

CES 49

Compulsory Ethiopian Standard

Fourth Edition

2021

Leather – Finished Shoe upper leather- Specification



ICS: 59.140.30

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Foreword

This Ethiopian Standard has been prepared under the direction of the Technical Committee for Leather and Leather products(TC 74) and published by the Ethiopian Standards Agency (ESA).

This Compulsory Ethiopian Standard cancels and replaces CES 49:2015.

Application of this standard is COMPULSORY with respect to clause 5.5(table 4).

A Compulsory Ethiopian Standard shall have the same meaning, interpretation and application of a "Technical Regulation" as implied in the WTO-TBT Agreement.

Implementation of this standard shall be effective as of 01 October 2013.

Leather –Finished Shoe upper leather –Specification

1. Scope

This Ethiopian standard specifies the requirements for finished shoe upper leather from inputs of skins and hides.

2. Normative references

The following referenced documents are indispensable for the application of this Ethiopian standard. Only the latest edition of the documents (including any amendments) shall be applicable.

ES 1180, Leather – Terminology;

ES 1188, Leather - Determination of chromium content as chromic oxide (Cr_2O_3);

ES ISO 3379, Leather- Determination of distension and strength of grain;

ES ISO 4045, Leather -Determination pH;

ES 1195, Leather - Determination of moisture content;

ES ISO 3380, Leather- Determination of shrinkage temperature at the wet-blue stage

ES ISO: 2418, Leather - Determination of Laboratory samples – Location and Identification;

ES ISO 2419, Leather - Preparation and conditioning of test samples;

ES ISO 4044, Leather – Preparation of chemical test samples;

ES ISO 2588, Leather -Sampling – Number of items for a gross sample;

ES ISO 11646, Leather – Measurement of area;

ES 1190, Leather – Determination of flexing endurance;

ES 1192, Leather – Determination of double hole stitch tear strength;

ES ISO 4047, Leather- Determination of sulphated total ash and sulphated water insoluble ash;

ES 1191, Leather –Determination of water-soluble matter, water- soluble inorganic matter and water – soluble Organic matter;

ES 1194, Leather – Determination of bound organic substances and degree of tannage.

ES ISO 105-B02 Leather – Determination of Color fastness to xenon light

ESISO 2417 Leather-Determination of Static Water absorption

3. Definitions

For the purpose of this standard the definitions in ES 1180 and the following shall apply.

3.1 Tannery Round (TR): A grading system that is set between the tanneries and buyers to incorporate in percent grades from I to IV.

4. Types

Shoe upper leather shall be of the following types;

- a) glazed leather
- b) Finished box side
- c) corrected grain
- d) Suede leather
- e) Patent leather
- f) Nubuck
- g) Embossed
- h) Full-grain aniline
- i) Fullvegetable tanned

5. Requirements

5.1 Tanning Requirements

5.1.1 Glazed leather shall be tanned with basic chromium salts and/or other suitable tanning agents that shall not shrink in the blue stage when tested in boiling water according to the method Specified in ES ISO 3380

- 5.1.2 **Finished box side** shall be tanned with basic chromium salts, and/or other suitable tanning agents, which may be followed by retanning with suitable retanning agents.
- 5.1.3 **Corrected grain** – shall be tanned with basic chromium salts and/or other suitable tanning agents, which may be followed by retanning with suitable retanning agents.
- 5.1.4 **Suede leather** – shall be tanned with basic chromium salts and/or other suitable tanning agents, which may be followed by retanning with suitable retanning agents.
- 5.1.5 **Patent leather** – shall be tanned with basic chromium salts and/or other suitable tanning agents, which may be followed by retanning with suitable retanning agent.
- 5.1.6 **Nubuck** shall be tanned with basic chromium salts and/or other suitable tanning agents, which may be followed by retanning with suitable retanning agents.
- 5.1.7 **Embossed** shall be tanned with basic chromium salts or vegetable tanning materials, which may be followed by re-tanning with suitable re-tanning agents.
- 5.1.8 **Full grain aniline** – shall be tanned with basic chromium salts and/or other suitable tanning agents, which may be followed by retanning with suitable retanning agents.
- 5.1.9 **Full vegetable tanned** shall be tanned with vegetable tanning materials, which may be followed by retanning with suitable retanning agents.
- 5.1.10 **Fungicides** shall be added at the end of tanning operation and/or before dying to promote mildew resistance in the leather when tested according to the method of test specified in the ES 1193. The fungicide shall be effective and non-toxic.

