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

GB/T 7759.1-2015

**Rubber, vulcanized or thermoplastic -- Determination of
compression set -- Part 1: At ambient or elevated temperatures
(English Translation)**

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Foreword

GB/T 7759 "Rubber, vulcanized or thermoplastic - Determination of compression set"

is composed of two parts:

- Part 1: At ambient or elevated temperatures;
- Part 2: At low temperatures.

This Part is Part 1 of GB/T 7759.

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

This Part replaces GB/T 7759-1996 "Rubber, Vulcanized or thermoplastic -- Determination of compression set at ambient elevated or low temperatures". Compared with GB/T 7759-1996, the main technical changes in this Part are as follows:

- Add the WARNING;
- Modify the normative references (see Chapter 2 of this Edition, Chapter 2 of Edition 1996);
- Delete the provisions on steel plate size (see 4.1.1 of this Edition, 4.1.1 of Edition

1996);

- Delete the provisions on limiter height error when using multiple limiters. Delete Table 1 and use text description instead. Delete the provision "It is recommended to use a circular limiter" (see 4.1.2 of this Edition, 4.1.3 of Edition 1996);
- Delete the content of the test container (see 4.3 of Edition 1996);
- Change the requirements for thickness meters. The diameter of the pressure foot is changed from the original 4~10 mm to $4\text{ mm} \pm 0.5\text{ mm}$. The pressure is changed from the original $22\text{ kPa} \pm 5\text{ kPa}$ to $22\text{ kPa} \pm 5\text{ kPa}$ and $10\text{ kPa} \pm 2\text{ kPa}$ according to the hardness of the rubber (see 4.4 of this Edition, 4.5 of Edition 1996);
- Change the accuracy of the timing device from $\pm 0.2\text{ s}$ to $\pm 1\text{ s}$;
- Change the legend of the test device, from the original circular device to two devices: one is a rectangular device, the other is a circular device. GB/T 7759-

1996 specifies the specific size of the compression device, but this Part does not

specify the specific size, and only gives two schematic diagrams of the compression device (see Figure 1 of this Edition, Figure 1 of Edition 1996);

- Delete the requirement that "the difference between the heights of the three test pieces shall not exceed 0.01 mm" when measuring the height of the test piece (see

7.2 of this Edition, 7.2 of Edition 1996);

Rubber, vulcanized or thermoplastic - Determination of
compression set - Part 1: At ambient or elevated
temperatures

WARNING: Persons using this Part should be familiar with normal laboratory practice. This Part does not purport to address all of the safety problems, if any, associated with its use. It is the responsibility of the user to establish appropriate safety and health practices and to ensure compliance with any national regulatory conditions.

CAUTION: Certain procedures specified in this Part may involve the use or

generation of substances, or the generation of waste, that could constitute a local environmental hazard. Reference should be made to appropriate documentation on safe handling and disposal after use.

1 Scope

This Part specifies methods for the determination of the compression set characteristics of vulcanized and thermoplastic rubbers at ambient or elevated temperatures.

The methods are intended to measure the ability of rubbers of hardness within the range

10 IRHD to 95 IRHD to retain their elastic properties at specified temperatures after

prolonged compression at constant strain (normally 25%) under one of the alternative sets of conditions described. For rubber of nominal hardness 80 IRHD and above, a lower compression strain is used: 15% for a nominal hardness from 80 IRHD to 89 IRHD and 10% for a nominal hardness from 90 IRHD to 95 IRHD.

NOTE 1: When rubber is held under compression, physical or chemical changes can occur that prevent the rubber returning to its original dimensions after release of the deforming force. The

result is a set, the magnitude of which depends on the time and temperature of compression as well

as on the time and temperature of recovery. At elevated temperatures, chemical changes become

increasingly more important and lead to a permanent set.

NOTE 2: Short-time compression set tests, typically for 22 h, at elevated temperatures are commonly used as a measure of the state of cure, a means of material classification and a specification to ensure the quality of a compound. Longer tests, typically for 1000 h, at elevated

temperatures take account of the effect of ageing and are often used to predict service performance,

including that of sealing materials. Short-time tests at ambient temperature show mainly the effect

of physical changes (re-orientation of the molecular chains and the fillers).

Type B test pieces are preferred when it is required to cut test pieces from products. In this case, the test pieces shall be taken as near to the center of the product as possible, unless otherwise specified. When possible, the test piece shall be cut in such a way that its axis is parallel to the direction of compression of the product in service.

5.2 Preparation

The test pieces shall be prepared by molding each disc, whenever possible. Preparation by cutting out each disc or by laminating not more than three discs is permitted. The use of test pieces prepared by laminating several discs for control of finished products shall be agreed between interested parties.

Cutting shall be performed in accordance with GB/T 2941-2006. When cupping (the formation of a concave surface) is a problem, the test piece shape can be improved by cutting it in two stages: first cut an oversize test piece and then trim it to the exact dimensions with a second cutter.

Laminated test pieces shall conform to the dimensions specified in 5.1 and shall be prepared by laminating discs or rubber cut from sheets without adhesives. Discs may be compressed by a few percent for 1 min so that they stick together. The number of discs laminated to produce a test piece shall not exceed three. The total thickness shall then be measured.

Test pieces prepared by the various methods described above may give different results and comparison of values shall be avoided.

NOTE: Attention is drawn to the marked effects of the state of cure on compression set values. It may be necessary to adjust the cure of molded test pieces to be representative of different thicknesses of sheets or moldings.

5.3 Number of test pieces

A minimum of three test pieces shall be tested, separately or as a set.