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(पहला पुनरीक्षण)

**Mechanically Extracted Coir
Fibres — Specification**

Part 4 Machine Twisted Curled Coir Fibres
(*First Revision*)

ICS 59.060.01

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FOREWORD

This Indian Standard (Part 4) (First Revision) was adopted by the Bureau of Indian Standards after the draft finalized by the Coir and Coir Products Sectional Committee had been approved by the Textile Division Council.

This standard was first published in 1999. Curled coir fibre used as a major raw material in the manufacture of consumer goods like rubberized coir sheets for cushioning and moulded rubberized coir cushioning.

Part 1, 2 and 3 of this standard cover requirements for bristle fibres, mattress coir fibres and decorticated coir fibres respectively. This part (Part 4) of the series covers the requirements for curled coir fibres.

Further, it has now been revised to incorporate the additional requirements for Ecomark.

The Ministry of Environment and Forests, Government of India has instituted a scheme for labelling environment friendly products known as 'Ecomark scheme'. This standard is based on the criteria as notified by the Government of India *vide* Gazette Notification No. 893(E), dated 18 September 2018 for labelling coir and coir products as environment friendly.

The Ecomark scheme is being operated by the Bureau of Indian Standards. However, to obtain the licence to use the Ecomark on a product, it is also essential to obtain BIS licence to use the Standard Mark as per the relevant Indian Standard for that product.

The composition of the committee responsible for the formulation of this standard is given at Annex F.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated, expressing the result of a test or analysis shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

*Indian Standard***MECHANICALLY EXTRACTED COIR
FIBRES — SPECIFICATION****PART 4 MACHINETWISTED CURLED COIR FIBRES***(First Revision)***1 SCOPE**

This standard (Part 4) prescribes the requirements and methods of test for machine twisted curled coir fibres of commercial grade.

2 REFERENCES

The standards listed in Annex A contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of standards.

3 TERMS AND DEFINITIONS

For the purpose of this standard the following definitions shall apply.

3.1 Machine Twisted Curled Coir Fibre — A product made out of mechanically extracted coir fibres by regulated and even-feeding of the fibres with the help of a mechanical arrangement in curling machines to form a thick strand of evenly distributed parallelized fibres which is processed further to form twisted curled rope of continuous length.

3.2 Designation of Fibres —The coir fibres are designated on the basis of length as under:

- a) Long fibres : Above 150 mm;
- b) Medium fibres : Above 100 mm and up to 150 mm; and
- c) Short fibres : Above 50 mm and up to 100 mm.

4 ATMOSPHERIC CONDITIONS FOR TESTING

Unless otherwise specified in the contract/order, all tests shall be carried out in a standard atmosphere at 65 ± 2 percent relative humidity and $27 \pm 2^\circ\text{C}$ temperature.

5 REQUIREMENTS**5.1 Diameter and Mass of Coil**

5.1.1 The curled coir fibre ropes shall be machine twisted with 16 to 24 curls per 300 mm having diameter as agreed between the buyer and the seller and wound into coil weighing 25 to 30 kg. The variation in the diameter of curled rope in the same coil shall not exceed 3mm

5.1.2 Methods of test are given in Annex B.

5.2 Proportion by Mass of Fibres of Different Lengths

The proportion by mass of long, medium and short fibre in the machine twisted curled coir fibre rope shall be as agreed to between the purchaser and the supplier. Where no such agreement, exists, the proportion by mass of long, medium and short fibres in the machine twisted curled coir fibre rope shall be as given below when determined by the method given in Annex C:

- a) Long fibres : 20 percent, *Min*;
- b) Medium fibres : 80 percent, *Max*; and
- c) Short fibres : 25 percent, *Max*.

5.3 Impurities

The impurities, mainly pith, dust, bits of exo carp and fibre bits below 50 mm shall not exceed 10 percent when determined by the method prescribed in Annex D.