5.2 General Manufacturing Norms or Requirements of Shoe Upper:

5.2.1 For grain finished upper after chrome tanning operations, shall be re-tanned with syntans, dyed, fat liquored, dried, chemically and mechanically finished; so as to render at least the required fullness, softness (as per the intended products), roundness, non-stretchy property, rub resistance, color fastness, water repellent and leveled to the substance with not more than 0.1mm variation. The final finished material shall have clean flesh side with uniform color shade and physical appearance on the grain side and shall be free from process defects.

5.2.2 For suede finished upper, after full chrome/alum tanning operations, shall be re-tanned or mordant, deep and uniform dyed, fat liquored, dried, flesh side buffed and grain side shaved/snuffed; so as to render at least the inner softness but non stretchy, fine and uniform nap length, dry surface feel, water repellent and leveled to the substance with not more than 0.1mm variation. The final finished material shall have clean suede/flesh side with uniform shade and both sides shall be free from process defects.

5.3 Physical requirements

Leather that is used for making of shoe upper shall conform to the physical requirements specified in table 1 and 2 below when tested according to the relevant method of tests specified there in.

Table 1 Physical requirements for finished shoe upper leather (hide)

Sr. No.	Characteristics		Finished box side	Corrected grain	Suede leather	Patent leather	Nubuck	Embossed	Full grain aniline	Vegetable tanned	Method of test
1	Tensile strength, N/mm ² , min		20	20	20	25	20	20	20	25	ES ISO 3376
2	Elongation at break, percent by length,		40-80	40-80	40-80	40-80	40-80	40-80	40-80	40-80	ES ISO 3376
3	Water absorption % by mass,	a) After 2 hrs	60	40	60	30	-	60	60	35	ES ISO 2417
		b) After 24 hrs	85	85	85	45	-	85	85	45	
4	Double hole stitch tears strength, N/mm thickness, min.		100	100	100	125	100	100	100	125	ES 1192
5	Flexing endurance, number of flexes before loss of adhesion of finished layer, min.										ES ISO 5402-1
	a) Dry flexing	40,000	40,000	40,000	40,000	-	40,000	40,000	40,000		
	b) Wet flexing	10,000	10,000	10,000	10,000	-	10,000	10,000	10,000		
6	Color fastness to rubbing										ES ISO 105 AO2 ES ISO 105-AO3 ES ISO 11640 ES ISO 15700
	a) Dry rubbing, 100 cycles	4	4	-	4	4	4	4	4		
	b) Wet rubbing, 50 cycles	3	3	-	3	3	3	3	3		
7	Ball Burst strength in kg.(minimum)		30	30	30	30	-	30	30	30	ES ISO 3379
8	Distention in mm, min		7	7	7	7	7	7	7	7	ES ISO 3379
9	Color fastness test (Xenon light), min		-	-	3	-	3	-	-	-	ES ISO 105-B02
10	Max percentage of Static water absorption after 30'		-	-	30	-	-	-	-	-	ESISO 2417
11	Crocking test (wet and dry), back and forth total 10 rubs for each, min		-	-	2/3	-	2/3	-	-	-	SATRA TM 167

Table 2 Physical requirements for finished shoe upper leather (skin)

Sr. No.	Characteristics	Glazed kid	Corrected grain	Suede leather	Patent leather	Embossed	Full grain aniline	Vegetable tanned	Method of test
1	Tensile strength, N/mm ² , min	15	15	15	15	15	15	15	ES ISO 3376
2	Elongation at break, percent by length,	40-80	40-80	40-80	40-80	40-80	40-80	40-80	ES ISO 3376
3	Water absorption % by mass, max.	a) After 2 hrs	60	40	60	30	60	60	ES ISO 2417
		b) After 24 hrs	85	85	85	45	85	85	
4	Double hole stitch tears strength, N/mm thickness, min.	80	80	80	80	80	80	80	ES 1192
5	Flexing endurance, number of flexes before loss of adhesion of finished layer, min.	a) Dry flexing	40,000	40,000	-	40,000	40,000	40,000	ES ISO 5402-1
		a) Wet flexing	10,000	10,000	-	10,000	10,000	10,000	
6	Color fastness to rubbing								ES ISO 105 AO2 ES ISO 105-AO3 ES ISO 11640 ES ISO 15700
	a) Dry rubbing, 100 cycles	4	4	-	4	4	4	4	
	b) Wet rubbing, 50 cycles	3	3	-	3	3	3	3	
7	Ball Burst strength in kg.(minimum)	20	20	20	20	20	20	20	ES ISO 3379
8	Distention in mm, min	7	7	7	7	7	7	7	ES ISO 3379
9	Color fastness test (Xenon light), min	-	-	3	-	-	-	-	ES ISO 105-B02
10	Max percentage of Static water absorption after 30' v/v	-	-	60 -80	-	-	-	-	ES ISO 2417
11	Crocking test (wet and dry), back and forth total 10 rubs for each, min	-	-	2/3	-	2/3	-	-	SATRA TM 167

