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Guide line for knitting process

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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 the draft is presented by Ethiopian Textile Industries Development Instiute (ETIDI)

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

Guide line for knitting process

1. Scope:

This Ethiopian standard specifies the general guideline for knitting process which deals with process activity, production, quality control and machine maintenance.

2. Normative reference

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.

ES 6265:2018-Terminology Relating to Textiles

ES ISO 9947 : Textile Machinery And Accessories — Two-for-One Twisters — Vocabulary

ES ISO 4921: :Knitting - Basic concepts - Vocabulary

ES ISO 8388: Knitted fabrics – Types – Vocabulary.

ES ISO 7839 : knitting machines-vocabulary and classification

ES ISO 13990-3 : yarn feeders and yarn control for knitting machines

ES ISO 13990-1 : yarn feeders and yarn control for knitting machines

3. Terms and definition

For the purpose of this Ethiopian standard the following definition shall apply.

3.1.
Knitting-
is a process of forming fabric by the intermeshing the loops of yarns. When one loop is drawn through another, loops are formed in horizontal or vertical direction.

3.2.
Weft knitting –
Weft Knitting is a method of forming a fabric in which the loops are made in horizontal way from a single yarn and intermeshing of loops take place in a circular or flat form on across wise basis.

3.3.
Single jersey-
The weft knitted fabrics produced with one set of needles (both in tubular or flat forms) are called as single jersey or plain knitted fabrics.

3.4.
Double jersey-
Weft knitted fabrics (tubular/flat) produced with two set of needles mounted in two needle beds are called as double jersey or double knit fabrics.

3.5.
Warp Knitting –
Warp Knitting is a method of forming a fabric in which the loops are made in vertical way along the length of the fabric from each warp yarns and intermeshing of loops take place in a flat form of length wise basis.

3.6. Creel-
creel is part of knitting machine in which yarn package are ready to feed in the machine.

3.7.
Main pulley feeder (MPF) –
it is manages positive feed .it is also an important part of the machine .it gives positive feed to the machine

3.8.
Feeder: feeder is help yarn to feed in to the machine
Needle: it is a principal element of the knitting machine .it help the yarn to create a loop.

3.9.
Maintenance Planning –
Maintenance planning is the maintenance management activity that is carried out to prepare the maintenance plan. It consists of a "structured set of tasks that include activities, procedures, resources and the time scale required to carry out maintenance".

3.10.
Maintenance Scheduling –
Maintenance scheduling is a process in which different maintenance tasks or activities are assigned to resources and then placed within certain time windows in order to be accomplished.

3.11.
Machine auditing –
Systematic and documented process for obtaining audit evidence about the status of machines and evaluating it objectively to determine the extent to which the audit criteria set in the audit checklist fulfilled.

4. GUIDELINE FOR PRODUCTION AND QUALITY

4.1. General guide line

4.1.1. Knitting plan should be prepared and machines to be balanced based on the actual conditions and knitting machines to be allotted to achieve the target plan.

4.1.2. Minimum stock of raw material should be maintained based on the annual plan prepared.

4.1.3. There should be a continuous monitoring of individual operator's output and efficiency and the low efficiency operators should be provide awareness and refreshment training and also used for better cleaning of working area and machineries.

4.1.4. Different System should be in place for optimization to improve the quality and productivity of the factory.

4.1.5. The required temperature and humidity should be maintained throughout the production process.

4.1.6. Standard operating procedures (SOP) or work instructions should be given to operators and carried out the work as specified and should be monitored accordingly.

4.1.7. Management information system related to activities such as labor, machinery status, raw material, production, etc. should be checked according to the quality and production plan.

4.1.8. Quality plan should be developed in order to achieve customer requirements within the available resources.

4.2. Process based guidelines for knitting process

4.2.1. Yarn supply

4.2.1.1. The first step should be receiving the yarn in cones/cheese from the yarn supplier.

4.2.1.2. Before storing it, the yarn has to be inspected in order to approve if all the parameters are within the standards agreed in the contract between the buyer and supplier.

