SRI LANKA STANDARD 494:1980
UDC 664.782.44:678.4.06-434.1

SPECIFICATION FOR RUBBER ROLLERS FOR RICE HULLING MACHINES

BUREAU OF CEYLON STANDARDS

SPECIFICATION FOR RUBBER ROLLERS FOR RICE HULLING MACHINES

SLS 494:1980

Gr. 4

BUREAU OF CEYLON STANDARDS
53, Dharmapala Mawatha,
Colombo 3,
Sri Lanka.

Sri Lanka Standards are subject to periodical revision in order to accommodate the progress made by industry. Suggestions for improvement will be recorded and brought to the notice of the Committees to which the revisions are entrusted.

This Standard does not purport to include all the necessary provisions of a contract.

SRI LANKA STANDARD
SPECIFICATION FOR RUBBER ROLLERS FOR RICE HULLING MACHINES

FOREWORD

This Sri Lanka Standard was authorized for adoption and publication by the Council of the Bureau of Ceylon Standards on 1980-12-18, after the draft, finalised by the Drafting Committee on Rubber Rollers, had been approved by the Technical Advisory Committee on Rubber and Rubber Products and the Chemicals Divisional Committee.

With the emphasis of becoming self sufficient in rice, increasing paddy production and obtaining good quality milled rice have become of paramount importance. Rice hulling machines equipped with rubber rollers are widely used in this country to dehusk the paddy. The rubber rollers wear away quickly and need to be replaced very often. Hence, rice millers are very keen to obtain good quality rubber rollers with high wear resistance, which will enable them to dehusk as much paddy as possible. These should not stain the rice.

During the discussions it was revealed that shelling capacity is a function of the rice hulling machine

as a whole and not merely on the pair of rollers. It was therefore decided not to include a requirement for shelling capacity. The Committee expects that the parameters specified for dimensions and rubber characteristics will give a roller of acceptable quality.

The requirement of non-staining of rice milled by coloured rollers was considered to be important and has been included in the specification although an appropriate objective test method has not been included due to want of sufficient data.

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 analysis, shall be rounded off in accordance with CS 102. The number of significant places retained in the rounded off value should be the same as that of the specified value in this specification.

In the preparation of this specification valuable assistance derived from the publications of the International Organization for Standardization (ISO), Indian Standards Institution and Japanese Standards Association is gratefully acknowledged.

1 SCOPE

This standard specifies material, dimensions and other requirements for key type rubber rollers used in rice hulling machines to dehusk the paddy. Only rollers with a cylindrical core made of metal with a rubber outer covering are covered by this specification.

2 REFERENCES

CS 102 Presentation of numerical values

SLS 297 Methods of testing vulcanized rubber

Part 2 Determination of tensile stress-strain properties

Part 4 Determination of hardness

SLS 428 Random sampling methods

3 CLASSIFICATION

3.1 The rubber rollers shall be of the following two classes.

Class *A* - Non-black rollers
Class *B* - Black rollers

3.2 Both Class *A* and Class *B* shall be the key type rollers (see Figure 1).

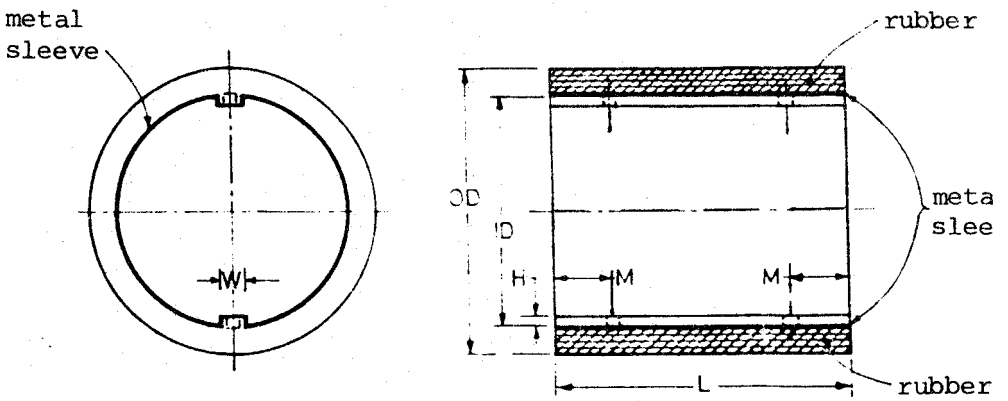

FIGURE 1 - Key type rubber roller

4 MATERIAL

4.1 The rubber part of the roller shall be made from natural or synthetic rubber or a blend of both. It shall not contain any scrap or reclaimed rubber. The rubber shall be compounded with non-toxic material.