5.4 Chemical requirements

Leather that is used for making shoe upper shall conform to the chemical requirements specified in the in table 3 below.

Table 3 Chemical requirements for grading finished shoe upper leather

Sr. No.	Characteristics	Glazed kid	Finished box side	Corrected grain	Suede leather	Patent leather	Nubuck	Embossed	Full grain aniline	Vegetable tanned	Method of test
1	Total Ash % by mass max. above the content of tanning oxide	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.0	ES ISO 4047
2	Chromium as Cr ₂ O ₃ , % by mass, min.	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5		ES 1188
3	Water soluble matter % by mass, max	5.0	-	-	-	-	-	-	-	3.0	ES 1191
4	Solvent extractable substance, % by mass	2.5-7.5	3-7	3-7	3-7	3-7	3-7	2-6	2-6	16-23	ES ISO 4048
5	Hide substance, % by mass, min.	60	60	60	60	60	60	60	60	60	ES ISO 5397
6	pH of water-soluble min	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	ES ISO 4045
7	Difference figure, % by mass, max	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	ES ISO 4045
8	Bound organic matter, % by mass, max	12	12	12	12	12	12	12	12	12	ES 1194
9	Degree of tannage % by min.	-	-	-	-	-	-	-	-	50	ES 1194

5.5 Restricted Chemicals shall be as table 4 below

Table 4: - Restricted Chemical requirements

Characteristics	Requirement	Test method
Chromium VI content	Below 3 mg/kg	ES ISO 17075
Formaldehyde content	Below 300 mg/kg	ES ISO 17226
Pentachlorophenol (PCP)	5 ppm	DIN 53313
Lead (Pb)	Below 0.8mg/kg	ES ISO 17072
AZO Dyes	30 ppm of any of the amines	DIN 53316

6. Grading

6.1 Identification of major and minor defects:

Major Defects: Ekek, hole, putrefaction, pox, poor pattern, wound/sears, and deep knife cut damage, old animal skins, poor substance, process defects are among others.

Minor Defects: Such as scratch, blood stains, gouge mark, wrinkles, pinhole, heat damage, vainness, blood stain, process defects.

6.2 Finished Shoe upper leather manufactured from hides and skins of grain and suede finished type shall be graded based on usable area as in tables 5 and 6 as follows.

Table 5 Classification and grading of grain finished shoe upper leather

grade	Useable area by % of total area	Description
I	85-100	Leather with even substance, good pattern, filled flanks, uniform shade, even grain, could have few defects like drawn grain on bells or shoulder area
II	70-84	Leather with even substance, good pattern, filled flanks, uniform shade, even grain, could have few defects like drawn grain, scars, holes, knife cut on bells or shoulder area,
III	55-69	Leather with even substance, good pattern, filled flanks, uniform shade, even grain, could have defects like drawn grain, scars, holes, deep knife cuts, also on but area.
TR 1	55 - 100	From Grade I to III (55 -100 % usable area) are tannery round one (TR 1)
IV	40-54	Leather with even substance, good pattern, loose flanks, uniform shade, even grain, could have defects like holes, deep knife cuts, also on but area.
TR 2	40 - 100	From Grade I to IV (40 -100 % usable area) are tannery round two (TR 2)
V	25-39	Leather with varied substances loose flanks and cuts holes brands which are randomly spread on leather surface.
VI	15-24	Leather with diversely varied substances loose flanks and cuts holes brands which are randomly spread on leather surface
Reject	Less than 15	Leather with having a cutting value of less than 15 %