4.2.1.3. It should be controlled that of the moisture level (%) of the received yarn within the standard, which is different for different types of fibers,

4.2.1.4. The yarn should be checked for yarn count, yarn twist, color, damages and any irregularities.

4.2.1.5. After passing the first inspection, the yarn should be stored in a clean and dry warehouse, with having open air circulation, lifted up from the ground and clearly marked.

4.2.2. warping

4.2.2.1. In this step a sheet of yarns should be winded in smaller beams by using a warping knitting machine.

4.2.2.2. In this phase the yarn should be waxed in order to avoid static electricity during knitting, especially when using manmade fibers.

4.2.2.3. Yarn faults should be monitored according to the quality plan to control the process.

4.2.2.4. Splice strength should be checked and maintained within standard to reduce splice slippages in the next process.

4.2.2.5. Quality control should have system to monitor the breakage rate, splice strength, and objectionable faults according to the defined quality plan for effective usage of the raw material.

4.2.2.6. The individual warp yarns should be uniformly spaced across the whole width of the beam.

4.2.3. Yarn Conditioning

4.2.3.1. The optimum pressure and temperature should be maintained

4.2.3.2. The process parameters such as weight gain, moisture gain, improved strength and elongation should be checked according to the quality plan.

4.2.3.3. After yarn conditioning the cones / cheeses should be let in open air and after that Operator should cover the cones / cheeses individually by using polythene cover.

4.2.4. Raw material storing

4.2.4.1. The stock lots should have a display of details with quantity.

4.2.4.2. Good housekeeping should be maintained.

4.2.4.3. Floor space should be marked with yellow lines and lots should be stored within the lines to avoid mix-up and easy quantification.

4.2.4.4. Main raw material store should be free from grease, hazardous chemicals, fuel etc.

4.2.4.5. After the yarn is conditioned, all of the cones should be distributed to the knitting sections using internal memos.

4.2.5. Knit design

4.2.5.1. Knit design should be prepared as per the customer need or market demand before starting knitting, among these four primary basic structures/designs in weft knitting. These are

a) plain (single jersey)
b) rib (double jersey)
c) inter lock (double jersey)
d) purl

4.2.6. Creel-ling

4.2.6.1. Cones should be arranged on the creel based on the predetermined design (esp. color design)

4.2.6.2. While running dyed yarn, it should be keep approved swatch to check and avoid misplacement of yarn.

4.2.6.3. In case of other yarns we should be take instruction from supervisor, fitter or other shift operator about the yarn sequence.

4.2.6.4. We should be writing the yarn sequence on the machine frequently and check the yarn sequence after every new loading.

4.2.6.5. Load the yarn at the earliest it should be with poly bags only to avoid the fluff sitting over it which you can remove while knotting the tail ends.

4.2.6.6. If you found any other lots available near by the machine, it should be pack the yarn immediately putting stickers with details which supervisors can return to the RMD.

4.2.7. Machine setting

4.2.7.1. The machine should be set as per the predetermined characteristic futures of prospected product needs (GSM, Wales/course per inch, loop length, speed …).

4.2.7.2. Production and pattern specifications should be interpreted to determine required machine settings for knitted product

4.2.7.3. Documentation relating to machine settings, operation and maintenance should be interpreted, referenced and applied according to the needs of the task

4.2.7.4. Tools appropriate for the machine and task should be selected, prepared and used in a safe and effective manner to set up machine for operation

4.2.7.5. Machine should be set up according to required specifications for operation or product change including fixing of required attachments and to run at optimum quality and efficiency levels

4.2.7.6. Knitting operators should be instructed of any special operating requirements

4.2.8. sample testing

4.2.8.1. Knitting machine should be operated in accordance with manufacturer's and workplace instructions to test settings against specifications and operational standards

4.2.8.2. Knitted product or sample should be examined to identify required adjustments to machine settings or pattern specifications

4.2.8.3. Quality tests should be conducted or organized as required to ensure optimal production outcomes are achieved

4.2.8.4. Required adjustments should be identified and documented and machine settings adjusted accordingly.

4.2.8.5. Before running the knitting machine, we should follow the following steps to check that the machine stands by or not.

