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DRAFT STANDARD FOR PUBLIC COMMENT

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வெளியிட்டுத் திகதி
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SRI LANKA STANDARDS INSTITUTION
GUARDIAN OF QUALITY

Draft Sri Lanka Standard
SPECIFICATION FOR COCONUT EKEL-BASED BROOMS MANUFACTURED WITH NATURAL MATERIALS
(DSLS :)

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இவ்வரைவு இலங்கைக் கட்டளையெனக் கருதப்படவோ அன்றிப் பிரயோகிக்கப்படவோ கூடாது
This draft should not be regarded or used as a Sri Lanka Standard.

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Comments to be sent to: SRI LANKA STANDARDS INSTITUTION, 17, VICTORIA PLACE, ELVITIGALA MAWATHA, COLOMBO 08.

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Introduction

This Draft Sri Lanka Standard has been prepared by the Sri Lanka Standards Institution and is now being circulated for technical comments to all interested parties.

All comments received will be considered by the SLSI and the draft if necessary, before submission to the Council of the Institution through the relevant Divisional Committee for final approval.

The Institution would appreciate any views on this draft which should be sent before the specified date. It would also be helpful if those who find the draft generally acceptable could kindly notify us accordingly.

All Communications should be addressed to:

The Director General
Sri Lanka Standards Institution,
17, Victoria Place,
Elvitigala Mawatha,
Colombo 08.

Draft Sri Lanka Standards

Specification for coconut ekel-based brooms manufactured with natural materials

Gr.

SRI LANKA STANDARDS INSTITUTION
17, Victoria Place
Elvitigala Mawatha
Colambo 8
SRI LANKA

Draft Sri Lanka Standards

Specification for coconut ekel-based brooms manufactured with natural materials

FOREWORD

This Sri Lanka Standard was approved by the Sectoral Committee on Textiles, Clothing and Leather and was authorized for adoption and publication as a Sri Lanka Standard by the Council of the Sri Lanka Standards Institution on …….

Guidelines for the determination of a compliance of a lot with the requirements of this standard based on statistical sampling and inspection are given in Appendix **A**.

For the purpose of deciding whether a particular requirement of this specification is complied with, the final value, observed or calculated, expressing the result of a test or an analysis, shall be rounded off in accordance with **SLS 102**. The number of significant places retained in the rounded off value shall be the same as that of the specified value in this specification.

1. SCOPE

This Standard covers coconut ekel-based sweeping brooms fabricated by using natural materials such as wood, coir twine and rattan. This Standard does not cover ekel brooms fabricated using other materials.

2. REFERENCES

SLS 16	Standard atmospheres for conditioning and testing textiles
SLS 102	Presentation of numerical values
SLS 428	Random sampling methods

3 TERMS AND DEFINITIONS

For the purposes of this specification the following definitions shall apply:

coconut ekel: Stiff midrib of a coconut leave

customer: Person or organization that could or does receive a product or a service that is intended for or required by this person or organization.

rattan: (*Calamus spp.*) A climbing, trailing, or shrubby palm of the subfamily Calamoideae, characterized by long, flexible stems

pests: Organisms that are capable of causing damage, economic loss or commercial loss to commodity