4.2 The metal part of the roller shall have an anular cross-section and shall be made of a suitable metal which may be plain or perforated.

5 DIMENSIONS

The dimensions of the key type roller, when read in conjunction with Figure 1 shall be as given in Table 1.

TABLE 1 - Dimensions of key type rubber roller

Size code	Outer diameter (OD), mm	Inner diameter (ID), mm	Length (L), mm	No. of keys	Key dimensions		
					W mm	H mm	M mm
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
AK	256	202	254	2	21	9.5	50
BK	223	184	203	1	9.5	6.5	50
CK	223	184	152	1	14.5	5.5	32
Tolerance	+ 2 - 1	+ 0 - 1	± 1	-	±0.5	±0.5	±1

6 SURFACE FINISH

The rubber roller shall be free from blisters, air bubbles, pin holes, cracks, embedded foreign matter and other defects which may impair its serviceability. It shall have a smooth or grooved finish. The maximum depth of groove shall be one millimeter.

7 PHYSICAL PROPERTIES OF RUBBER

7.1 Hardness

For both classes of rollers, hardness of all five measurements in accordance with **7.1.1** shall be between 85 IRHD and 95 IRHD.

7.1.1 The hardness shall be measured at 27 $\pm$ 2 ^{o}C in accordance with the method specified in SLS 297 Part 4, the hardness meter shall be equipped with a suitable base plate for use with curved surfaces. The measurements shall be taken at five points, three points approximately 120^{o} apart around the circumference in the middle of the roller and two points at a distance of 10 per cent of the cover face length, from each end. If the roller surface is grooved, it shall be made smooth by buffing the surface before hardness measurements are taken.

7.2 Decrease in hardness

For both classes of rollers the decrease in hardness after the test specified in **7.2.1** shall be not more than 10 IRHD and in no case shall the hardness be less than 80 IRHD.

7.2.1 Five test pieces of suitable size shall be taken out from different parts of the rubber roller on test and their hardness shall be measured in accordance with SLS 297 Part 4. The test pieces shall then be put in the air thermostat for 2 h at 80 ± 2 °C and hardness shall be measured again immediately after taking them out of the thermostat.

7.3 Tensile strength and elongation at break

7.3.1 Tensile strength shall be not less than 9.8 MPa for both classes of rollers when measured in accordance with **7.3.3.**

7.3.2 Elongation at break shall be not less than 200 per cent for both classes of rollers when measured in accordance with **7.3.3.**

7.3.3 The test for tensile strength and elongation at break shall be carried out in accordance with the method stipulated in SLS 297 Part 2 using dumb-bell test pieces. Three pieces shall be taken preferably from different layers of rubber in the lengthwise direction of the roller (that is: parallel to the axis of the roller). The test result shall be the mean but all three values shall be reported.

8 OTHER REQUIREMENTS

8.1 The rubber rollers shall be made of such material that it will not discolour the rice.

8.2 The rubber roller shall be uniform and homogeneous in construction.

8.3 The thickness of the rubber shall be uniform and not less than 18 mm. The difference in thickness measured at random at 4 points in a rubber roller shall not vary by more than 0.5 mm.

8.4 The rubber layer of the roller shall adhere firmly to the metal sleeve.

8.5 The rubber surface shall be free from sulphur bloom.

8.6 The key type rubber roller shall be provided with a hole tapped for a 8 mm size bolt. There shall be two tapped holes for rollers of length 254 mm and for others there shall only be one. The distance from the centre of the hole to the metal sleeve edge of the roller (see *M* in Figure 1) shall be as specified in Table 1 for different size of rollers.

9 MARKING AND PACKAGING

9.1 Marking

Each roller shall be legibly and indelibly marked with the following particulars :

a) Manufacturer's name and address and/or registered trade mark ;

b) Size code; and

c) Batch or code number.

The marking shall be on the inner part of the metal sleeve and shall be clearly visible.

