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DRAFT EAST AFRICAN STANDARD

Handle for hand tools — Specification

EAST AFRICAN COMMUNITY

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0 Foreword

Development of the East African Standards has been necessitated by the need for harmonizing requirements governing quality of products and services in the East African Community. It is envisaged that through harmonized standardization, trade barriers that are encountered when goods and services are exchanged within the Community will be removed.

The Community has established an East African Standards Committee (EASC) mandated to develop and issue East African Standards (EAS). The Committee is composed of representatives of the National Standards Bodies in Partner States, together with the representatives from the public and private sector organizations in the community.

East African Standards are developed through Technical Committees that are representative of key stakeholders including government, academia, consumer groups, private sector and other interested parties. Draft East African Standards are circulated to stakeholders through the National Standards Bodies in the Partner States. The comments received are discussed and incorporated before finalization of standards, in accordance with the Principles and procedures for development of East African Standards.

East African Standards are subject to review, to keep pace with technological advances. Users of the East African Standards are therefore expected to ensure that they always have the latest versions of the standards they are implementing.

The committee responsible for this document is Technical Committee EASC/TC 042, *Production and general engineering*.

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Handle for hand tools — Specification

1 Scope

This Draft East African Standard specifies general and specific requirements of handles for hand tools. The standard covers handles made of different materials such as wood, plastics, metals and composites.

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.

ISO 13061-1, *Physical and mechanical properties of wood — Test methods for small clear wood specimens — Part 1: Determination of moisture content for physical and mechanical tests*
ISO 24153, *Random sampling and randomization procedures*

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 <http://www.iso.org/obp>

3.1 hand tool

a tool operated by human hands.

3.2

suitability coefficient

value of a timber species for the use of tool handles is evaluated taking into consideration its shock resistance, bending strength, resilience, stiffness and hardness.

4 Classification of wooden tool handles

For the purpose of this standard, all wooden tool handles have been divided into the following five classes depending on the nature of the tool for which the handle is meant and the strength required:

- a) *Class 1*
This class includes all tool handles over 75 cm in length required for heavy duty striking tools, such as 9.2 kg forging hammers, 6.3 kg double faced sledge hammers, 2 kg felling axes, 2 kg pick axes, 3 kg axes, beaters and carpenters adzes;
- b) *Class 2*
This class includes tool handles varying in length from over 60 cm to 75 cm required for medium duty striking tools, such as 1 kg boiler makers riveting ballpane hammers and 3 kg double-faced sledge hammers.
- c) *Class 3*

This class includes tool handles up to 60 cm in length required for light duty striking tools, such as 2 kg Indian adzes, 1-5 kg smith hammers, 2 kg splicing wire hammers and 1.75 kg tinmans hammers;

d) *Class 4*

This class includes handles required for scooping tools, such as shovels, rakes and spades; and

e) *Class 5*

This class includes handles required for cutting and shaping tools, such as chisels, files, saws, augers, screw drivers and sickles.

5 Requirements

5.1 Materials

5.1.1 Wood suitable for various classes of tool handles

5.1.1.1 The various classes of tool handles shall be manufactured from any of timbers given in Annex A to E.

5.1.1.2 The blanks shall be seasoned to a moisture content not exceeding 15%. It shall be free from centre heart (pith), any kind of decay (rot), checks, shakes, splits (except a few hair splits), borer holes, warp and any other defect, except those permitted in the finished handles under 8 which is likely to reduce the life of handles or affect-their utility.

5.1.2 Plastics

Plastic materials used in the fabrication of tool handles shall be made from durable, impact-resistant polymer such as polypropylene, polyvinyl chloride (PVC), HDPE, nylon or fiberglass reinforced plastic (FRP). Materials shall be UV-stabilized if intended for outdoor use.

5.1.3 Metals

Metallic handles shall be manufactured from corrosion-resistant metals such as stainless steel or aluminium. Mild steel with corrosion resistant coatings can be used.

5.1.4 Composites

Composite materials made up of two or more different materials shall also be used in the fabrication of tool handles.

5.2 Dimensions

5.2.1 Dimensions

Unless otherwise specified in the agreement between the purchaser and producer, the dimensions of tool handles shall conform to relevant standards for specific type of tool.