supplier: Person or organization that provides a product or a service

4 REQUIREMENTS

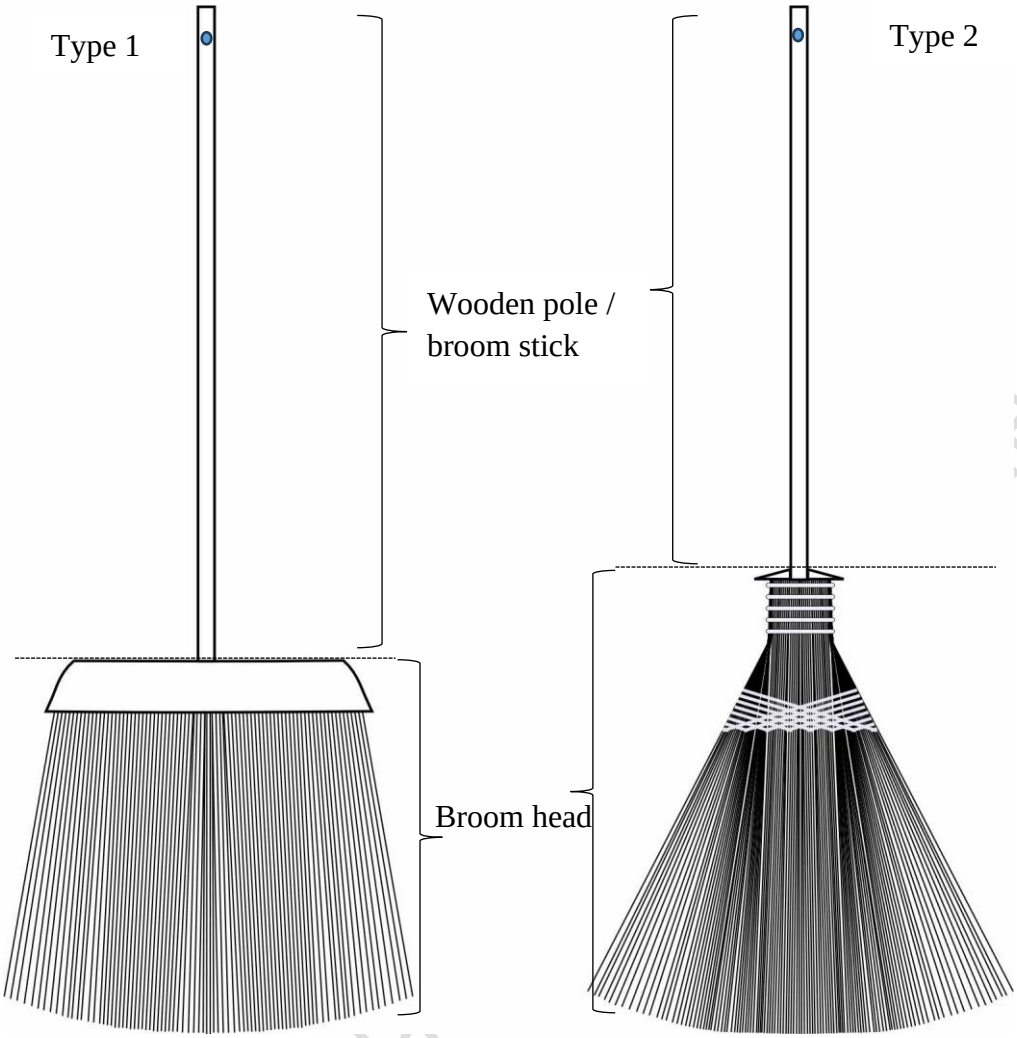

Figure 1 – Types of ekel broom

4.1 General

4.1.1 The broom shall be made out of wood, coconut ekel and fixing materials. The ekel broom shall consist of the following parts (see Figure **1**):

I. Wooden pole (broom stick); and
II. Broom head.

4.1.2 The pole of the broom shall be straight, having a smooth surface and circular cross section. The pole and broom head shall be symmetrically aligned unless otherwise agreed to between the supplier and the customer. All the edges shall be rounded or chamfered.

4.1.3 The pole and broom head shall be fixed in order to prevent the detaching and breaking. The fixing materials shall be made out of coir twine, rattan (*Calamus spp.*) or wood with suitable adhesives.

4.1.4 Ekel tuft of the broom head shall be uniformly expanded. The individual ekel shall be free from objectionable defects, impurities such as unseparated coconut leaf parts liable to affect the intended purpose.

4.1.5 The broom head and pole shall be free from defects liable to affect the intended purpose when inspecting in accordance with Appendix **B**.

4.1.6 Dyes and coatings of the finished product should be agreed to between the supplier and the customer. All the applied treatments, dyes, coatings and preservatives shall be complying to the prevailing laws, rules and regulations.

4.1.7 Type

Based on the fixing method used in the broom head, following types can be identified (see Figure **1**):

a) Type 1 – Ekel are fastened by wooden parts with adhesives; and
b) Type 2 – Ekel are fixed by coir twine, rattan or suitable means with a wooden pin (see Figure **2**).

4.2 Requirements for an ekel broom

4.2.1 The ekel broom shall be complied with the requirements given in the Table **1**.

Table 1 – Dimensions, Physical and mechanical properties for a broom

Sl. No	**Parameter**		**Requirement**		**Method of test**
			Type 1	**Type 2**	
i	Dimension*, mm, min.	A – B*	20	20	Appendix C
		D – G*	270	160	
		E – F	50	50	
		a*	70	170	
		b	400	380	
		h*	1400	1400	
ii	Diameter* of the pole, mm		22 - 26		
iii	Curvature of the pole, max.		0.7		Appendix D
iv	Weight of ekel, g, min.		475		Appendix E
v	Bending resistance of a ekel, mm, min		As per the Table **3**		Appendix F
vi	Weight*, g, max.		750	875	Appendix G

Table **1** is continued …

Table **1** is continued …

Sl. No	Parameter	Requirement		Method of test
		Type 1	Type 2	
vii	Strength of the broom	25 kg		Appendix H
viii	Moisture content of wooden part, max. per cent,	20		Appendix J
ix	Moisture content of ekel, max. per cent,	20		Appendix K

*Any other specification can be considered in accordance the agreement between the supplier and the customer

4.2.2 If the treatment for pests and fungus is required (regulatory or otherwise), all the wooden parts shall be treated as per the method given in Appendix **M**. The treated wood parts shall be tested according to the Appendix **N**.

5 PACKAGING

The packaging shall be as agreed to between the manufacture and the customer.

