Tear strength	⩾ 40 N average tear force		
EN ISO 17700	Colour fastness	Inside staining method A: if unlined footwear, must comply ⩾ 2/3 after 50 cycles with perspiration solution Outside surface colour change and staining method A: ⩾ 3 (grey scale) after 150 cycles dry and 50 cycles wet method B: ⩾ 3 to 4 (grey scale) after 512 cycles dry and 128 cycles wet		

[a] w.v.d. = without visible damage.

4.4.2 Additional requirements

These additional requirements should be agreed by both component supplier and footwear manufacturer. See Table 6.

Table 6 — Test methods and properties for uppers components for casual footwear — Additional requirements

Subclause	Test method	Property	Requirement		
4.4.2.1	EN ISO 17693	Lastability	These figures will be influenced by the shape of the footwear $\geqslant$ 7,0 mm (for leather grain crack) $\geqslant$ 6,0 mm (for other materials first damage) NOTE This test method is only applicable for component before lasting.		
4.4.2.2	ISO 17697	Seam strength	$\geqslant$ 8 N/mm (method A)		
4.4.2.3	EN 1392	Bondability [a, b]	$\geqslant$ 3 N/mm		
4.4.2.4	ISO 17699	WVP and WVA	WVP $\geqslant$ 0,8 mg/cm^2.h If 0,8 mg/cm^2.h $\leqslant$ WVP $<$ 2,0 mg/cm^2.h then WVA $\geqslant$ 8,0 mg/cm^2		
4.4.2.5	ISO 17701	Colour migration	24 h, colour change and staining $\geqslant$ 4 (grey scale)		
4.4.2.6	ISO 17702	Water resistance	Penetration time $\geqslant$ 60 min, absorption after 60 min $\leqslant$ 20 % (water resistant) Penetration time $\geqslant$ 180 min, absorption after 180 min $\leqslant$ 25 % (highly water resistant)		
4.4.2.7	ISO 17703	High temperature resistance	the material must keep $\geqslant$ 80% of its original tensile strength and elongation		
4.4.2.8	ISO 17704	Abrasion resistance	dry 12 800	wet 6 400	not worse than moderate abrasion degree
4.4.2.9	ISO 17706	Breaking strength and elongation	$\geqslant$ 10 N/mm, elongation $\geqslant$ 15 % (across) and $\geqslant$ 7 % (along)		
4.4.2.10	EN ISO 4098 EN ISO 4047	Water soluble substance content	$\leqslant$ 3 % sulphated ashed water soluble (SAWS) $\leqslant$ 18 % total water soluble (TWS)		
4.4.2.11	ISO 17698	Delamination resistance	dry $\geqslant$ 0,3 N/mm (for leather) wet $\geqslant$ 0,2 N/mm (for leather) dry $\geqslant$ 0,8 N/mm (for other materials) wet $\geqslant$ 0,6 N/mm (for other materials)		

[a] Reference adhesives and reference material shall comply with EN 1391.

[b] The dimensions and number of test pieces for this test method shall be those included in ISO 17709.

4.5 Performance requirements for uppers components for men's town footwear

4.5.1 Essential requirements

These essential requirements shall be fulfilled in all cases. See Table 7.

Table 7 — Test methods and properties for uppers components for men's town footwear — Essential requirements

Test method	Property	Requirement		
ISO 17694	Flex resistance	For leather, dry 80 000 cycles (w.v.d.) [a] wet 20 000 cycles (w.v.d.)	For coated leather, dry 80 000 cycles (w.v.d.) wet 20 000 cycles (w.v.d.) at − 5 °C 20 000 cycles (w.v d.)	For other materials, dry 80 000 cycles (w.v.d.) at − 5 °C 20 000 cycles (w.v.d.)
ISO 17696	Tear strength	⩾ 40 N average tear force		
EN ISO 17700	Colour fastness	Inside staining method A: if unlined footwear, must comply ⩾ 2/3 after 50 cycles with perspiration solution Outside surface colour change and staining method A: ⩾ 3 (grey scale) after 100 cycles dry and 50 cycles wet method B: ⩾ 3 to 4 (grey scale) after 256 cycles dry and 128 cycles wet		

[a] w.v.d. = without visible damage.