a) Check the oil in each lubrication portion for the sufficiency, if the oil found insufficient, just fill the oil to specified position.
b) Check the yarn for perfection connection and check the take-up tension for normality.
c) Operate the machine with manual operation stick and pay attention to whether or not the machine has abnormal sound if you found the needle latch by a brush thus facilitating knitting operation.
d) When the machine is delivered to your factor, although machine is applied with anti-rusting oil, part of the needle will still be rusted please replace them.
e) Check the power of source was connected with machine, turn power on and check all the switches for normal operation.
f) Use manual operation for to stick to rotating machine as slowly as you could. If everything is ok then press the run button to run the machine.

4.2.9. Yarn tension

4.2.9.1. We should be check the yarn pass through yarn tensioner and the MPF pass correctly.

4.2.9.2. Yarn tension plays an important role in knitting so the following should be taken care of:

a) MPF washer spring adjustment
b) Slow vibration of stopper
c) Presence of yarn eye guides (feeder, pipe, and creel)
d) Replacement of damaged pipes
e) Yarn wrapping on MPF (main pulley feeder)

4.2.10. Feeder tube

4.2.10.1. The quality of incoming yarn should be easily monitored on each feeder tube.

4.2.11. Yarn eye guide

4.2.11.1. Missing eye guides should be checked at a regular interval and replaced accordingly.

4.2.12. Creel pipe position

4.2.12.1. The creel pipe position should be properly adjusted for smooth flow of yarn and damaged pipe should be replaced with new ones.

4.2.13. Yarn passage

4.2.13.1. Yarn passage should be as smooth as possible.

4.2.13.2. Yarn should not touch any part of the machine other than guides.

4.2.14. MPF tension washer

4.2.14.1. Missing MPF tension washer should be checked at regular interval and replaced accordingly.

4.2.15. Knitting production

4.2.15.1. Daily production targets should be defined on the basis of production capacity of the machine.

4.2.15.2. To provide complete view of the existing work order running on the machine, a knitting program chart should be attached on each machine. (Format is attached in the annex…)

4.2.15.3. The knitting program chart should include the following points:

a) Machine No.
b) Work Order No.
c) Machine Type
d) Machine Gauge /Diameter
e) Machine RPM
f) Yarn Brand
g) Yarn Count
h) Fabric Type
i) Stitch Length
j) GSM

4.2.15.4. Whenever, starting the new article it is appropriate to make a data chart, information should be included in the said data sheet:

a) Machine Number
b) Design
c) Yarn Count
d) Stitch Length
e) Round Meter
f) Tension
g) Sinker Timing / Needle Timing
h) Feeder Position.
i) IRO Tape.
j) Number of teeth of MPF tape
k) Greige GSM
l) Finish GSM
m) Problems encountered during production of the article
n) Possible solutions of problems
o) Swatch of the Fabric

4.2.15.5. It is very difficult to determine an ideal speed (rpm) even for particular design and machine itself. It differs with the yarn quality as well as the machine condition. Therefore the optimum speed of machine should be set after experiments.

4.2.15.6. Finally the machine should be operating as per the predetermined design and speed and then produce the fabric.

4.2.16. Doffing & marking

4.2.16.1. The roll should be doffing always after counter is completed.

4.2.16.2. The roll should be doff after cleaning

4.2.16.3. The roll should be cover with poly only without stain.

4.2.16.4. There should be the details/markings on the roll as soon as possible according to the machine chart as follows.

a) Machine no.
b) Roll no.
c) Shift.
d) Yarn lot no.
e) Date
f) Operator name.

4.2.17. Quality Control

4.2.17.1. The doffed knitted rolled fabric coming out from the knitting machine should be inspected in order to approve if its parameters are within previously determined requirements.