6 MARKING AND LABELING

Following information shall be legibly and indelibly marked on each product or on bulk package on a label securely attached:

a) Name of the product;
b) Name and address of the manufacturer and/ or importer;
c) Date of manufacture; and
d) Brand name if any.

In addition, any marking and labelling requirements can be included as agreement between the supplier and the customer.

7 METHODS OF TEST

7.1 The test shall be carried out as Appendices **B** to **N**.

7.2 The conditioning and testing atmosphere shall be the Standard atmosphere specified in **SLS 16**.

8 CRITERIA FOR CONFORMITY

The conformity to this Standard shall be as specified in Appendix **A.**

APPENDIX A
COMPLIANCE OF A LOT

The sampling scheme given in Appendix **A** should be applied where compliance of a lot to the requirements of this Standard is to be assessed based on statistical sampling and inspection.

Where compliance with this Standard is to be assured, appropriate schemes of sampling and inspection shall be adopted based on manufacturer's control systems coupled with type tests and testing procedures.

A.1 LOT

A.1.1 In any consignment, all the brooms of same material, design and type belonging to one batch of a manufacture or supply shall constitute a lot.

A.2 SCALE OF SAMPLING

A.2.1 The samples shall be inspected and tested from each lot for ascertaining conformity of the lot to the requirements of this Standard.

A.2.2 The number of units to be selected as the sample from a lot shall be in accordance with Column **1** and Column **2** of Table **2**.

A.2.3 The number of units to be selected as the sub sample 1 from the sample selected as in **A.2.2** shall be in accordance with Column **1** and Column **4** of Table **2**.

A.2.4 The number of units to be selected as the sub sample 2 from the sample selected as in **A.2.2** shall be in accordance with Column **1** and Column **5** of Table **2**.

TABLE 2 – Scale of sampling

No. of units in the lot (1)	No. of units to be selected for the sample (2)	Acceptance No. for sample (3)	Size of sub-sample 1 (4)	Size of sub-sample 2 (5)
Up to 500	13	1	5	3
501 to 1 200	20	1	5	5
1 201 to 10000	32	2	8	5
10 001 and above	50	3	8	5

A.2.5 All units shall be selected at random. In order to ensure randomness of selection, random number tables as given in **SLS 428** shall be used.

A.3 NUMBER OF TESTS

A.3.1 Each unit selected as in **A.2.2** shall be inspected for packaging and marking requirements specified in Clause **5** and **6**.

A.3.2 Each unit selected as in **A.2.2** shall be inspected for the requirements specified in Clauses **4.1**.

A.3.3 Each unit selected from first sub sample as in **A.2.3** shall be tested for the requirements of Sl. no. **i** (Dimension), Sl. no. **ii** (Diameter of the pole), Sl. no. **iii** (Curvature of the pole), Sl. no. **vi** (Weight of the broom) and Sl. no. i**v** (Weight of the ekel) specified in Table **1** of Clause **4.2**.

A.3.4 Each unit selected from second sub sample as in **A.2.4** shall be tested for the requirements of Sl. no. **v** (Bending resistance) and Sl no. **vii** (Strength) specified in Table **1** of Clause **4.2**.

A.3.5 Composite sample selected from second sub sample as in **A.2.4** shall be tested for the requirements of Sl no. **viii** and i**x** (Moisture content) specified in in Table **1** of Clause **4.2**.

A.3.6 If the treatment for pests and fungus is required, composite sample selected from second sub sample as in **A.2.3** shall be tested for the requirements specified in Clause **4.2.2**.

A.4 CRITERIA FOR CONFORMITY

A lot shall be declared as conforming to the requirements of this Standard if the following conditions are satisfied.

A.4.1 Each unit inspected as in **A.3.1** shall satisfies the relevant requirements.

A.4.2 The number of units, not conforming to any one or more requirements when examined as in **A.3.2** is less than or equal to the corresponding acceptance number given in Column **3** of Table **2**.

A.4.3 Each unit inspected as in **A.3.3** shall satisfies the relevant requirements.

A.4.4 Test specimens inspected as in **A.3.4** shall satisfies the relevant requirements.

A.4.5 Each unit inspected as in **A.3.5** shall satisfies the relevant requirements.

A.4.6 Test specimens inspected as in **A.3.6** shall satisfies the relevant requirements.

APPENDIX B
DEFECTS OF THE WOODEN PARTS
(Normative)

B.1 Check-Small separation of the wood fibres in a longitudinal direction, not penetrating as far as the opposite or adjoining side of a pole.

B.2 Compression failures- Fracture across the grain in which the fibres are broken transversely or are crushed by compression.

B.3 Dead knot- A dead knot is darker and may fall off, leaving a hole that can weaken the strength of the wooden parts.

B.4 End split - A longitudinal separation of the fibres which extends to the middle portion of the pole at edge of the pole.

B.5 Hollow knot - A knot which has fallen out leaving a hole whose sides are free from decay.

B.6 Knot - A portion of a branch which has become embedded in the wood by the natural growth of the tree.