5.4 Texture

The machine twisted curled fibre shall be hard twisted with curls evenly distributed along the length.

5.5 Moisture Content

The moisture content of machine twisted curled coir fibre rope shall not exceed 15 percent when determined by the method described in Annex E.

5.6 Chloride Content

The chloride content of the curled coir fibres, when determined by the method prescribed in IS 4202, shall not exceed 0.6 percent by mass.

5.7 Sulphate Content

The sulphate content of the curled coir fibres, when determined by the method prescribed in IS 4203, shall not exceed 0.25 percent by mass.

6 CORRECTED NET MASS

The corrected net mass of the lot shall not be less than the contract mass and shall be calculated by adding 18 percent moisture regain to its oven-dry mass. The oven-dry mass of each bale shall be calculated from its net mass and the moisture content; and later determined by method prescribed in Annex E.

7 ADDITIONAL REQUIREMENTS FOR ECOMARK (OPTIONAL)

7.1 The product shall meet the requirement specified in this Indian Standard.

7.2 The manufacturer shall produce the consent clearance as per the provisions of *Water (Prevention and Control of Pollution) Act, 1974* and *Air (Prevention and Control of Pollution) Act, 1981* and the authorization(s), if required under the rules notified under the *Environment (Protection) Act, 1986* and the rules made there under while applying for the Ecomark as per *Bureau of Indian Standards Act, 2016*.

7.3 The product(s) or product packaging(s) may display in brief the criteria based on which the product(s) has/have been labelled environment friendly.

7.4 The material used for product packaging(s) shall be recyclable, reusable or biodegradable.

7.5 The product shall meet the specific requirements as given in Table 1.

Table 1 Specific Requirements for Ecomark
(Clause 7.5)

Sl No.	Parameter	Requirement	Method of Test
(1)	(2)	(3)	(4)
i)	Residual pesticides (sum parameter) (ppm) (Max)	1.0	IS 15651
ii)	pH of aqueous extract	6-7	IS 8391 (Part 1)

8 PACKING AND MARKING

8.1 Machine twisted curled coir fibre rope shall be wound into coils and tied by 2-ply coir yarn at least at 4 places along the circumference at diametrical positions and further packed as agreed to between the buyer and the seller.

A label giving the following particulars shall be attached to each package:

- a) Indication of the source of manufacture;

- b) Serial number of the coil;
- c) Weight of the coil;
- d) Type of fibre used (decorticated/bristle);
- e) Criteria for which coir fibre has been labelled as 'Eco-friendly'; and
- f) Any other information required by the buyer or by the law in the force.

8.2 BIS Certification Marking

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act, 2016* and the Rules and Regulations framed there under, and the products may be marked with the Standard Mark.

9 SAMPLING, INSPECTION AND TESTING

9.1 Sampling

9.1.1 Lot

All coils of curled coir fibres delivered to a buyer against one dispatch note shall constitute a lot.

9.1.2 The conformity of a lot to the requirements of the standard shall be determined on the basis of the tests carried out on the coils selected from it.

9.1.3 Unless otherwise agreed to between the buyer and the seller, the number of coils to be selected from the lot shall be in accordance with column 2 of Table 2.

Table 2 Number of Coils to be Selected
(Clause 9.1.3)

Lot Size	Sample Size
<i>N</i>	<i>n</i>
(1)	(2)
up to 50	3
51 to 100	5
101 to 200	6
201 to 300	7
301 to 500	8
501 to 800	9
801 and above	10

9.1.3.1 The coils shall be selected at random. In order to ensure randomness of selection, all the coils in the lot may be serially numbered as 1, 2, 3 and so on and every *r*th coil may be selected until the requisite number is obtained, *r* being the integral part of *N/n*, where *N* is the lot size and *n* is the sample size.