4.2.17.2. parameters that should be checked are fabric measurement, knit damages, foreign fibers, Oil stain ,dirty marks etc should be as ES 6583

4.2.17.3. Test/check these:

a) Fabric stability and finished width
b) Double stitch problem
c) Press off problem
d) Bar line
e) Grey fabric GSM
f) Stitch length of fabric sample
g) Measuring actual stitch length
h) Fabric stability and finished width

4.2.18. Material handling and house keeping

4.2.18.1. Handling and storing of fabric roll

Fabric roll should not be placed on floor as it causes oil mark on the fabric. A clean plastic sheet may be used to place the fabric roll on the floor and also place plastic sheet over the stored roll to avoid accumulation of fluff on the fabric.

4.2.18.2. Air circulation system

a) The overall cleaning condition on production floor affects the fabric quality. So to get good quality fabric, floor cleaning and fluff suction system should be adapted.

b) At list industrial vacuum cleaner should be used for fluff control.

4.2.18.3. Separating and covering the knitting machine

The stopped machine should be covered with polypropylene sheet to avoid fluff accumulation from one machine to another. And similarly, the machines which are not in operation should be covered with polypropylene sheet from top to bottom for avoiding the accumulation of fluff on it.

5. GUIDELINE FOR MAINTENANCE

5.1. General guidelines for knitting machinery

5.1.1. Yearly preventive maintenance plan and schedule should be prepared for each machine considering the following main factors:

5.1.1.1. Manufacturer's Recommendations.

5.1.1.2. Quality level required.

5.1.1.3. Condition of the Machines – Technology & Age

5.1.1.4. Type of raw material used.

5.1.1.5. Process parameters Maintained.

5.1.1.6. Atmospheric conditions.

5.1.2. Working procedures/standard operating procedures should be prepared for preventive maintenance, corrective maintenance, operator care and lubrication so as to have repeatable process, capture knowledge, train new employees, and reduce self-induced failures.

5.1.3. Minimum stock of critical spares should be identified and maintained and the factory management should be proactive to deliver the spares in time.

5.1.4. Basic setting of machineries should be checked and ensured periodically.

5.1.5. Machine history record card should be maintained for each machine.

5.1.6. Machine audit should be done during schedule cleaning to keep up the machine for better quality and performance.

5.1.7. Systems like Total Productive Maintenance (TPM) should be implemented.

5.1.8. Consumable spares should be replaced in time as per manufacturer's recommendation and the factory's standard to avoid production loss.

5.1.9. Machine break downs should be recorded for analyzing and corrective and preventive actions should be taken.

5.1.10. Suitable lubricant/oil recommended by the manufacturer should be selected and applying it.

5.1.11. Quality of compressed air and pressure gauge should be checked: -

a) Air should be free from oil and moisture.

b) Leakages in airline should be corrected.

5.2. Machinery audit

5.2.1. The job "Machinery Audit" should be assigned to well-experienced senior persons in maintenance department. They are expected to give a searching look to the mechanical condition of the machinery.

5.2.2. After machinery Inspection, the audit personnel should be expected to submit a report to the management on the various corrective actions to be taken indifferent departments with a view to improve the overall mechanical condition of the process machinery.

5.3. Section based guidelines for machinery and equipment maintenance

5.3.1. Yarn Conditioning

5.3.1.1. Temperature and pressure gauge should be calibrated periodically.

5.3.2. Knitting section

5.3.2.1. Maintenance of knitting machine is very important that affect the machine efficiency, machine life and fabric quality. So the management should prepare a maintenance schedule and it should be followed strictly.

5.3.2.2. The main parts of the knitting machine should be checked with extreme care and responsibility.

5.3.2.3. Follow the guidelines for machine maintenance plan (Daily, Weekly, Monthly, and Bi-Annually and Annually

5.3.2.4. The selection of oil should be done keeping in view both the quality of the fabric and the machine lubrication requirement.

5.3.2.5. Sinker timing reference points should be available on all machines for correct setting of sinker timing gauges.

5.3.2.6. Revolution per minute (RPM) and Counter meters on knitting machines should always be in working conditions...

5.3.2.7. Follow the following guideline for machine cleaning:

a) Each operator should individually take care of the proper machine cleaning
b) At each doff machine should be cleaned including the net cover
c) Waste cloth should be used for bed and underside cleaning
d) Machine cleaning with air pressure should be done only by operator
e) Cleaning of the creel should also be done
f) The machines which are not in production should be covered to avoid accumulation of fluff on the machine

5.3.2.8. . Uneven surface cams should be buffed or new cams should be used to save the life of needles.