B.7 Live knot- A live knot is usually lighter in colour and generally never fall out.

B.8 Pest and Diseases attack - Any Damage caused by wood destroying agents
B.9 Split- A longitudinal separation of the fibres which extends to the middle portion of the pole .

B.10 Surface checking- Checks that occur on the round surface of the pole

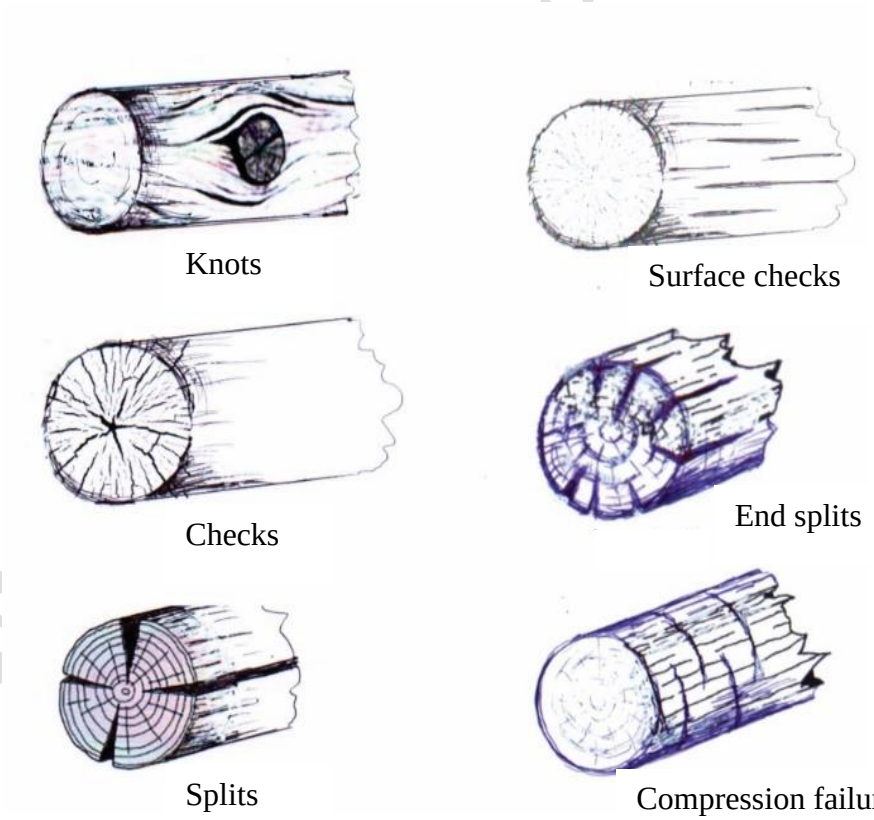

Figure 2 – Defects of the wooden parts

APPENDIX C
DETERMINATION OF THE DIMENSION OF THE BROOM
(Normative)

C.1 Apparatus

C.1.1 A ruler or measuring tape graduated in mm
C.1.2 A Vernier caliper

C.2 Procedure

C.2.1 The diameter of the pole shall measure at three different places using the Vernier caliper.

