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**Code of Practice for Grading of Textile-
Fabrics**

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Foreword

This Ethiopian Standard has been prepared under the direction of Technical Committee for Textile-Fabrics (TC 70) and published by the Ethiopian Standards Agency (ESA).

In preparing this Ethiopian Standard reference has been made to the following:

EAS 253-1: 2001 Code of Practice for Grading of Textiles. Part 1 Fabrics published by East Africa Standard(EAS)

Acknowledgement is made for the use of information from the above publication.

DRAFT STANDARD

Code of Practice for Grading of Textile Fabrics

1. Scope

This Ethiopian Standard specifies Code of Practice for Grading of woven and knitted textile fabrics with its requirements.

2. Normative references

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

ES 6579 : Textiles and textile merchandise — Terms and definitions
ES ISO 2076, Textiles — Man-made fibers — Generic names
ES ISO 4921, Knitting — Basic concepts — Vocabulary
ES ISO 6938, Textiles — Natural fibers — Generic names and definitions
ES ISO 8388, Knitted fabrics — Types — Vocabulary
ES ISO 8499, Knitted fabrics — Description of defects — Vocabulary
ES ISO 22198, Textiles — Fabrics — Determination of width and length
ES 6702 Guideline for sustainable Textile production

3. Definitions

For the purpose of this Standard the definitions given in ES ISO 8499 and ES ISO 6938 shall apply.

4. Code of practice/Requirements

4.1. General Requirements

- 4.1.1. The fabric shall have been made in accordance with sound manufacturing practice from clean, evenly spun yarn as ES 6702
- 4.1.2. The fabric shall be with acceptable uniform make, width, or size (as relevant), design, color(s), and finish;
- 4.1.3. The fabric shall be delivered in a clean and commercially dry condition.

4.2. Specific requirements

4.2.1. Grading of piece fabric with four point system

- 4.2.1.1.** No running yard shall be penalized more than 4 points for warp and weft defects.
- 4.2.1.2.** For Fabric width exceeding of 66 inch, maximum penalty points can be increased above 4 per linear yard in proportion to the width.
- 4.2.1.3.** Defects appearing within one inch of either edge shall be rejecting.
- 4.2.1.4.** Any hole other than a pin hole shall be considered a major defect and assigned 4 points for penalty.
- 4.2.1.5.** The maximum penalty for any one meter shall not be more than four points.
- 4.2.1.6.** The total defect points in each 100 square yards being below 40, this roll of fabric may be accepted. If defects points above 40 in 100 square yds then fabric should be rejected.
- 4.2.1.7.** It should be mentioned here that the limit or level of acceptability of fabric is ascertained by the buyer & seller of the fabric

4.2.1.8. Piece fabrics shall be graded in accordance with the requirements of Table 1.

Table 1 — Grading requirements				
S.No.	Minimum piece length (m)	Width(m)	Defects permissible	Grade
			Woven/Knitted	
1	As declared/greed (−0.5 % tolerance)	As declared (+2 % variation)	No major defect No more than 1 minor defect per 10 continuous meters No minor defect in a piece less than 10 meters	A
2	As declared/greed (−0.5 % tolerance)	As declared (+2 %)	No major defects No more than 1 minor defect per 10 continuous meters No minor defect in a piece less than 6 meters	B
3	As declared/greed	As declared (+2 % variation)	No major defects	C
Test method		ES ISO 22198	ES ISO 8499, Annex A & B	

Note: For Major defects, Minor defects and Grading refer Annex A, B, & C

4.3. Inspection and classification of defects

- 4.3.1. Visually examine and measure each fabric for compliance with the relevant requirements of clause 4, using 4 point system and procedures specified on the clause 4.4 to classify the fabric.
- 4.3.2. Defects in woven fabrics shall be inspected and classified in accordance with AnnexA.
- 4.3.3. Defects in knitted fabrics shall be inspected and classified in accordance with Annex B.

4.4. Fabric inspection procedure:

- 4.4.1. The steps should be follow which is necessary to ensure effective fabric inspection quality control programs are:
 - a) Determine the fabric quantity to be inspected.
 - b) Select the fabric rolls for inspection.
 - c) Place the fabric roll on inspection frame /machine.
 - d) Cut off a 6-inch piece across the width of the fabric from the beginning of the roll. Mark this piece so that the inspector will know the right and left side of the fabric. Use the strip to check the shading side-to-side and end-to-end by checking it at least against the middle of the roll and once at the end of the roll.
 - e) Inspect for visual defects at a speed slow enough to find the defects.
 - f) Check that the roll that contains the meters as stated by the Fabric Supplier.
 - g) Check for bowing & skewing in the fabric.
 - h) Major fabric defects are to be flagged by the Fabric Supplier. However, if any fault is not flagged already then it must be marked with a sticker or masking tape during inspection for its traceability and corrective action at cutting stage.
 - i) Record the faults of the fabric on the Fabric Quality Report format (annex D)

4.5. Eligibility criteria for the quality inspector:

- 4.5.1.** The person should be graduate and trained specifically.
- 4.5.2.** He or she should have be a minimum of two year experience in the textile industry.
- 4.5.3.** He or she should be well experienced with the 4-point fabric inspection system.
- 4.5.4.** He or she should be active and physically fit.
- 4.5.5.** He or she should not be colorblind and examine him/her periodically

5. Marking

- 5.1.** In addition to other marking requirements relevant to a specific standard, each piece of fabric shall be marked with its grade in accordance with this standard.
- 5.2.** All defective areas in a fabric shall be flagged by a visible indicator on one of the selvages.