5.2.2 Tolerances

Unless otherwise indicated in the relevant standards for specific type of tool, the following tolerances on handle dimensions shall be permissible, +3 -0 mm where the head, socket, blade or tongue of the tool will fit; and ± 2 mm at other places.

5.3 Manufacture

5.3.1 Handles shall be ergonomically designed to provide a comfortable and secure grip.

5.3.2 Handles shall provide a surface resistance for grip strength and endurance.

5.3.3 Handles shall be built to withstand rigorous use and high durability.

5.4 Workmanship and finish

5.4.1 Tool handles shall be finished smooth all over. The surface should have a coefficient of friction ranging from 0.3 – 0.5 when tested dry.

5.4.2 All handles shall be free of sharp edges, ridges, or splinters that could cause blisters or discomfort.

5.4.3 Wooden handles shall be free from the following defects:

- a) brittle heart;
- b) decay;
- c) slope of grain in excess of 1 in 20;
- d) abrupt dipped grain;
- e) insect damage;
- f) pith;
- g) reaction wood;
- h) compression failures;
- i) cross-break; and
- j) ring shakes and Splinters.

5.4.4 Permissible defects

Unless otherwise specified, wooden tool handles, defects to the extent as indicated in Table 1 shall be permissible in the finished handles.

Table 1: Permissible defects

S/No.	Defect	Length of Handles	Extent of Permissible Defect
i.	Deviation of grain	All	1 in 20 <i>Max</i>
ii.	Pin knots	Up to 30 cm	None
		Over 30 cm	One beyond two-thirds of the length from the tool end
iii.	Sapwood		
	- At waist	All	None
	- At other places	Up to 30 cm	None
		Over 30 cm	20 percent, <i>Max</i>

5.5 Treatment

Unless otherwise specified by the purchaser, all accepted wooden tool handles shall be treated with a suitable wood preservative such as boiled linseed oil, varnish, lacquer, or polyurethane to protect against moisture, fungi, insects and others.

6 Tests methods

6.1 Wooden tool handles shall satisfy the tests prescribed under 6.1.2 and 6.1.3.

6.1.1 Timber Species

The species of timber used may be identified.

NOTE: When the supply is made in mixed species of timbers, the tool handles of each species shall be kept separately.

6.1.2 Moisture, Content

Moisture content shall be determined either by using a moisture meter or by oven drying method in accordance with ISO 13061-1. The specimen used for determination of moisture content by oven drying method shall be a disc of thickness 2-5 cm. For class 1 and class 2 handles, 3 specimens shall be cut at distance of L/4, L/2 and 3L/4 from one end of the selected sample handle and the average of 3 moisture contents shall be reported. In case of handles other than class 1 and class 2 handles, one specimen cut from the middle of the selected sample handle would be sufficient.

6.1.3 Striking Test

Handles required for heavy, medium and light striking tools shall be correctly fitted to the relevant dummy heads and shall be struck twelve times, as in normal use, against a block of any hard wood. At the end of this test, the handle shall not show any sign of failure.

6.1.4 Visual Inspection

6.1.4.1 Inspection of wooden handles

For wooden handles of striking tools, inspection should be particularly rigorous. Wood used for tool handles should be straight grained with grain running parallel to the handle. Any serious deviation in the grain pattern should be examined for possible hair cracks and marked with a soft pencil for scrutiny during and after the bending test. There should not be any decay (rot), centre heart (pith), borer holes and cracks or splits resulting from incorrect seasoning. Discoloration of wood is not acceptable, unless it is a known characteristic of the species and does not affect the strength of the handle. All wooden parts must be free of machine chips or sharp edges resulting from the production process. The wooden parts must be oiled, waxed or varnished. The simplest test is to run the hand over the surface and any rough parts are unacceptable.

6.1.4.2 Inspection of plastic handles and metallic handles

There should be no cracks, seams, scales, blowholes or discoloration, particularly on the sharpened or polished edges that might indicate defects in the original material or in its subsequent treatment. All sharp edges other than the cutting edge should have been removed. Particular attention should be given to any bolts or rivets, which should be countersunk on handles, the joint between head and handle, and any parts where the hands grip or slide when using the tool. Any rough edges likely to cause discomfort or injury to the hands are unacceptable. The metal part must be corrosion resistant (coated, painted, varnished or lacquered) as specified and there should be no evidence of rust on the handle.

