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CODE OF PRACTICE FOR BALE COATING, PACKING AND MARKING OF NATURAL RUBBER

(First Revision)

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Indian Standard

CODE OF PRACTICE FOR BALE COATING, PACKING AND MARKING OF NATURAL RUBBER

(First Revision)

0. FOREWORD

0.1 This Indian Standard (First Revision) was adopted by the Indian Standards Institution on 28 March 1986, after the draft finalized by the Rubber Sectional Committee had been approved by the Petroleum, Coal and Related Products Division Council.

0.2 This standard was first published in 1969. In this revision, the method of packing has been added. The previous Indian Standard was designated as code of practice for bale coating and marking of rubber. The designation has now been modified.

0.3 Rubber industry would be progressively switching to technical classification of natural rubber for which a specification has been finalized by Rubber Sectional Committee. Accordingly natural rubber is to be packed in bales of 25 or 50 kg in low density polyethylene films compatible with rubber (*see* **4.1**). However, the visual system of grading which is prevalent today in this country will continue for some more time till plantations switch over to the new system completely. This code of practice covers, therefore, a good packing practice for visually graded rubbers to safeguard it against foreign impurities.

0.4 In the visual grading, most plantation rubber is supplied in the form of compressed cubical bales. These compressed cubical bales of 25 or 50 kg may be packed in low density polyethylene films (*see* **4.1**) compatible with rubber and may be further wrapped as agreed to between the purchaser and the supplier.

0.5 In the preparation of this standard assistance has been derived from the following publications:

Draft ISO Recommendation No. 1434 Amount of bale coating on natural rubber bales. International Organization for Standardization.

ASTM D 2449-65 T Tentative specification for limit on bale coating on surface of natural rubber bales. American Society for Testing and Materials.

Natural rubber packing specification. International standards of quality and packing for natural rubber grades (the green book). The Rubber Manufacturers Association, Inc (USA).

1. SCOPE

1.1 This code of practice prescribes the method of packing and marking of natural rubber and the requirements of the coating solution and its mode of application to bales of natural rubber.

2. BALE COATING SOLUTION

2.1 Ingredients – The following ingredients should be used for the preparation of the bale coating solution.

2.1.1 *Solvent* — A hydrocarbon of petroleum distillate conforming to grade 145/205 low aromatic of IS : 1745-1978* or kerosine conforming to IS : 1459-1974†.

2.1.2 *Natural Rubber Solution Binder* – 500 g clean rubber and 8 litres solvent (**2.1.1**) are first taken and allowed to swell for not less than 24 hours. Then 4 litres of solvent is added further and stirred until uniformly mixed.

2.1.3 *White Powder* — Fine white powder as given in **2.1.3.1** to **2.1.3.3** or a combination of these, having a specific gravity range of 2·60 to 3·00 at 27°C, and passing 100 percent through 150-micron IS Sieve and 83 percent through 45-micron IS Sieve.

2.1.3.1 Talc (hydrous magnesium silicate) — conforming to IS : 380-1978‡.

2.1.3.2 Kaolin (hydrous aluminium silicate) — conforming to IS : 68-1979§.

2.1.3.3 Whiting (calcium carbonate) — conforming to IS : 1685-1975||.

*Specification for pertoleum hydrocarbon solvents (*second revision*).

†Specification for kerosines (*second revision*).

‡Specification for french chalk, technical (*second revision*).

§Specification for kaolin for paints (*first revision*).

||Specification for whiting for rubber industry (*first revision*).

2.2 Preparation of Bale Coating Solution — Take the rubber solution (**2.1.2**) and dilute with 26 litres of solvent and add powder up to 37 kg or reduced amount to produce a bale coating solution which flows readily and remains bound to the rubber surface after drying. This solution is enough for coating approximately 125 bales.

2.2.1 The coating after drying should impart no tack when two treated rubber surfaces are compressed against each other.

2.2.2 The coating solution when tested according to Appendix A shall not show the presence of glue, starch and calcium sulphate.

2.2.3 The bale coating, when tested according to the method given in Appendix B, shall be distributed uniformly within the rubber.

3. APPLICATION OF COATING

3.1 All sides of the bales shall be uniformly coated with one or two coats of bale coating solution.

3.2 The average amount of bale coating on the bale in the sample should not exceed 4 g/kg of rubber, when tested according to the method prescribed in Appendix C.

4. PACKING

4.1 The natural rubber shall be packed in 25 or 50 kg bales. The material shall be wrapped in low density polyethylene sheets and shall be further wrapped as agreed to between the purchaser and the supplier.

NOTE — Low density polyethylene sheets which are easily dispersible in rubber and of the following description, are generally found suitable:

Thickness, mm	0·030 to 0·038
Relative density	0·92
Melting point, *Max*	109°C

5. MARKING

5.1 Each bale of raw natural rubber shall be marked indelibly with grade of rubber, net mass of bale, name of the producer/estate or trade-mark, if any, and year of production.

APPENDIX A

(*Clause* 2.2.2)

TEST FOR GLUE, STARCH AND CALCIUM SULPHATE

A-1. TEST FOR GLUE

A-1.1 Remove 3 g of coating and burn. Observe the odour.