4.5.2 Additional requirements

These additional requirements should be agreed by both component supplier and footwear manufacturer. See Table 8.

Table 8 — Test methods and properties for uppers components for men's town footwear — Additional requirements

Subclause	Test method	Property	Requirement		
4.5.2.1	EN ISO 17693	Lastability	These figures will be influenced by the shape of the footwear $\geqslant$ 7,0 mm (for leather grain crack) $\geqslant$ 6,0 mm (for other materials first damage) NOTE: This test method is only applicable for component before lasting.		
4.5.2.2	ISO 17697	Seam strength	$\geqslant$ 8 N/mm (method A)		
4.5.2.3	EN 1392	Bondability [a, b]	$\geqslant$ 3,5 N/mm		
4.5.2.4	ISO 17699	WVP and WVA	WVP $\geqslant$ 0,8 mg/cm^2.h If 0,8 mg/cm^2.h $\leqslant$ WVP $<$ 2,0 mg/cm^2.h then WVA $\geqslant$ 8,0 mg/cm^2		
4.5.2.5	ISO 17701	Colour migration	24 h, colour change and staining $\geqslant$ 4 (grey scale)		
4.5.2.6	ISO 17702	Water resistance	Penetration time $\geqslant$ 60 min, absorption after 60 min $\leqslant$ 20 % (water resistant) Penetration time $\geqslant$ 180 min, absorption after 180 min $\leqslant$ 25 % (highly water resistant)		
4.5.2.7	ISO 17703	High temperature resistance	The material must keep $\geqslant$ 80 % of its original tensile strength and elongation		
4.5.2.8	ISO 17704	Abrasion resistance	dry 12 800	wet 6 400	No worse than moderate abrasion degree
4.5.2.9	ISO 17706	Breaking strength and elongation	$\geqslant$ 10 N/mm, elongation $\geqslant$ 15 % (across) and $\geqslant$ 7 % (along)		
4.5.2.10	EN ISO 4098 EN ISO 4047	Water soluble substance content	$\leqslant$ 3 % sulfated ashed water soluble (SAWS) $\leqslant$ 18 % total water soluble (TWS)		
4.5.2.11	ISO 17698	Delamination resistance	dry $\geqslant$ 0,3 N/mm (for leather) wet $\geqslant$ 0,2 N/mm (for leather) dry $\geqslant$ 0,8 N/mm (for other materials) wet $\geqslant$ 0,6 N/mm (for other materials)		

[a] Reference adhesives and reference material shall comply with EN 1391.

[b] The dimensions and number of test pieces for this test method shall be those included in ISO 17709.

4.6 Performance requirements for uppers components for cold weather footwear

4.6.1 Essential requirements

These essential requirements shall be fulfilled in all cases. See Table 9.

Table 9 — Test methods and properties for uppers components for cold weather footwear — Essential requirements

Test method	Property	Requirement		
ISO 17694	Flex resistance	For leather, dry 100 000 cycles (w.v.d.) [a] wet 20 000 cycles (w.v.d.)	For coated leather, dry 100 000 cycles (w.v.d.) wet 20 000 cycles (w.v.d.) at – 20 °C 30 000 cycles (w.v.d.)	For other materials, dry 100 000 cycles (w.v.d.) at – 20 °C 30 000 cycles (w.v.d.)
ISO 17696	Tear strength	⩾ 40 N average tear force		
EN ISO 17700	Colour fastness	Inside staining method A: if unlined footwear, must comply ⩾ 2/3 after 50 cycles with perspiration solution Outside surface colour change and staining method A: ⩾ 3 (grey scale) after 150 cycles dry and 50 cycles wet method B: ⩾ 3 to 4 (grey scale) after 512 cycles dry and 128 cycles wet		
ISO 17702	Water resistance	Penetration time ⩾ 240 min, absorption ⩽ 20 %		
ISO 17705	Thermal insulation	⩾ $24 \cdot 10^{-3}$ m^2.°C/W		

[a] w.v.d. = without visible damage.