7 Sampling

The method of drawing representative samples of tool handles and the criteria for conformity shall be as prescribed in Annex F.

8 Packing and Marking

8.1 Packing

Handles shall be strapped or bagged. Strapping shall be such that it will not damage the surfaces of the handles.

8.2 Marking

Each handle when supplied separately without a tool, it shall bear the following information in legible marking on a label securely glued to the handle or clearly hammer-stamped or branded on an end or on a face of the handle:

- a) manufacturer's name, initial or registered trade-mark,
- b) class of the handle (for wooden handles only).
- c) type of material and/or grade (where applicable)
- d) country of origin

Annex A

(Informative)

Timbers for Class 1 Handles

Botanical name	Standard trade name	Comperative suitability coefficient for tool handles with respect to axle wood taken as 100
<i>Acacia Catechu</i>	Khair	109
<i>Acacia nilotica</i>	Babul	92
<i>Aglaia spp.</i>	Aglaia	113
<i>Albizia odoratissima</i>	Kala-siris	110
<i>Anogeissus acuminata</i>	Yon	113
<i>Anogeissus latifolia</i>	Axle wood	100
<i>Anogeissus pendula</i>	Kardhai	96
<i>Atalantia monophylla</i>	Jungli nimbu	98
<i>Careya arborea</i>	Kumbi	104
<i>Cassia fistula</i>	Amaltas	105
<i>Casuarina equisetifolia</i>	Casuarina	95
<i>Chloroxylon sivietenia</i>	Satin wood	103
<i>Dalbergia sissoo</i>	Sissoo	91
<i>Fraxinus spp.</i>	Ash	97
<i>Grewia tillifolia</i>	Dhaman	106
<i>Heritiera spp.</i>	Sundri	110
<i>Hopea spp.</i>	Hopea	123
<i>Manilkara spp.</i>	Bullet wood	116
<i>Maniltoa polyandra</i>	Ping	114
<i>Mesua assamica</i>	Sianahor	103
<i>Mesua floribunda</i>	Karol	104
<i>Mesua ferrea</i>	Mesua	141
<i>Olea spp.</i>	Olive	133
<i>Parotopsis Jacquemontiana</i>	Pohu (Parrotia)	91
<i>Planchona valida</i>	Red-bombwe	91
<i>Pterocarpus marsupium</i>	Bijasal	97
<i>Quercus spp.</i>	Indian Oak	92
<i>Sageraea elliptica</i>	Chooi	146
<i>Schleichera oleosa</i>	Kusum	112
<i>Shorea robusta</i>	Sal	104
<i>Terminalia alata</i>	Laurel	94
<i>Terminalia citrina</i>	-	91
<i>Terminalia manii</i>	Black chuglam	91
<i>Terminalia chebula</i>	Myrobalan	100
<i>Thespesia populnea</i>	Bhendi	120

<i>Vitex spp,</i>	Milla	97
<i>Xylia Xylocarpa</i>	Irul	91
<i>Xylocarpus spp.</i>	Pussur	92
<i>Zanthoxylum rhetsa</i>	Mullilam	92

Annex B

(Informative)

Timbers for Class 2 Handles

Botanical name	Standard trade name	Comperative suitability coefficient for tool handles with respect to axle wood taken as 100
<i>Acacia melanoxylon</i>	-	80
<i>Acrocarpus fraxinifolius</i>	Mundani	86
<i>Aegle marmelos</i>	Bael	79
<i>Albizia procera</i>	Safed siris	89
<i>Amoora spp.</i>	Amari	81
<i>Azadirachta indica</i>	Neem	84
<i>Celtis australis</i>	Celtis	81
<i>Cullenia rosayroana</i>	Karani	82
<i>Diospyros spp.</i>	Econy	88
<i>Dipterocarpus spp.</i>	Gurjan	77
<i>Dysoxylum malabaricum</i>	White cedar	85
<i>Exbucklandia populnea</i>	Pipli	79
<i>Gluta travancorica</i>	Gluta	76
<i>Hardwickia binata</i>	Anjan	87
<i>Lagerstroemia microcarpa</i>	Benteak	81
<i>Lagerstroemia parviflora</i>	Lendi	85
<i>Madhuca longifolia</i>	Mahua	79
<i>Miliusa tomentosa</i>	Hoom	83
<i>Qugeinia oojeinensis</i>	Sandan	82
<i>Palaquium ellipticum</i>	Pali	79
<i>Palaquium polyanthum</i>	Tali	85
<i>Pongamia minnata</i>	Karanji	80
<i>Prosopis cineraria</i>	Jhand	85
<i>Shorea talura</i>	-	88
<i>Stereopermum spp.</i>	Padri	85
<i>Syzygium spp.</i>	Jaman	86
<i>Teceona Mandis</i>	Teak	85
<i>Terminalia arjuna</i>	Arjun	85
<i>Terminalia bialota</i>	White chuglem	83
<i>Terminalia Paniculata</i>	Kindal	82