C.2.2 Other dimensions shall measure using the ruler or measuring tape

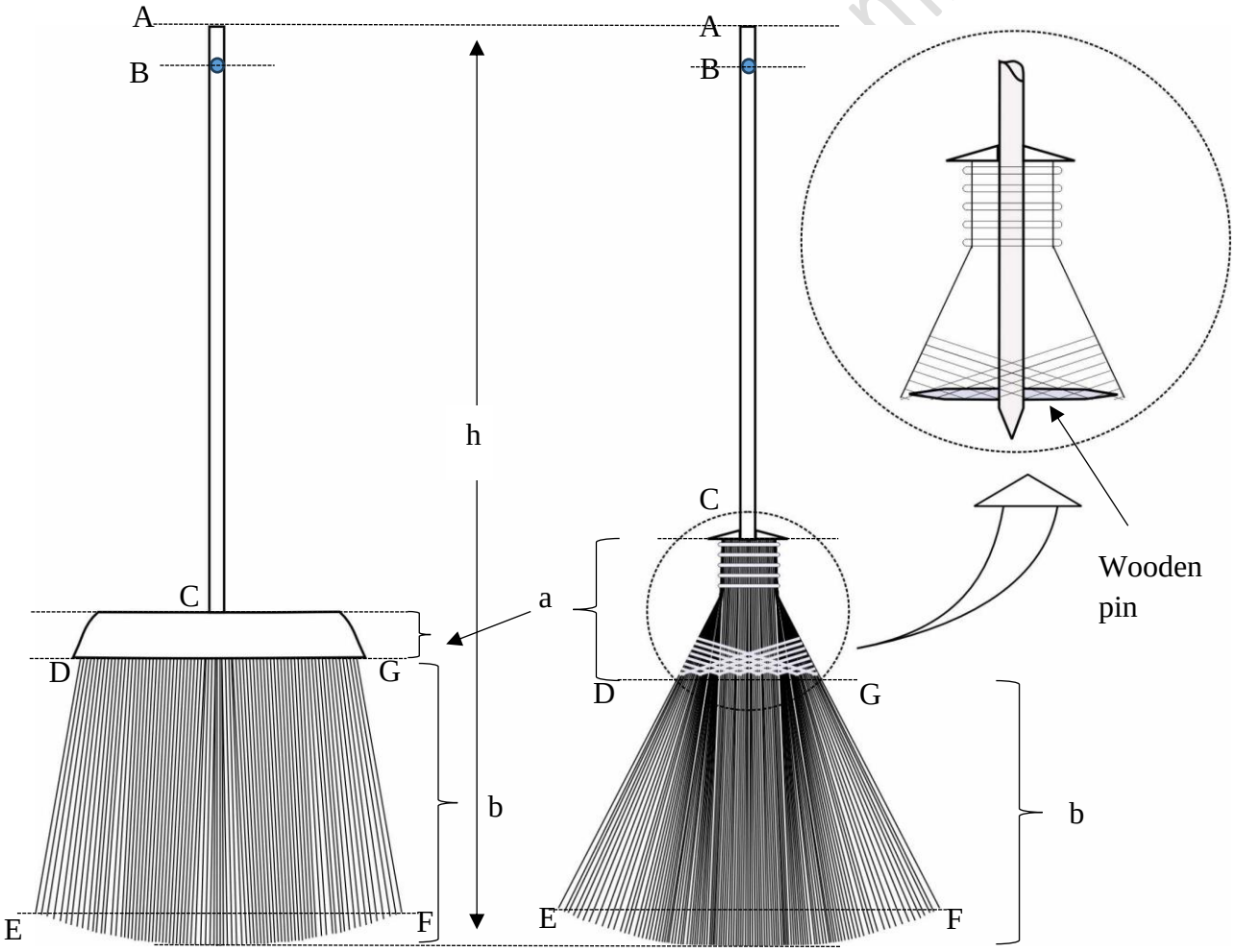

Figure 3 – Dimensions of an Ekel broom

APPENDIX D
DETERMINATION OF THE POLE STRAIGHTNESS

D.1 Apparatus

D.1.1 A thread having length is more than 1.5 m
D.1.2 A ruler or measuring tape graduated in mm

D.2 Procedure

D.2.1 Place the thread on A and C positions according to the Figure **4**

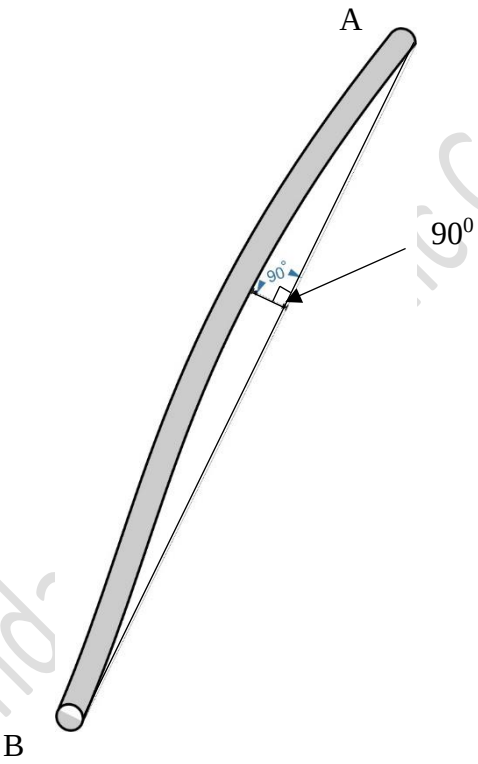

Figure 4 – Curvature of the pole

D.2.2 Measure the maximum curvature (**a**) for the full-length (warpage/ deviation) using the thread and the ruler.

APPENDIX E
DETERMINATION OF THE WEIGHT OF THE EKEL

Cut all the ekel and weigh with A weighing scale ability to measure nearest 1 g. The working range 100 g to 1 kg.

APPENDIX F
DETERMINATION OF THE BENDING RESISTANCE PROPERTIES OF THE EKEL

F.1 Apparatus

F.1.1 Pull-push gauge (see Figure **6**)
F.1.2 Bench vise or clamp(s)
F.1.3 Metal ring

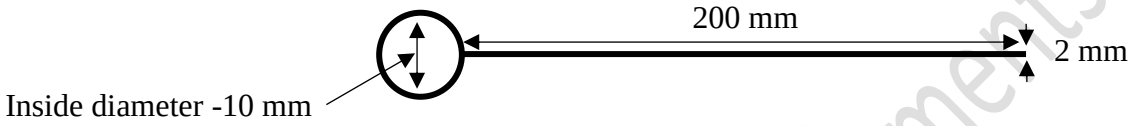

Figure 5 – Metal ring

F.2 Test specimen

Select a broom or a broom head according to the Appendix **A**

F.3 Procedure

F.3.1 Prepare a metal ring as per the Figure **5**.
F.3.2 Select a bunch of ekel from point 2 area (maximum number of ekel) and insert in to the ring.
F.3.3 Fix the broom and set the testing setup the as per the Figure **6**.
F.3.4 Fix the push-pull gauge to the metal ring at the marked level.
F.3.5 Pull the selected bunch of ekel 150 mm and take the reading (see Figure **6**)
F.3.6 Repeat the **F.3.4** and **F.3.5** for the point of 1 and 3