9.1.4 For evaluating percent by mass of long, medium and short fibres; percentage of impurities;

texture chloride content; and sulphate content about 1 kg of the coir fibres shall be selected from twenty different randomly distributed places in the selected coils by taking about 50 g of the fibre from each place. The quantity drawn from each coil shall be kept separately.

9.1.4.1 For evaluating moisture content about 500 g of the coir fibre shall be collected from 10 different randomly distributed places in the selected coils by taking 50 g of the fibre from each place. The quantity so drawn from each place shall be immediately transferred to a suitable air-tight container and the container sealed to avoid any moisture difference.

9.1.5 *Criteria for Conformity*

The lot shall be considered as conforming to the requirements of the standard if the following conditions

are satisfied:

- a) The average value of percent by mass of long, medium and short fibres, and impurities, diameter, twist and weight of coil shall satisfy the requirements as specified in **5.1** to **5.3**.
- b) From the observed values of moisture content, chloride content and sulphate content, the average (\bar{x}) and range (R) are calculated and the expression $\bar{x} - 0.4 R$ is less than or equal to values specified in **5.4** to **5.6**.

NOTES:

1 The average (\bar{x}) is the value obtained by dividing the sum of the observed values by the number of tests.

2. The range 'R' is the difference between the maximum and the minimum in the set of observed values.

ANNEX A

(Clause 2)

LIST OF REFERRED INDIAN STANDARDS

<i>IS No.</i>	<i>Title</i>	<i>IS No.</i>	<i>Title</i>
4202 : 1967	Method for determination of chloride content of textile materials	15651 : 2006	Textiles — Requirements for environmental labelling — Specification
4203: 1967	Method for determination of sulphate content in textile materials	8391 (Part 1) : 2018	Rubberized coir sheets for cushioning — Specification: Part 1 Curled (<i>second revision</i>)
9308 (Part 1) : 1987	Specification for mechanically extracted coir fibres: Part 1 Bristle coir fibre (<i>first revision</i>)		

ANNEX B

(Clause 5.1.2)

METHODS OF TEST FOR MASS, DIAMETER AND CURLS PER UNIT LENGTH

B-1 MASS

Without removing the wrapping material, if any, weigh each coil in the lot to the nearest 0.5 kg and determine the total gross mass of all the coils in the lot.

four points, leaving a span of 5 m between the points of measurement along the length of coil and record the mean value.

B-2 DIAMETER OF CURLED COIR ROPE

All the coils in the test lot shall be tested for determination of diameter. The measurement of diameter of curled coir rope may be taken by vernier calipers correct to 1 mm recording the measurement at

B-3 CURLS PER UNIT LENGTH

Each coil of test lot shall be tested for determination of curls per 300 mm using a graduated scale. The measurements may be taken at four sections along the length of the coil leaving a span of 5 mm between the sections and record the mean value.

ANNEX C

(Clause 5.2)

METHOD FOR DETERMINATION OF THE PERCENT BY MASS OF LONG, MEDIUM AND SHORT FIBRES

C-1 TEST SPECIMENS

Draw 3 test specimens weighing approximately 2 g each from the test sample (*see 9.1.4*).

the table by holding one end of each fibre with the forefinger of one hand and stretching the other end with the fingers of the other hand. Arrange the fibres so measured into three groups according to their length as given below:

C-2 EQUIPMENT

For the purpose of this test, a flat table marked with a scale with 10 mm graduations shall be used.

<i>Length of the Fibre</i> <i>mm</i>	<i>Group</i>
Above 150	Long fibres
Above 100 and upto 150	Medium fibres
Above 50 and upto 100	Short fibres

C-3 PROCEDURE

C-3.1 Take one of the test specimens and measure the length of the individual fibre on the scale marked on

C-3.2 Weigh the fibres in each group and calculate the percentage of the mass of Fibres in each group to the total mass of fibres in all the three groups.

C-3.3 Repeat the test with the remaining two test specimens.

C-3.4 Average of the percentage by mass, of fibres in respective groups shall be deemed to be the percent by mass of short, medium and long fibres in the consignment.

