Indian Standard

METHODS OF TEST FOR NATURAL RUBBER

PART 2 DETERMINATION OF VOLATILE MATTER

NR : 2

(Second Revision)

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(*Continued on page* 2)

(*Continued from page* 1)

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(*Continued on page* 8)

Indian Standard

METHODS OF TEST FOR NATURAL RUBBER

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NR : 2

(Second Revision)

0. FOREWORD

0.1 This Indian Standard (Part 2) (Second Revision) was adopted by the Indian Standards Institution on 13 March 1985, after the draft finalized by the Rubber Sectional Committee had been approved by the Petroleum, Coal and Related Products Division Council.

0.2 'Methods of test for natural rubber' had been originally covered in the following four parts of IS : 3660:

IS : 3660 (Part I)-1972 Determination of dirt, volatile matter, ash, total copper, manganese, iron, rubber hydrocarbon, viscosity (shearing disc viscometer), and mixing and vulcanizing of rubber in a standard compound (*first revision*)

IS : 3660 (Part II)-1968 Determination of solvent extract and nitrogen content

IS : 3660 (Part III)-1971 Plasticity and plasticity retention index

IS : 3660 (Part IV)-1979 Determination of colour, accelerated storage-hardening test and vulcanization characteristics (MOD test)

0.2.1 While reviewing various test methods for natural rubber, the Committee decided to align them with the corresponding International Standards. No unification of test methods for natural and synthetic rubber has been considered necessary. However, in revising test methods for natural rubber, the Committee had decided to revise and split the standard (IS : 3660) in further parts and publish individual test methods under natural rubber (NR) series. For proper referencing of the existing test methods and the new methods under revision a table

showing correspondence of the various methods of test covered in the previous parts of IS : 3660 (Part I, II, III, and IV) with the presently split parts *vis-a-vis* the original NR: number have been given in Appendix A.

0.2.2 In order to facilitate cross-reference, it has been decided to retain the original discrete NR series number assigned to various test methods as indicated in original IS : 3660 (Part I, Part II, Part III and Part IV), in the new *revised* Parts of IS : 3660.

0.3 The test method given in this revised standard supersedes the test method as given under NR: 2 of IS : 3660 (Part 1)-1972. All the four parts of the original IS : 3660 shall be withdrawn upon its complete revision.

0.4 In the preparation of this standard, assistance has been derived from ISO 248-1979 'Rubbers raw — Determination of volatile matter content' published by the International Organization for Standardization.

0.5 In reporting the result of a test or analysis made in accordance with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with IS : 2-1960*.

1. SCOPE

1.1 The standard prescribes a method for the determination of volatile matter, which is volatile at 100°C, present in the natural rubber.

2. APPARATUS

2.1 Chemical Balance

2.2 Desiccator with Efficient Desiccant

2.3 Roll Mill

2.4 Oven — Capable of being controlled at 100 ± 5°C.

3. PROCEDURE

3.1 Sheet out a test piece of about 600 g, following **3.1.1** of IS : 3660 (Part I)-1972†. Weigh to the nearest 0·1 g before and after homogenization.

3.1.1 Select a test portion of about 10 g from the homogenized test piece and weigh it to the nearest 0·1 mg.

*Rules for rounding off numerical values (*revised*).

†*Methods of test* for natural rubber: (Part I). [Under revision as IS : 3660 (NR : 0)].

3.1.2 With the mill set at 70 ± 5°C and with a mill opening which will produce a sheet of less than 2 mm thickness, pass the test portion twice between the rolls.

3.2 Place the test portion, so derived, for 1 hour in the oven, controlled at 100 ± 5°C with the ventilators open. Arrange the rubber to present the largest possible surface area to the hot air. Allow to cool in a desiccator and weigh. Repeat the heating and weighing until the loss on successive weighings at half-hour interval is less than 1 mg.

4. EXPRESSION OF RESULTS

4.1 Calculate the volatile matter from the following formula:

$$\text{Volatile matter, percent by mass} = \left[1 - \left(\frac{B\,D}{A\,C} \right) \right] \times 100$$

where

B = mass in g of piece after homogenization,

D = final mass in g of test portion after oven drying,

A = initial mass in g of piece before homogenization, and

C = initial mass in g of test portion as taken from the piece.

APPENDIX A

(*Clause* 0.2.1)

TABLE SHOWING CORRESPONDENCE OF THE VARIOUS METHODS OF TEST COVERED IN THE EXISTING IS : 3660 (PART 1)-1972, IS : 3660 (PART 2)-1968, IS : 3660 (PART 3)-1971, AND IS : 3660 (PART 4)-1979 *WITH* THE REVISION/ PROPOSED REVISION OF ALL THE FOUR PARTS OF IS : 3660

Existing Test Methods			Proposed Revision		Remarks
Test Method	IS : No.	Part (Series)	IS : No.	Series	
(1)	(2)	(3)	(4)	(5)	(6)
NR SERIES					
Determination of dirt	IS : 3660-1972	Part 1 (NR : 1)	IS : 3660 (Part 1)	(NR : 1)	
Determination of volatile matter	IS : 3660-1972	Part 1 (NR : 2)	IS : 3660 (Part 2)	(NR : 2)	
Determination of ash	IS : 3660-1972	Part 1 (NR : 3)	IS : 3660 (Part 3)	(NR : 3)	
Determination of total copper	IS : 3660-1972	Part 1 (NR : 4)	IS : 3660 (Part 4)	(NR : 4)	
Determination of manganese	IS : 3660-1972	Part 1 (NR : 5)	IS : 3660 (Part 5)	(NR : 5)	
Determination of iron	IS : 3660-1972	Part 1 (NR : 6)	Deleted since this test is no longer being done		
Determination of rubber hydrocarbon	IS : 3660-1972	Part 1 (NR : 7)	IS : 3660 (Part 6)	(NR : 7)	Under Revision
Determination of viscosity by shearing disk viscometer	IS : 3660-1972	Part 1 (NR : 8)	IS : 3660 (Part 7)	(NR : 8)	
Mixing and vulcanizing in a standard compound	IS : 3660-1972	Part 1 (NR : 9)	IS : 3660 (Part 8)	(NR : 9)	
Determination of solvent extract	IS : 3660-1968	Part 2 (NR : 10)	IS : 3660 (Part 9)	(NR : 10)	
Determination of nitrogen content	IS : 3660-1968	Part 2 (NR : 11)	IS : 3660 (Part 10)	(NR : 11)	

Determination of plasticity	IS : 3660-1971	Part 3 (NR : 12)	IS : 3660 (Part 11)	(NR : 12)	Yet to be revised
Determination of plasticity retention index (PRI)	IS : 3660-1971	Part 3 (NR : 13)	IS : 3660 (Part 12)	(NR : 13)	
Determination of colour	IS : 3660-1979	Part 4 (NR : 14)	IS : 3660 (Part 13)	(NR : 14)	
Determination storage-hardening test	IS : 3660-1979	Part 4 (NR : 15)	IS : 3660 (Part 14)	(NR : 15)	
Determination of vulcanization characteristics (MOD test)	IS : 3660-1979	Part 4 (NR : 16)	IS : 3660 (Part 15)	(NR : 16)	

(*Continued from page* 2)

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