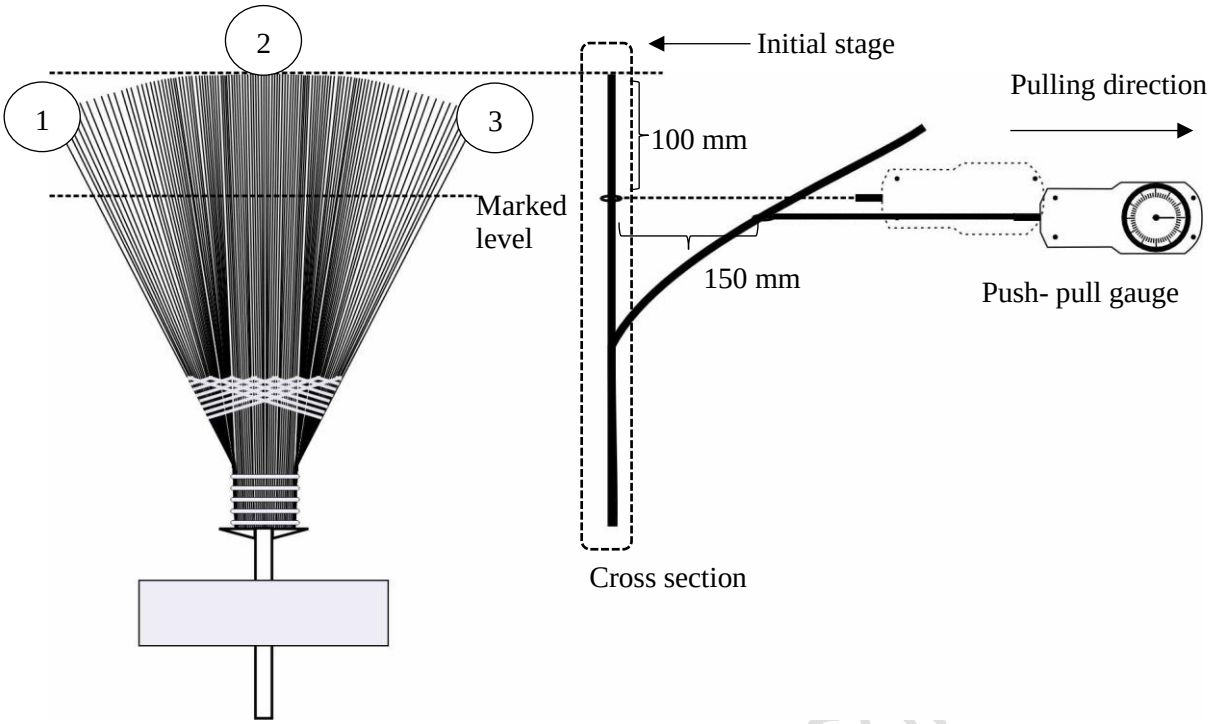

Figure 6 – Pulling areas and testing setup

Table 3 – Bending resistance of ekel

Point	Minimum force, N
1	3
2	5
3	3

APPENDIX G
DETERMINATION OF WEIGHT OF THE BROOM
(Normative)

G.1 Apparatus

G.1.1 A weighing scale ability to measure nearest 1 g. The range 100 g to 3 kg
G.1.2 A device for keep the broom on a scale in vertical direction

G.2 Procedure

G.2.1 Place the device mentioned **G.1.2** on the scale and re-zero.

G.2.2 Measure the weight of the broom placed on the weighing scale in the vertical direction.

APPENDIX H
DETERMINATION OF THE STRENGTH OF A BROOM
(Normative)

H.1 Apparatus

H.1.1 25 kg weight (can be able to hang)
H.1.2 A test base (see Figure **10**)

H.2 Preparation of test specimen

Take a randomly selected broom from the drawn sample as per the Table **2** of Appendix **A**