5.3.2.9. After changing the complete set of needles with the new one, better condition needles should be sorted out from old set of needles and should be used as replacement whenever, needle brakes on any machine.

5.3.2.10. The record of broken needles and individual needles replaced on daily basis should be prepared.

5.3.2.11. Needle and sinker change schedule should also be maintained properly.

5.3.2.12. The concerned in-charge must ensure that all the data being collected should be accurate.

5.3.2.13. Check the machine & surrounding area, fabric, yarn etc. Thoroughly before planning to work.

Annex A

(Normative)

Quantitative best practice for knitting factories

No	Deliverable Parameters	Unit of measure	Best practice	Company Existing	
1	Knitting production				
1.1	Over all Knitting plant Utilization	%	98		
1.2	0ver all Knitting plant Efficiency	%	85		
1.3	Speed of Knitting Machine (Circular)	rpm	36		
1.4	Circular Knitting Machine Productivity	Kg/shift	170 (28 Ne yarn)		
1.5	Knitting Direct personnel ratio	operator/machine	1 per 4 machine		
		mechanic per machine	1 per 4 machine		
1.6	Hard Waste	%	0.40%		
2	Quality Tests				
2.1	Fresh knitted fabric percentage (A grade)	%	97		
2.2	Quality Check of Yarn	lot	Every Lot		
3	Maintenance & Utility				
3.1	Planned maintenance/ Total maintenance	%	>85%		
3.1	unplanned down time	%	~0%		
3.2	Reactive maintenance	%	<15%		
3.3	Maintenance overtime/ Total company ove	%	<5%		
3.4	maintenance work order reworked/Total w	%	~0%		

Annex B
(Normative)
Qualitative best practice for knitting factories

Qualitative Aspects	Best Practice Parameters	Company Existing (Yes/ No)	Remark
Production	Standard Operational Procedures		
	Work Instructions		
	Machine Charts		
	Different Production Reporting Formats		
	Production Controlling System		
	Production Planning and Schedules		
	Performance Evaluation Sheets		
Quality	Quality Checking and Fabric Grading System		
	Standard Operational Procedures		
	Work Instructions		
	Different Quality Reporting Formats		
	Performance Evaluation Sheets		
	Quality Round		
	Quality Assurance System		
	Quality Plan		
Maintenance	Maintenance Planning		
	Machine history Records		
	Maintenance Check Points		
	Maintenance Time Frame		
	Standard Operational Procedures		
	Daily Oil and Needle Consumption		
	Work Instruction		
	Different Reporting and Follow up System and F		
Product Development	Producing New Different type of Products		

Annex C
(Informative)
Machine History Template

Section:	Machine name:		Manufacturer:	Machine No:	power:
Model:	Country of origin:		manufactured year:	Date of commissioning:	
Manufacturer address:				price:	
				length, width and height:	

Major Replacement on the Machine

Date	Part Number	Spare Part Used	QTY	Price	Maintenance Done	Type of Maintenance	Engaged Technician	Maintenance Cost	Signature

Annex D
(Informative)
Machine Audit Checklist for Knitting Machine

		Machine No. & Date			
	Checks points				
SR.No	**Cleaning**	**Remarks**			
1	Top & down fan motor & blade				
2	Yarn feeding device				
3	Cam box of cylinder& dial				
4	Needles &sinkers tracks				
5	Take down system				
6	Machine motor & surrounding area				
7	Creel & tube				
SR.No	**Oiling & Greasing**				
1	Machine bed				
2	Drive &YFD gears				
3	Cam box & nozzles				
4	Take up device				
5	Top gears (for D.K. only)				
SR.No	**Cylinder change report**				
1	Cylinder change from --to				
2	Cylinder centering & leveling, height				
3	Dial centering &leveling				
4	Distance-CAM box &cylinder				
5	Distance-CAM box & dial				
6	Yarn carrier centering				
SR.No	**Stop Motion**				
1	Yarn Feeding Device (Coni)				
2	Needles detector				
3	Doors				
	Job start time				
	Job finish time				
Remarks or notes					
Sign of	**Sign of shift official**	**Sign of technical**			