9.2 Packaging

Rollers of same class and size code shall be packed as agreed to between the purchaser and supplier for safe handling in transit.

10 SAMPLING AND CRITERIA FOR CONFORMITY

10.1 Scale of sampling

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

10.1.2 Samples shall be taken and tested from each lot for ascertaining the conformity of the lot to the requirements of this specification.

10.1.3 Number of rollers to be selected from the lot shall be in accordance with Columns 1 and 2 or 4 of Table 2.

10.1.4 Rollers shall be selected at random. To ensure randomness of selection a random number table as specified in SLS 428 shall be used.

10.2 Number of tests and criteria for conformity

10.2.1 For visual and dimensional requirements

The rollers selected according to **10.1.3** shall be examined for requirements given in **5, 6** and **8**. The roller failing to satisfy any one or more of these requirements shall be considered as a defective. The lot shall be considered as conforming to the requirements given in **5, 6** and **8** if the number of defective rollers in the sample does not exceed the number given in Column 3 of Table 2.

10.2.2 *For physical requirements*

If the lot conforms to the requirements given in **5, 6** and **8**, a sub-sample of size given in Column 4 of Table 2 shall be taken from the rollers selected in **10.2.1**. Each roller in the sub-sample shall be tested separately for the requirements given

TABLE 2 - Scale of sampling and criteria for conformity

Lot size	For visual and dimensional tests		For physical tests	
	Sample size	Permissible no. of defectives	Sub-sample size	Permissible no. of defectives
(1)	(2)	(3)	(4)	(5)
Up to 25	2	0	2	0
26 to 50	3	0	2	0
51 to 100	5	0	2	0
101 to 300	13	1	3	0
301 to 500	32	3	5	0
501 to 1000	50	5	8	1
1001 and above	80	7	13	1

in 7. A roller not satisfying any one or more requirements of 7 shall be considered as defective. The lot shall be considered as conforming to this specification if the number of defectives in the sub-sample does not exceed the number given in Column 5 of Table 2.

SLS CERTIFICATION MARK

The Sri Lanka Standards Institution is the owner of the registered certification mark shown below. Beneath the mark, the number of the Sri Lanka Standard relevant to the product is indicated. This mark may be used only by those who have obtained permits under the SLS certification marks scheme. The presence of this mark on or in relation to a product conveys the assurance that they have been produced to comply with the requirements of the relevant Sri Lanka Standard under a well designed system of quality control inspection and testing operated by the manufacturer and supervised by the SLSI *which includes surveillance inspection of the factory, testing of both factory and market samples.*

Further particulars of the terms and conditions of the permit may be obtained from the Sri *Lanka Standards Institution, 17, Victoria Place, Elvitigala Mawatha, Colombo 08.*

Printed at SLSI (Printing Unit)

SRI LANKA STANDARDS INSTITUTION

The Sri Lanka Standards Institution (SLSI) is the National Standards Organization of Sri Lanka established under the Sri Lanka Standards Institution Act No. 6 of 1984 which repealed and replaced the Bureau of Ceylon Standards Act No. 38 of 1964. The Institution functions under the Ministry of Science & Technology.

The principal objects of the Institution as set out in the Act are to prepare standards and promote their adoption, to provide facilities for examination and testing of products, to operate a Certification Marks Scheme, to certify the quality of products meant for local consumption or exports and to promote standardization and quality control by educational, consultancy and research activity.

The Institution is financed by Government grants, and by the income from the sale of its publications and other services offered for Industry and Business Sector. Financial and administrative control is vested in a Council appointed in accordance with the provisions of the Act.

The development and formulation of National Standards is carried out by Technical Experts and representatives of other interest groups, assisted by the permanent officers of the Institution. These Technical Committees are appointed under the purview of the Sectoral Committees which in turn are appointed by the Council. The Sectoral Committees give the final Technical approval for the Draft National Standards prior to the approval by the Council of the SLSI.

All members of the Technical and Sectoral Committees render their services in an honorary capacity. In this process the Institution endeavours to ensure adequate representation of all view points.

In the International field the Institution represents Sri Lanka in the International Organization for Standardization (ISO), and participates in such fields of standardization as are of special interest to Sri Lanka.

Printed at the Sri Lanka Standards Institution, 17, Victoria Place, Elvitigala Mawatha, Colombo 08.