4.6.2 Additional requirements

These additional requirements should be agreed by both component supplier and footwear manufacturer. See Table 10.

Table 10 — Test methods and properties for uppers components for cold weather footwear — Additional requirements

Subclause	Test method	Property	Requirement	
4.6.2.1	EN ISO 17693	Lastability	These figures will be influenced by the shape of the footwear $\geqslant$ 7,0 mm (for leather grain crack) $\geqslant$ 6,0 mm (for other materials first damage) NOTE This test method is only applicable for component before lasting.	
4.6.2.2	ISO 17697	Seam strength	$\geqslant$ 10 N/mm (method A)	
4.6.2.3	EN 1392	Bondability [a, b]	$\geqslant$ 4 N/mm	
4.6.2.4	ISO 17699	WVP and WVA	WVP $\geqslant$ 0,8 mg/cm^2.h If 0,8 mg/cm^2.h $\leqslant$ WVP $<$ 2,0 mg/cm^2.h then WVA $\geqslant$ 5,0 mg/cm^2	
4.6.2.5	ISO 17701	Colour migration	24 h, colour change and staining $\geqslant$ 4 (grey scale)	
4.6.2.6	ISO 17703	High temperature resistance	The material must keep $\geqslant$ 80 % of its original tensile strength and elongation	
4.6.2.7	ISO 17704	Abrasion resistance	dry 25 600 / wet 12 800	No worse than moderate abrasion degree
4.6.2.8	17706	Breaking strength and elongation	$\geqslant$ 10 N/mm, elongation $\geqslant$ 15 % (across) and $\geqslant$ 7 % (along)	
4.6.2.9	EN ISO 4098 EN ISO 4047	Water soluble substance content	$\leqslant$ 3 % sulfated ashed water soluble (SAWS) $\leqslant$ 18 % total water soluble (TWS)	
4.6.2.10	ISO 17698	Delamination resistance	dry $\geqslant$ 0,5 N/mm (for leather) wet $\geqslant$ 0,3 N/mm (for leather) dry $\geqslant$ 1,0 N/mm (for other materials) wet $\geqslant$ 0,7 N/mm (for other materials)	

[a] Reference adhesives and reference material shall comply with EN 1391.

[b] The dimensions and number of test pieces for this test method shall be those included in ISO 17709.

4.7 Performance requirements for uppers components for women's town footwear

4.7.1 Essential requirements

These essential requirements shall be fulfilled in all cases. See Table 11.

Table 11 — Test methods and properties for uppers components for women's town footwear — Essential requirements

Test method	Property	Requirement		
ISO 17694	Flex resistance	For leather, dry 50 000 cycles (w.v.d.) [a] wet 10 000 cycles (w.v.d.)	For coated leather, dry 50 000 cycles (w.v.d.) wet 10 000 cycles (w.v.d.) at − 5 °C 20 000 cycles (w.v.d.)	For other materials, dry 50 000 cycles (w.v.d.) at − 5 °C 20 000 cycles (w.v.d.)
ISO 17696	Tear strength	⩾ 40 N average tear force		
EN ISO 17700	Colour fastness	Inside staining method A: if unlined footwear, must comply ⩾ 2/3 after 50 cycles with perspiration solution Outside surface colour change and staining method A: ⩾ 3 (grey scale) after 100 cycles dry and 50 cycles wet method B: ⩾ 3 to 4 (grey scale) after 256 cycles dry and 128 cycles wet		

[a] w.v.d. = without visible damage.