Annex C

(Informative)

Timbers for Class 3 Handles

Botanical name	Standard trade name	Comperative suitability coefficient for tool handles with respect to axle wood taken as 100
<i>Acer spp.</i>	Maple	70
<i>Adina cordifolia</i>	Haldu	73
<i>Albizia lebbeck</i>	Kokko	74
<i>Artocarpus hirsutus</i>	Aini	74
<i>Bridelia spp.</i>	Kassi	65
<i>Calophyllum spp.</i>	Poon	74
<i>Gardenia latifolia</i>	Gardenia	65
<i>Gravillea robusta</i>	Silver Oak	66
<i>Holoptelea integrifolia</i>	Kanju	68
<i>Lagerstroemia hypoleuca</i>	Pyinma	68
<i>Lagerstroemia speciosa</i>	Jarul	70
<i>Mitragyna parvifolia</i>	Kaim	71
<i>Morus spp.</i>	Mulberry	72
<i>Terminalia procera</i>	White-bombwe	68

Annex D

(Informative)

Timbers for Class 4 Handles

D-1 Same timbers as for classes 1 and 2 handles are permissible for class 4 handles.

Annex E

(Informative)

Timbers for Class 5 Handles

E-1 In addition to the timbers specified for classes 1, 2 and 3 handles, the following timbers are also permitted:

Botanical name	Standard trade name	Comperative suitability coefficient for tool handles with respect to axle wood taken as 100
<i>Artocarpus chaplasha</i>	Chaplash	58
<i>Betula spp.</i>	Birch	56
<i>Dillenia spp.</i>	Dillenia	63

Annex F

(Normative)

Sampling of tool handles

F-1 Sampling and testing

F-1.1 Lot

In any consignment, all the tool handles of the same class and manufactured under similar conditions of production shall be grouped together to constitute a lot.

F-1.2 Visual Examination

All the tool handles in the lot shall be first inspected for visual defects, workmanship and finish. Any tool handle failing to satisfy the requirements for these characteristics shall be rejected. Those tool handles, which pass the visual examination, shall be subjected to further tests.

F-1.3 Selection of Sample for Further Tests

The number of tool handles to be selected for further testing from those accepted as in F-1.2 shall be in accordance with column 1 and 2 of Table F-1.

F-1.3.1 Samples shall be selected at random according to ISO 24153. In order to ensure randomness of selection, all the accepted tool handles shall be kept separately in one lot and starting from any random tool handle, the requisite number is to be obtained from all sections of the stock as far as possible.

Table F-1: Number of Tool Handles to be selected and Criteria for Conformity

Number of tools handles accepted after visual inspection	Sample size	Permissible number of defective handles
(1)	(2)	(3)
201 to 300	6	0
301 to 500	7	0
501 to 800	8	0
801 and above	10	1
NOTE: For lots of 200 or less tool handles the number of handles to be tested and the tests to be carried out shall be as agreed to between the purchaser and the supplier.		

F-1.3.2 The samples selected as in F-1.3 shall be tested for dimensional requirements, moisture content and performance tests.

F-2 Criteria for conformity

F-2.1 The lot shall be considered as conforming to the requirements of the characteristics mentioned in F-1.3.2 if the number of tool handles failing to satisfy the requirements of the characteristics does not exceed the corresponding numbers given in column 3 of Table F-1.

Bibliography

- [1] RS 176:2013, *Wooden handles for forks, shovels, spades, beater picks, mattocks and picks — Specification*
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