Annex E
(Normative)
Sample maintenance Schedule for Knitting Machine

Sr.No.	Activity	Time(Minute)
1	Breaking yarn ends from feeder	3
2	Removing windings from IRO/Coni	10
3	Cover Creel	15
4	Loosening MPF / Coni / MER Belts	4
5	Pull up all yarn feeders	10
6	Fabric press off and removing remaining fabric	3
7	Bare running of machine after using oil	15
8	Cleaning excess oil from machine by air	2
9	Loosening cam box bolts	
	Sinker Cam Box	30
	Cylinder Cam Box	60
	Dial Cam Box	60
10	Removing cam boxes and keeping in trolley	35
11	Removing needles / sinkers and keeping on table	90
12	Cleaning of cylinder/sinker ring/dial with air	60
13	Cleaning and checking needles/sinkers	180
14	Check & clean all lycra wheel on feeder / MER	30
15	MPF checking for freeness, stop motion, repairing defective coni	45
16	Cam box cleaning, checking cams for tightness	60
17	Checking creel & feeder eyelets.	15
18	Nozzle cleaning	20
19	Take down cleaning, greasing gears in take down	30
20	Greasing of cylinder/ dial drive gears, cylinder bearing	30
21	Checking QAP and belts	10
22	Checking Oilier tank, filter	20
23	Cleaning of machine body, doors	30
24	Checking oil pipes	15
25	Checking air pipes and nozzles	20
26	Cleaning of lycra feeding device	30
27	Cleaning Creel Pipes	60
28	Cleaning & checking Fan	30
29	Putting needles/ sinkers	180
30	Issue replacement needles for damaged needles	20
31	Cam box putting on cylinder and tightening	60
32	Cam box putting on dial/sinker ring and tightening.	60
33	Threading yarn into yarn feeders	60
34	Knit down	60
35	Machine Hand over after fabric checking	30
		1462

Annex F
(Normative)
Knitting shift wise machine chart

Machine no.		Diameter		Date	
		Gauge			
Party Name				Shift	
Yarn Count - 1		Stitch Length		Team Name	
Lot No.					
Yarn Count - 2		Stitch Length		Operator Name	
Lot No.					
Yarn Count - 3		Stitch Length		Running RPM	
Lot No.				Oil input	

Roll no.	Start Time	Doffing Time	Revolution	Needles Replace	Detention if any / Remarks
Total					
Running RPM					
Total Revolution of the shift @ 100 %					
Actual Revolution of the shift					
Actual Revolution efficiency in %					

CHECK POINTS DURING THE SHIFT		
Station	Check points	Mark if O.K If not inform to shift fitter
Oil	Check all tube are passing oil	
Flutter Blower	Check all air blower are working & in place	
Doors	All doors with stop motion is working	
Conies	Check all positive feeders are free & both up & down light is working	
Fans	Check all fans are working	
Needles detector	Check all detector are in place & set properly	
Oil leakage	Check there is no oil leakage in down the bed	

Annex G
(Informative)
Difference between the Warp& Weft knits

Warp Knitting	Weft Knitting
The loops are produced to the length of fabric	The loops are produced to the width of the fabric
The threads runs in the vertical direction	The threads runs in the horizontal direction
Each loop in the horizontal direction is made from a d	A horizontal row of loops can be made by using on thre
It is elastic to the length	It is elastic to the width
It's elasticity is less	Higher elasticity
Yarns are supplied from beam	From cone
At least one yarn is needed for each needle	Any number of needle are required for one yarn
Less shrinkage	More/Higher shrinkage

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Ethiopian Standards Agency

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,
- ❖ Facilitat 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.

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).

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