4.7.2 Additional requirements

These additional requirements should be agreed by both component supplier and footwear manufacturer. See Table 12.

Table 12 — Test methods and properties for uppers components for women's town footwear — Additional requirements

Subclause	Test method	Property	Requirement		
4.7.2.1	EN ISO 17693	Lastability	These figures will be influenced by the shape of the footwear $\geqslant$ 7,0 mm (for leather grain crack) $\geqslant$ 6,0 mm (for other materials first damage) NOTE This test method is only applicable for component before lasting.		
4.7.2.2	ISO 17697	Seam strength	$\geqslant$ 4 N/mm (method A)		
4.7.2.3	EN 1392	Bondability [a, b]	$\geqslant$ 3 N/mm		
4.7.2.4	ISO 17699	WVP and WVA	WVP $\geqslant$ 0,8 mg/cm^2.h If 0,8 mg/cm^2.h $\leqslant$ WVP $<$ 2,0 mg/cm^2.h then WVA $\geqslant$ 8,0 mg/cm^2		
4.7.2.5	ISO 17701	Colour migration	24 h, colour change and staining $\geqslant$ 4 (grey scale)		
4.7.2.6	ISO 17702	Water resistance	Penetration time $\geqslant$ 60 min, absorption after 60 min $\leqslant$ 20 % (water resistant) Penetration time $\geqslant$ 180 min, absorption after 180 min $\leqslant$ 25 % (highly water resistant)		
4.7.2.7	ISO 17703	High temperature resistance	The material must keep $\geqslant$ 80 % of its original tensile strength and elongation		
4.7.2.8	ISO 17704	Abrasion resistance	dry 12 800	wet 6 400	not worse than moderate abrasion degree
4.7.2.9	ISO 17706	Breaking strength and elongation	$\geqslant$ 8 N/mm, elongation $\geqslant$ 15 % (across) and $\geqslant$ 7 % (along)		
4.7.2.10	EN ISO 4098 EN ISO 4047	Water soluble substance content	$\leqslant$ 3 % sulfated ashed water soluble (SAWS) $\leqslant$ 18 % total water soluble (TWS)		
4.7.2.11	ISO 17698	Delamination resistance	dry $\geqslant$ 0,3 N/mm (for leather) wet $\geqslant$ 0,2 N/mm (for leather) dry $\geqslant$ 0,8 N/mm (for other materials) wet $\geqslant$ 0,6 N/mm (for other materials)		

[a] Reference adhesives and reference material shall comply with EN 1391.

[b] The dimensions and number of test pieces for this test method shall be those included in ISO 17709.

4.8 Performance requirements for uppers components for fashion footwear

4.8.1 Essential requirements

These essential requirements shall be fulfilled in all cases.

Table 13 — Test methods and properties for uppers components for fashion footwear — Essential requirements

Test method	Property	Requirement
ISO 17694	Flex resistance	dry 15 000 cycles without visible damage
ISO 17696	Tear strength	⩾ 30 N average tear force
EN ISO 17700	Colour fastness	Inside staining method A: if unlined footwear, must comply ⩾ 2/3 after 50 cycles with perspiration solution Outside surface colour change and staining method A: ⩾ 2 (grey scale) after 100 cycles dry and 20 cycles wet method B: ⩾ 2 to 3 (grey scale) after 256 cycles dry and 64 cycles wet

4.8.2 Additional requirements

These additional requirements should be agreed by both component supplier and footwear manufacturer. See Table 14.