H.3 Procedure

H.3.1 Mark the P and Q as per the Figure **9**

H.3.2 The specimen shall be kept as Figure **10**

H.3.3 A central load of 20 kg, shall be gently applied on the specimen

Distance between A and P = 2 cm

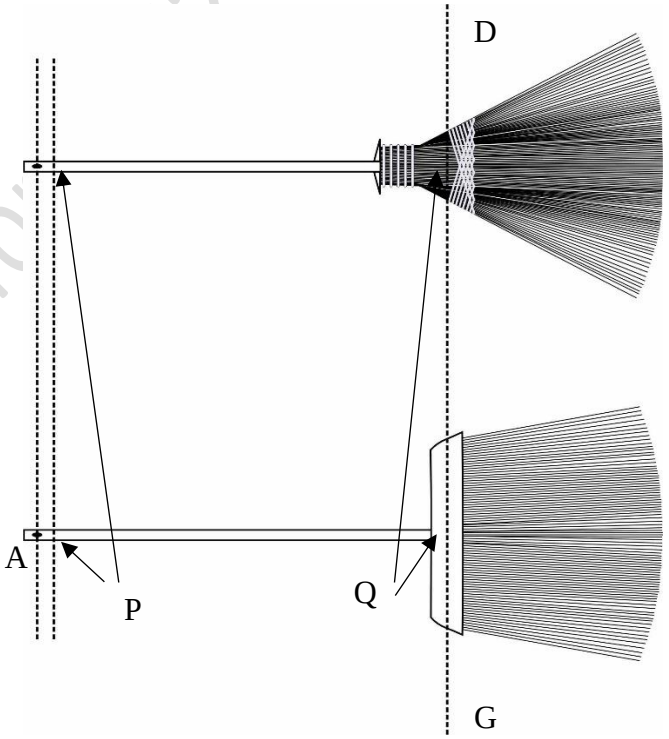

Figure 9

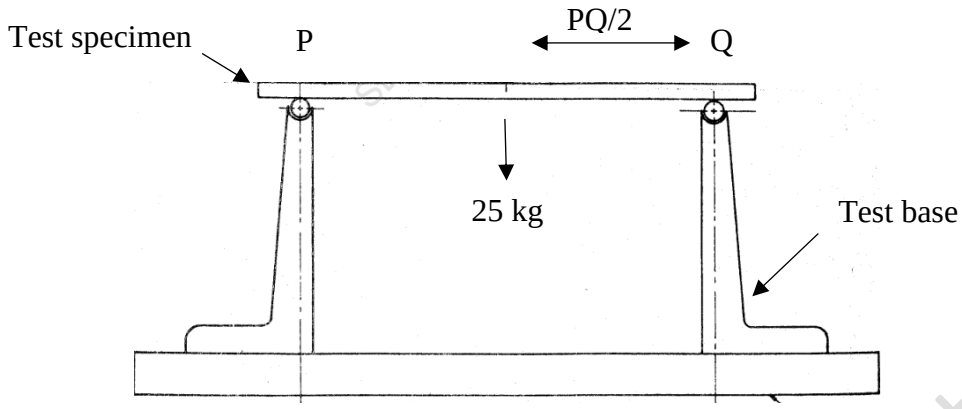

Figure 10

H.3.3 Repeat above **H.3.1** to **H.3.3** steps for another 4 specimens

APPENDIX J
DETERMINATION OF MOISTURE CONTENT OF THE WOODEN PARTS
(Normative)

J.1 Apparatus

J.1.1 Oven
J.1.2 Balance capable of weighing to an accuracy of 0.01 g
J.1.2 Wood cutting devise

J.2 Preparation of the sample

Cut the wooden parts in to the small pieces (app. 1x1 cm) and prepare a composite sample.

J.3 Procedure

J.3.1 Weigh 50 g of specimen from the prepared sample as per the **J.2**.

J.3.2 Dry the test specimen to constant mass at a temperature of 103 ± 2 °C for 6 hrs.

J.3.3 Cooling the specimen in a desiccator. weigh it rapidly enough to avoid an increase in moisture content by more than 0.l %. The accuracy of weighing shall be at least 0.5 % of the mass of the specimen.

J.3.4 Constant mass is considered to be reached if the loss in mass between two successive weighing carried out at an interval of one hour is equal to or less than 0.5 % of the mass of the specimen.

J.4 Calculation

Moisture content, per cent by mass = $\frac{m_1\text{-}m_2}{m_1}$ X 100%

Where,

m_1 is the mass, in grams, of the specimen before drying and;

m_2 is the mass, in grams, of the specimen after drying.

APPENDIX K
DETERMINATION OF MOISTURE CONTENT OF THE EKEL
(Normative)

K.1 Apparatus

K.1.1 Oven
K.1.2 Balance capable of weighing to an accuracy of 0.01 g
K.1.3 Knife of ekel cutting devise

K.2 Preparation of the sample

Cut the ekel from the selected broom heads and prepare a composite sample.

K.3 Procedure

K.3.1 Weigh 10 g of specimen from the prepared sample as per the **K.2**.

K.3.2 Dry the test specimen to constant mass at a temperature of 103 ± 2 °C for 6 hrs.

K.3.3 Cooling the specimen in a desiccator. weigh it rapidly enough to avoid an increase in moisture content by more than 0.l %. The accuracy of weighing shall be at least 0.5 % of the mass of the specimen.