A-1.2 An odour of wool, burnt bone or burnt meat indicates the presence of glue.

A-2. TEST FOR STARCH

A-2.1 Reagent

A-2.1.1 *Iodine Solution* — approximately 10 percent (*m/v*).

A-2.2 Procedure — Scrape off approximately 3 g of the coating material; boil in water, cool and add iodine solution.

A-2.3 A blue colour indicates the presence of starch in the coating.

A-3. TEST FOR CALCIUM SULPHATE

A-3.1 Reagent

A-3.1.1 *Hydrochloric Acid* — approximately 0·1 N (*see* IS : 265-1976*).

A-3.1.2 *Barium Chloride Solution* — 10 percent (*m/v*).

A-3.2 Procedure — Scrape off approximately 5 g of coating material from the bale and take it in a beaker. Add dilute hydrochloric acid and filter. Add to the filtrate 2 ml of barium chloride solution.

A-3.3 A white precipitate indicates the presence of calcium sulphate.

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*Specification for hydrochloric acid (*second revision*).

APPENDIX B

(*Clause* 2.2.3)

MILL TEST FOR DISTRIBUTION OF COATING SOLUTION

B-1. OUTLINE OF THE METHOD

B-1.1 A sample of bale surface covered with coating solution is drawn and then mixed in a mill and examined visually for dispersion after sheeting.

B-2. APPARATUS

B-2.1 Laboratory Mill — The laboratory mixing mill has two parallel and cylindrical hardened-steel rolls 15·25 ± 0·25 cm in outside diameter. The rolls are fitted with adjustable guides to allow a maximum working width of 26·5 ± 1·5 cm. The mill has provisions for maintaining the temperature of the roll surfaces at 70 ± 5°C during the mixing of the rubber. The speed of the slow roll is 24 ± 2 rev/min and the friction ratio is 1·4 : 1.

B-3. PROCEDURE

B-3.1 Select carefully a part of the bale that is free from adhering dirt. Break 400 to 450 g of the rubber down on a warm laboratory mill with an opening of 1·5 mm at 70 ± 1°C for 5 minutes. Cut each way six times and sheet the rubber off at an approximate thickness of 2·3 mm. Examine visually for dispersion of coating material.

B-4. RESULT

B-4.1 If the coating material is uniformly dispersed with the rubber without agglomeration, the coating is satisfactory.

APPENDIX C

(*Clause* 3.2)

METHOD OF TEST FOR DETERMINING THE AMOUNT OF BALE COATING ON NATURAL RUBBER BALES

C-1. GENERAL

C-1.1 This method gives a procedure for determining the amount of mineral filler from bale coating present on the outside wrapper sheets from bales of natural rubber by finding the ash content.

C-2. SAMPLING

C-2.1 Portions from the outside wrapper sheets should be carefully removed at random from any three sides of the bale so as to lose a minimum of bale coating. The sampled portions should be handled and stored so as to lose a minimum of bale coating.

C-2.2 The number of bales sampled from a lot should be in accordance with IS : 5599-1970*.

C-3. PROCEDURE

C-3.1 Die cut two 5-cm square test pieces from each sample taking care not to lose bale coating. Any bale coating falling from the test piece shall be added to the ashing crucible together with the test piece. Determine the ash content in accordance with IS : 3660 (Part 1)-1972† except that the mass to the nearest 0·000 1 g of the 5-cm square test piece should be used rather than a 5 to 6 g portion of homogenized rubber.

C-4. CALCULATION

C-4.1 Calculate the amount of bale coating per bale as follows:

$$A = \frac{B\,C}{S\,M}$$

where

A = amount of bale coating in g/kg of rubber,

B = nominal surface area of bale in cm^2,

C = average amount of ash for the six test pieces in g,

S = surface area of test piece in cm^2, and

M = nominal mass of bale in kg.

C-4.1.1 The average of the values for the six test pieces shall be taken as the value for the bale.

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*Methods for sampling of raw rubber.

†Methods of test for natural rubber: Part 1 Determination of dirt, volatile matter, nitrogen, ash, total copper, manganese, iron, rubber hydrocarbon, viscosity (shearing disc viscometer), and mixing and vulcanizing of rubber in a standard compound (*first revision*).

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INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

Quantity	Unit	Symbol
Length	metre	m
Mass	kilogram	kg
Time	second	
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

Quantity	Unit	Symbol
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

Quantity	Unit	Symbol	Definition
Force	newton	N	$1\ N = 1\ kg.m/s^2$
Energy	joule	J	$1\ J = 1\ N.m$
Power	watt	W	$1\ W = 1\ J/s$
Flux	weber	Wb	$1\ Wb = 1\ V.s$
Flux density	tesla	T	$1\ T = 1\ Wb/m^2$
Frequency	hertz	Hz	$1\ Hz = 1\ c/s\ (s^{-1})$
Electric conductance	siemens	S	$1\ S = 1\ A/V$
Electromotive force	volt	V	$1\ V = 1\ W/A$
Pressure, stress	pascal	Pa	$1\ Pa = 1\ N/m^2$