Table 14 — Test methods and properties for uppers components for fashion footwear — Additional requirements

Subclause	Test method	Property	Requirement
4.8.2.1	EN ISO 17693	Lastability	These figures will be influenced by the shape of the footwear ⩾ 7,0 mm (for leather grain crack) ⩾ 6,0 mm (for other materials first damage) NOTE This test method is only applicable for component before lasting.
4.8.2.2	ISO 17697	Seam strength	⩾ 3 N/mm (method A)
4.8.2.3	EN 1392	Bondability [a, b]	⩾ 2,5 N/mm
4.8.2.4	ISO 17701	Colour migration	24 h, colour change and staining ⩾ 4 (grey scale)
4.8.2.5	ISO 17698	Delamination resistance	dry ⩾ 0,2 N/mm (for leather) wet ⩾ 0,1 N/mm (for leather) dry ⩾ 0,7 N/mm (for other materials) wet ⩾ 0,5 N/mm (for other materials)
4.8.2.6	EN ISO 4098 EN ISO 4047	Water soluble substance content	⩽ 3 % sulfated ashed water soluble (SAWS) ⩽ 18 % total water soluble (TWS)

[a] Reference adhesives and reference material shall comply with EN 1391.

[b] The dimensions and number of test pieces for this test method shall be those included in ISO 17709.

4.9 Performance requirements for uppers components for infants' footwear

4.9.1 Essential requirements

These essential requirements shall be fulfilled in all cases. See Table 15.

Table 15 — Test methods and properties for uppers components for infants' footwear — Essential requirements

Test method	Property	Requirement		
ISO 17694	Flex resistance	dry 15 000 cycles without visible damage		
ISO 17696	Tear strength	⩾ 30 N average tear force		
EN ISO 17700	Colour fastness	Inside staining method A: if unlined footwear, must comply ⩾ 2/3 after 50 cycles with perspiration solution Outside surface colour change and staining method A: ⩾ 3 (grey scale) after 100 cycles dry and 20 cycles wet method B: ⩾ 3 to 4 (grey scale) after 256 cycles dry and 64 cycles wet		
ISO 17704	Abrasion resistance	dry 12 800	wet 6 400	No worse than moderate abrasion degree.

4.9.2 Additional requirements

These additional requirements should be agreed by both component supplier and footwear manufacturer. See Table 16.

Table 16 — Test methods and properties for uppers components for infants' footwear — Essential requirements

Subclause	Test method	Property	Requirement
4.9.2.1	EN ISO 17693	Lastability	These figures will be influenced by the shape of the footwear $\geqslant$ 7,0 mm (for leather grain crack) $\geqslant$ 6,0 mm (for other materials first damage) NOTE This test method is only applicable for component before lasting.
4.9.2.2	ISO 17697	Seam strength	$\geqslant$ 3 N/mm (method A)
4.9.2.3	EN 1392	Bondability [a, b]	$\geqslant$ 3 N/mm
4.9.2.4	ISO 17699	WVP and WVA	WVP $\geqslant$ 0,8 mg/cm^2.h If 0,8 mg/cm^2.h $\leqslant$ WVP $<$ 2,0 mg/cm^2.h then WVA $\geqslant$ 8,0 mg/cm^2
4.9.2.5	ISO 17701	Colour migration	24 h, colour change and staining $\geqslant$ 4 (grey scale)
4.9.2.6	ISO 17702	Water resistance	Penetration time $\geqslant$ 60 min, absorption after 60 min $\leqslant$ 20 % (water resistant) Penetration time $\geqslant$ 180 min, absorption after 180 min $\leqslant$ 25 % (highly water resistant)
4.9.2.7	ISO 17703	High temperature resistance	the material must keep $\geqslant$ 80 % of its original tensile strength and elongation
4.9.2.8	ISO 17706	Breaking strength and elongation	$\geqslant$ 8 N/mm, elongation $\geqslant$ 15 % (across) and $\geqslant$ 7 % (along)
4.9.2.9	EN ISO 4098 EN ISO 4047	Water soluble substance content	$\leqslant$ 3 % sulphated ashed water soluble (SAWS) $\leqslant$ 18 % total water soluble (TWS)
4.9.2.10	ISO 17698	Delamination resistance	dry $\geqslant$ 0,3 N/mm (for leather) wet $\geqslant$ 0,2 N/mm (for leather) dry $\geqslant$ 0,8 N/mm (for other materials) wet $\geqslant$ 0,6 N/mm (for other materials)

[a] Reference adhesives and reference material shall comply with EN 1391.