K.3.4 Constant mass is considered to be reached if the loss in mass between two successive weighings carried out at an interval of one hour is equal to or less than 0.5 % of the mass of the specimen.

K.4 Calculation

Moisture content, per cent by mass= $\frac{m_1\text{-}m_2}{m_1}$ X 100%

Where,

m_1 is the mass, in grams, of the specimen before drying and;

m_2 is the mass, in grams, of the specimen after drying.

APPENDIX M
GUIDELINE FOR WOODEN PARTS PRESERVATION
(Normative)

M.1 Chemicals

M.1.1 Borax
M.1.2 Boric acid

M.2 Apparatus

M.2.1 Weighing balance
M.2.2 Dipping tank (see Figure **11**) suitable for heating or impregnation plant

M.3 Procedure

M.3.1 Weigh 5 kg of boric acid and 7.5 kg of borax powder.

M.3.2 Transfer above weighed chemicals into 100 liters of water in the dipping tank.

M.3.3 Heat the above **(M.3.2)** mixture approximately 60 °C until dissolved chemical compounds.

M3.4 Fully immerse the wooden parts in the dipping tank as per the Figure **11**

M.3.5 Maintain the solution temperature around 60 °C for minimum 30 minutes.

M.3.6 Treated wooden parts as per **M.3.5**, remove from the dipping tank and immediately dry using suitable drying method (sun dry or mechanical drying) with suitable stacking method.

Note:

If re-use the solution (**M.3.2**), following steps shall be taken:

1. Determine the volume of the remaining solution;
2. Calculate the volume of water that need to be refilled;
3. Calculate the amount of chemicals as per the ratio described in **M.3.1** and **M.3.2**; and
4. Transfer the above water volume and the chemicals in to the dipping tank

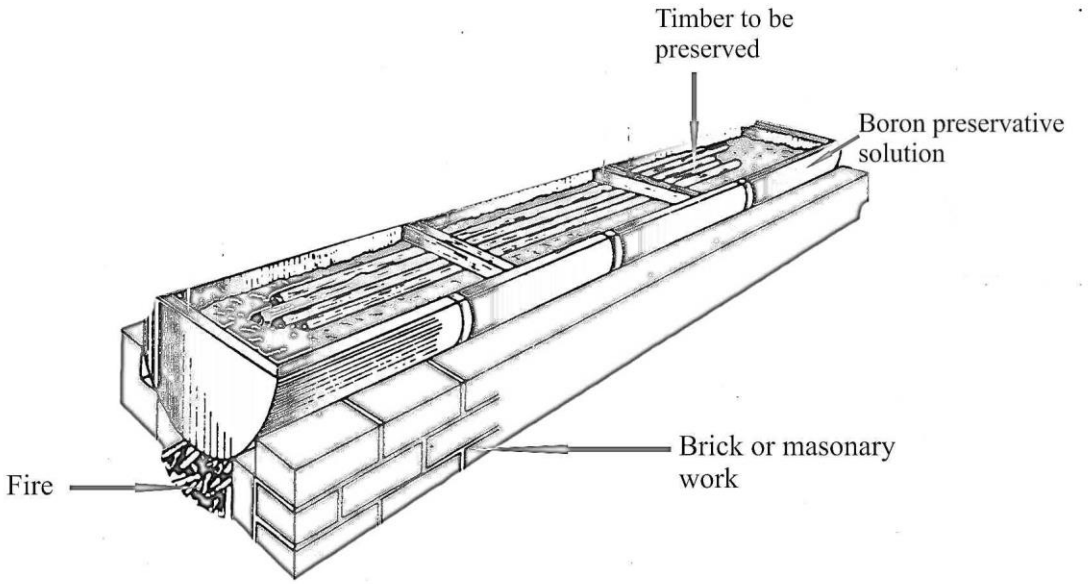

Figure 11 - Preservation tank made by welding of oil barrels

APPENDIX N
SPOT TEST FOR BORON TREATMENT
(Normative)

N.1. Apparatus

N.1.1 Wood cutting equipment
N.1.2 Two sprayers or two droppers

N.2 Reagents

N.2.1 Turmeric powder
N.2.2 95% ethyl alcohol
N.2.3 Salicylic acid
N.2.4 30% hydrochloric acid

N.3 procedure

N.3.1 Prepare alcoholic extract of the turmeric powder by mixing 2 g of turmeric powder with 100 ml of 95% ethyl alcohol.

N.3.2 Keep the above solution for 24 hours

N.3.3 Filter the above solution (**N.3.2**) and labeled as “A”

N.3.4 Prepare the mixture of 80 ml of distilled water and 20 ml of 30 percent hydrochloric acid solution

N.3.5 Saturate the solution with salicylic acid and labeled as “B”

N.3.6 Cut wooden parts and apply the solution A on the entire cutting cross section

N.3.7 Keep the specimen to be dried (appr. 2 min.)

N.3.8 Apply the solution B on the same place of solution A applied

N.4 Reaction

The treated surface develops red colour infer the boron treated area.