ANNEX D

(Clause 5.3)

METHOD FOR DETERMINATION OF THE PERCENTAGE OF IMPURITIES

D-1 TEST SPECIMENS

Draw 5 test specimens weighing approximately 60 g each from the test sample (see 9.1.4).

D-2 PROCEDURE

D-2.1 Dry one of the test specimens in a conditioning oven (E-1.1). Determine its oven-dry mass correct to the nearest 0.05 g.

D-2.2 Immediately after drying remove all pith, dust and other impurities adhering to the fibre and determine the oven-dry mass of the cleaned test specimen correct to the nearest 0.05 g.

D-2.3 Calculate the percentage of impurities in the test specimen by the following formula:

$$\text{Impurities, percent by mass} = \frac{(m_1 - m_2)}{m_1} \times 100$$

where

m_1 = oven-dry mass of the test specimen before cleaning, and

m_2 = oven-dry mass of the test specimen after cleaning.

D-2.4 Repeat the test with the remaining test specimens. The average of all the values thus obtained shall be deemed to be the percentage of impurities in the machine twisted curled coir fibres consignment'.

ANNEX E

(Clauses 5.5 and 6)

METHOD FOR DETERMINATION OF MOISTURE CONTENT

E-1 APPARATUS

E-1.1 Conditioning Oven

With forced ventilation, provided with positive valve control and capable of maintaining a temperature of 100 to 110 C, equipped with a weighing balance arranged to weigh machine twisted curled coir fibre with an accuracy of 0.5 g while suspended within the drying chamber. The holder of the fibre to be of such a type as to ensure free access of the dry air to all portions of the fibre.

E-2 PROCEDURE

E-2.1 500 g of coir fibre (see 8.1.4.1) is weighed correct to the nearest 0.5 g. Place the test specimen in the conditioning oven and dry for one hour at $100 \pm 2^\circ\text{C}$ and weigh to the nearest 0.5 g. Dry for another 15 min.

provided the loss in mass in drying of the test specimen, as disclosed by the first and second weightings. Does not exceed 0.25 percent of the first mass. Take the second mass to be the dry mass of the test specimen. If the loss exceeds 0.25 percent of the first mass, dry and weigh the test specimen at 15 min intervals till the loss between two successive weightings is 0.25 percent or less of the first of the two masses.

E-2.2 Calculate the percentage of moisture content by the following formula:

$$\text{Moisture content, percent by mass} = \frac{(m_1 - m_2)}{m_1} \times 100$$

Where,

m_1 = mass of the original test specimen, and

m_2 = mass of the oven-dried test specimen.

ANNEX F

(Foreword)

COMMITTEE COMPOSITION

Coir and Coir Products Sectional Committee, TXD 25

<i>Organization</i>	<i>Representative(s)</i>
Central Coir Research Institute, Kalavoor	DR ANITA DAS RAVINDRANATH (Chairman) SMT SUMI SEBASTIAN (<i>Alternate</i>)
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All India Rubberized Coir Products Manufacturers Association, Tirunelveli	SHRI SUNDARESAN SHRI MATHEW GEORGE (<i>Alternate</i>)
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Coir board, Kochi	SECRETARY JOINT DIRECTOR (<i>Alternate</i>)
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Coir on Foam Products, Coimbatore	SHRI HARIRAJAN SHRI PHILIP VARGHESE (<i>Alternate</i>)
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Kerala Organic Manure and Fertilizer, Kerala	SHRI G. RAJESH
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Kerala State Small Scale Coir Manufacturer's Federation, Alappuzha	PRESIDENT SECRETARY (<i>Alternate</i>)
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Natural Green Tech (P) Ltd.,	SHRI TOMMY MATHEW SHRI ABHISHEK THOMAS (<i>Alternate</i>)
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<i>Organization</i>	<i>Representative(s)</i>
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SHRI P. N. MURALI
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