Table 6 Classification and grading of suede finished shoe upper leather

Grade category	Usable area by % of total area	Description
I	85 – 100	This leather will have good and even substance suitable for final or intended use. The suede side should be uniformly dyed with the nap pointing vertically up even after bending and have no any visible veins, flay cuts and pox or scar marks or holes from the grain side.
II	70 – 84	This leather will have good and even substance suitable for final or intended use. The suede side should be uniformly dyed with the nap pointing vertically up even after bending but have one or two visible flay cuts on the suede side & one or two pox or scar marks on the grain side.
III	55 – 69	This leather will have good and even substance suitable for final or intended use. The suede side should be uniformly dyed with the nap pointing vertically up even after bending but the grain side could have several visible scratches and pox marks which could show up on suede side. On suede side there could be a few flay cuts not very deep and vein marks not
TR 1	55 - 100	From Grade I to III (55 -100 % usable area) are tannery round one (TR 1)
IV	40 – 54	This leather could have varied substance and similar surface defects as in Grade III, but still shall not affect at least the cutting value to 40%
TR 2	40 - 100	From Grade I to IV (40 -100 % usable area) are tannery round two (TR 2)
V	25 – 39	This leather will have pronounced pox marks, visible gash and scratches showing on grain and suede, non uniform color shade and/ or non uniform nap with poor writing effect
VI	15-24	This leather will have more pronounced pox marks, visible gash and scratches showing on grain and suede, non uniform color shade and/ or non uniform nap with poor writing effect
Reject	Less than 15	This is leather with any type of quality defect and a cutting value of less than 25%

7. Sampling

Sampling of shoe upper leather shall be carried out according to the method specified in ES ISO 2418, ES ISO 2419, ES ISO 2588 and ES ISO 4044.

8. Packing

The leather shall be packed in suitable packing materials that will protect the leather from moisture, direct sunlight and mechanical damage during transit and in storage.

9. Labeling

Each container of shoe-upper leather shall be labeled with the following information:

- a) Name and address of manufacturers
- b) The number of pieces, and/or total area, and area of each piece.
- c) . The type and grade;
- d) The mass, in kg;
- e) Batch number or code;
- f) Area in square feet
- g) Thickness range in mm; and
- h) Any labeling information required by the purchaser.

10. Compliance with the standard

A lot of shoe-upper leather shall be deemed to comply with this Ethiopian standard if up on inspection and testing the provisions in clause 5.5 of table 4 is satisfied.

Organization and Objectives

The Ethiopian Standards Agency (ESA) is the national standards body of Ethiopia established in 2010 based on regulation No. 193/2010. ESA is established due to the restructuring of Quality and Standards Authority of Ethiopia (QSAE) which was established in 1998.

ESA's objectives are:-

- ❖ Develop Ethiopian standards and establish a system that enable to check whether goods and services are in compliance with the required standards,
- ❖ Facilitate the country's technology transfer through the use of standards,
- ❖ Develop national standards for local products and services so as to make them competitive in the international market.

Ethiopian Standards

The Ethiopian Standards are developed by national technical committees which are composed of different stakeholders consisting of educational institutions, research institutes, government organizations, certification, inspection, and testing organizations, regulatory bodies, consumer association etc. The requirements and/or recommendations contained in Ethiopian Standards are consensus based that reflects the interest of the TC representatives and also of comments received from the public and other sources. Ethiopian Standards are approved by the National Standardization Council and are kept under continuous review after publication and updated regularly to take account of latest scientific and technological changes. Orders for all Ethiopian Standards, International Standard and ASTM standards, including electronic versions, should be addressed to the Documentation and Publication Team at the Head office and Branch (Liaisons) offices. A catalogue of Ethiopian Standards is also available freely and can be accessed in from our website.

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International Involvement

ESA, representing Ethiopia, is a member of the International Organization for Standardization (ISO), and Codex Alimentarius Commission (CODEX). It also maintains close working relations with the international Electro-technical Commission (IEC) and American Society for Testing and Materials (ASTM). It is a founding member of the African Regional Organization for standardization (ARSO).

More Information?

Contact us at the following address.

The Head Office of ESA is at Addis Ababa.

☎ 011- 646 06 85, 011- 646 05 65

☎ 011-646 08 80

✉ 2310 Addis Ababa, Ethiopia

E-mail: info@ethiostandards.org,

Website: www.ethiostandards.org



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