Annex A (Normative)

Classification of defects in woven fabrics

A.1. Major Defects

A.1.1 One or more ends missing in the body of the material throughout its length, or more than one end missing at a place and running over 60 cm or double ends running throughout.

A.1.2 Undressed snarls running over a length exceeding 5 per cent the length of the piece.

A.1.3 Smash

A.1.4 Cut or tear.

A.1.5 Any hole as a result of broken yarn.

A.1.6 Reed Marks running over the length exceeding 5 per cent of length of the piece.

A.1.7 Width inside defective selvages below specified tolerance.

A.1.8 Slack selvages causing the fabric to bulge halfway across width or more.

A.1.9 Warp or weft multiple float in the body of the fabric.

A.1.10 Shading or listing in fabrics having gradual change in tone or depth of shade (excluding selvedge or border running parallel to the selvedge).

A.1.11 Color flecks, dye bar, patchy or streaky or uneven dyeing.

A.1.12 Broken pattern and/or printing defect which mark the appearance of the fabrics.

A.1.13 One or more warp or weft soiled or discolored.

A.1.14 Weft crack extending 1/3 or more the width of the fabric.

A.1.16 Weft bar due to the difference in raw materials, count, twist, color, shad or pick spacing of adjacent groups of weft yarns.

A.1.17 Bad odor.

A.2. Minor defects

A.2.1 Weft crack extending less than 1/3 the width of the fabric.

A.2.2 Two or less adjacent ends or fillings running parallel or broken or missing and not extending beyond 10cm.

A.2.3 Oil or other stain in the fabric less than 10mm.

A.2.4 Slub

A.2.5 Selvedge defect.

A.2.6 Small hole as a result of separated yarns.

**Annex B
(Normative)**

Classification of defects in knitted fabrics

B.1. Major Defects

- B.1.1** Ladders more than 2.5 cm from fabric edges.
- B.1.2** Dropped stitches more than 10 mm.
- B.1.3** More than one needle line 2.5 cm from fabric edges.
- B.1.4** Cuts/holes exceeding 5 mm in size.
- B.1.6** Oil and/or other stains exceeding 10 mm in size.
- B.1.7** Misprints and bleeding of prints.
- B.1.8** Color flecks, dye bar, patchy or streaky or uneven dyeing.
- B.1.9** Design distortion of more than 5 cm.

B.2. Minor defects

- B.2.1** Mixed threads.
- B.2.2** Curved edges.
- B.2.3** More than one needle line up to 15 cm length.
- B.2.4** Holes and/or cuts below 5 mm in size.
- B.2.5** Oil and/or other stains less than 10 mm in size.

Annex C

(Normative)

Fabric defect size, penalty and Grading four point system

Size of defect	Penalty point
Length of defect in fabric, either length or width	
Defects up to 3 Inches(Defects up to 75 mm)	1 Point
Defects >3inches <6 inches(Defects > 75 mm < 150 mm)	2 Point
Defects >6inches <9 inches (Defects > 150 mm < 230 mm)	3 Point
Defects >9 inches (Defects > 230 mm)	4 Point
Holes and opening(largest dimensions)	
1 inch or less	2 Point
Over one inch	4 Point

Grading:

1. Linear Yard basis: -Acceptable tolerance=20 points per 100 linear yard

2. Square yard basis:

Points/100 sq. yd= $\frac{\text{Total Points scored in the bulk} \times 100 \times 36''}{\text{Width of the roll(inch)} \times \text{total yds inspected}}$

Acceptable tolerance=

- 28 points per 100 sq. yd. for each individual roll.
 - 20 points per 100 sq.ydfor average of rolls inspected.
- 1st Quality: Penalty points not exceed the acceptable tolerance.
- 2nd Quality: Penalty points exceed the acceptable tolerance.

Annex D (Informative)

Fabric Quality Report Format

S.No .	Defects	Points	1	2	3	4	Total
		Magni- tude	Up to 3"	3"to6"	6"to9"	Over 9"	
1	Drop Stitches or Holes						
2	Barriness						
3	Contaminations						
4	Needle Lines						
5	Sinker Lines						
6	Oil Lines or Stains						
7	Fabric Press Off						
8	Bowing						
9	Dyeing Patches						
10	Softener Marks						
11	Stains						
12	Color Fading						
13	Shade Variation						
14	Tonal Variation						
15	Wet Squeezer Marks						
16	Fold Marks						
17	Crease or Rope Marks						
18	Skewing or Diagonal Grain Lines						
19	Width Variation						
20	Others						

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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