[b] The dimensions and number of test pieces for this test method shall be those included in ISO 17709.

4.10 Performance requirements for uppers components for indoor footwear

4.10.1 Essential requirements

These essential requirements shall be fulfilled in all cases. See Table 17.

Table 17 — Test methods and properties for uppers components for indoor footwear — Essential requirements

Test method	Property	Requirement
ISO 17694	Flex resistance	dry 15 000 cycles without visible damage
ISO 17696	Tear strength	⩾ 30 N average tear force
EN ISO 17700	Colour fastness	Inside staining method A: if unlined footwear, must comply ⩾ 2/3 after 50 cycles with perspiration solution Outside surface colour change and staining method A: ⩾ 3 (grey scale) after 100 cycles dry and 20 cycles wet method B: ⩾ 3 to 4 (grey scale) after 256 cycles dry and 64 cycles wet

4.10.2 Additional requirements

These additional requirements should be agreed by both component supplier and footwear manufacturer. See Table 18.

Table 18 — Test methods and properties for uppers components for indoor footwear — Additonal requirements

Subclause	Test method	Property	Requirement
4.10.2.1	EN ISO 17693	Lastability	These figures will be influenced by the shape of the footwear ⩾ 6,0 mm NOTE This test method is only applicable for component before lasting.
4.10.2.2	ISO 17697	Seam strength	⩾ 3 N/mm (method A)
4.10.2.3	EN 1392	Bondability [a, b]	⩾ 2,5 N/mm
4.10.2.4	ISO 17699	WVP and WVA	WVP ⩾ 0,8 mg/cm^2.h If 0,8 mg/cm^2.h ⩽ WVP < 2,0 mg/cm^2.h then WVA ⩾ 6,0 mg/cm^2
4.10.2.5	ISO 17701	Colour migration	24 h, colour change and staining ⩾ 4 (grey scale)
4.10.2.6	ISO 17703	High temperature resistance	The material must keep ⩾ 80 % of its original tensile strength and elongation
4.10.2.7	ISO 17698	Delamination resistance	dry ⩾ 0,2 N/mm (for leather) wet ⩾ 0,1 N/mm (for leather) dry ⩾ 0,7 N/mm (for other materials) wet ⩾ 0,5 N/mm (for other materials)
4.10.2.8	EN ISO 4098 EN ISO 4047	Water soluble substance content	⩽ 3 % sulphated ashed water soluble (SAWS) ⩽ 18 % total water soluble (TWS)

[a] Reference adhesives and reference material shall comply with EN 1391.

[b] The dimensions and number of test pieces for this test method shall be those included in ISO 17709.

5 Marking and labelling

Marking and labelling is optional.

If reference to this Technical Report is made, only uppers complying with all the essential requirements can be marked. In this case, this shall be clearly marked by the manufacturer either directly on the product or by a label with the following additional information.

a) The manufacturer's name, trade mark or identification mark.

b) The type of footwear for which the upper shall be used as indicated in Table 19.

c) Reference to this Technical Report.

d) If the component complies, additional requirements agreed upon between the component supplier and the footwear manufacturer may be specified in the marking or label making reference to the correspondent subclause.

Any reference to compliance with this Technical Report shall not be put in a part of the upper which could be visible when the footwear is finished.

Table 19 — Codes for various types of footwear

Type of footwear	Code
General sports footwear	SP
School footwear	SC
Casual footwear	CS
Men's town footwear	MT
Cold weather footwear	CW
Women's town footwear	WT
Fashion footwear	FS
Infants' footwear	IF
Indoor footwear	IN

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