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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 1690-2010

Replacing GB/T 1690-2006

**Rubber, vulcanized or thermoplastic-Determination of the effect
of liquids**

硫化橡胶或热塑性橡胶 耐液体试验方法

(English Translation)

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Foreword

This standard was drafted in accordance with the rules given in GB/T 1.1-2009.

This standard replaces GB/T 1690-2006 Rubber, vulcanized or thermoplastic - Determination of the effect of liquids. Compared with GB/T 1690-2006, the main technical changes are as follows:

- a type II test piece for measuring changes in volume and mass, a 25 mm x 25 mm square, has been added (see 5.2);
- equation (1) has been corrected (see 7.2);
- an equation has been added (see 7.3);
- Annex B Reference liquids has been added, specifying the main properties of the domestic No. 1, No. 2 and No. 3 standard oils.

This standard modifies and adopts, by redrafting, ISO 1817:2005 Rubber, vulcanized - Determination of the effect of liquids. The technical differences from ISO 1817:2005 and their reasons are as follows:

- the title has been changed to Rubber, vulcanized or thermoplastic - Determination of the effect of liquids, because the scope also covers thermoplastic rubbers;
- the normative references have been adjusted to the technical conditions of China: GB/T 262 replaces ISO 2977, GB/T 528 replaces ISO 37, GB/T 1884 replaces ISO 3675, GB/T

2941-2006 replaces ISO 23529:2004, GB/T 3535 replaces ISO 3016:1994, GB/T 3536 replaces ISO 2592:2000, GB/T 6031 replaces ISO 48:1994 and GB/T 11547 replaces ISO 175:1999;

- GB/T 265, GB/T 267 and GB/T 388 have been added to Chapter 2, because they are referenced in the new Annex B;

- the test piece sizes for mass and volume changes are specified as type I, a 25 mm x 50 mm rectangle, and type II, a 25 mm x 25 mm square (5.2), whereas ISO 1817:2005 specifies a test piece of 1 cm³ to 3 cm³, a range too wide for consistent comparison of results;

- besides the ASTM No. 1, IRM 902 and IRM 903 oils of ISO 1817:2005 (Annex A), the domestic No. 1, No. 2 and No. 3 standard oils of GB/T 1690-1992 are retained (Annex B), because the imported reference oils are difficult to obtain and their results differ from those of the domestic oils;

- the explanation of the reasons for the standard simulated liquids has been deleted from A.1, because the provisions of Table A.1 are clear.

This standard was proposed by the China Petroleum and Chemical Industry Federation.

This standard is under the jurisdiction of the General Test Methods Subcommittee of the National Technical Committee on Rubber of Standardization Administration of China (SAC/TC 35/SC 2).

The previous editions of this standard are: GB/T 1690-1987, GB/T 1690-1992, GB/T 1690-2006.

1 Scope

This standard specifies methods for evaluating the resistance of vulcanized and thermoplastic rubbers to the action of liquids, by measuring properties of the rubbers before and after immersion in test liquids. The liquids concerned include service liquids such as petroleum derivatives, organic solvents and chemical reagents, as well as reference test liquids.

This standard is applicable to vulcanized rubbers and thermoplastic rubbers.

2 Normative references

The following documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

GB/T 262 · GB/T 265 · GB/T 267 · GB/T 388 · GB/T 528 · GB/T 1884 · GB/T 2941-2006 · GB/T 3535 · GB/T 3536 · GB/T 6031 · GB/T 11547

3 Test apparatus

The test pieces shall be suspended on a rod or wire and kept apart from adjacent test pieces, for instance by glass rings or other non-reactive spacers.

The measuring device shall be capable of measuring the lengths of the diagonals of the test piece.

4 Test liquids

The choice of the test liquid shall be based on the purpose of the test.

When information is required on the service behaviour of a vulcanized or thermoplastic rubber in contact with a particular liquid, that liquid shall, if possible, be chosen for the test.

5 Test pieces

Unless otherwise specified, the time interval between vulcanization and testing shall be as specified in GB/T 2941.

The test pieces shall be conditioned for at least 3 h at a standard laboratory temperature as specified in GB/T 2941, and the same temperature shall be used throughout any test or series of tests intended to be comparable.

6 Temperature and duration of immersion

Since the rate of penetration of liquids into rubbers depends on the temperature, on the type of rubber and on the type of liquid, a single standard period of immersion cannot be specified.

7 Procedure

The mass of each test piece is weighed before and after immersion at the standard laboratory temperature, to the nearest 1 mg.

The water displacement method is used for test liquids that are immiscible with water.