

Testing Method of Gasket Material

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1. Scope of Application

This shall regulate the test method of a non-metal gasket material used for improving the seal property on the engine, driving part and other parts of a vehicle.

2. Nomenclature and Explanation of Gasket Material

2.1 Asbestos joint sheet

A gasket material of a dense sheet manufactured by mixing, heating and pressing a asbestos compound.

2.2 Asbestos beater sheet

A gasket material of a sheet shape manufactured with mixing asbestos as main material and rubber latex as a adhesive in a beater.

2.3 Asbestos sheet and backing board

A gasket material made of asbestos fiber and a heat-resisting adhesive. Generally, this shall be rolled in a thin roll shape and a baking board shall be ground in a sheet shape.

2.4 Cork

A gasket material shaped with the even cork particles and a protein or synthesized resin as a adhesive.

2.5 Cork Rubber

A gasket material shaped by uniting, heating and pressing the even cork particles and a rubber compound

2.6 Cork Rubber Sponge

A gasket material manufactured by foaming rubber with the same phase composition as cork rubber.

2.7 Hachal sheet

A thin and strong gasket material used for a tag with Manila paper, craft paper and imitation vellum.

2.8 Chip Board

A gasket material of a sheet shape manufactured with old newspapers

2.9 Vulcanize fiber

A gasket material of a sheet shape manufactured by processing a cotton fiber or chemically pulped sheet with a chloridized zinc solution and adhering.

2.10 Cellulose fiber

A gasket material of a sheet shape manufactured by processing a cotton fiber or chemically pulped sheet with a protein and rubber.

2.11 Graphite

A gasket material of a sheet shape manufactured in a plate shape with graphite as a main component.

2.12 Non asbestos

A gasket material of a sheet shape manufactured with a non asbestos fiber and rubber latex as a adhesive. For example, aramide fiber shall be pertinent to this.

3. Type and Classification of Gasket Material

Type	Main material	Title of gasket material	Classification symbol
I	Asbestos Inorganic fiber	Pressed asbestos plate	G-AC01
		Asbestos beater sheet	G-AB01
		Asbestos paper and backing board	G-AM01
		Non asbestos	G-NC01
		Graphite	G-NG01
II	Cork	Cork	G-CC01
		Cork rubber	G-CR01
		Cork rubber sponge	G-CS01
III	Cellulose fiber Organic fiber	Chipboard, vulcanize fiber	G-OV01
		Cellulose fiber, Hachal sheet	G-OC01
		Rubber processed fiber	G-OR01
IV	Rubber	NBR	G-RN01
		Acryl	G-RA01
		Silicon	G-RS01
V	Semi metallic	Steel bestos	G-SB01
		Steel	G-SS01
		Power bestos	G-SP01
VI	Plastic	PP	G-PP01
		ABS	G-PA01

- * Nomenclature
- A : Asbestos, ABS fiber, Acryl rubber
- B : Beater Sheet, Bestos
- C : Compress, Cellulose, Cork
- G : Gasket, Graphite
- M : Mill Board
- N : Non Asbestos, NBR rubber
- O : Organic fiber

- P : Plastic, PP fiber, Power bestos
- R : Rubber
- S : sponge, silicon rubber
- V : Vulcanize fiber

4. Evaluation Items and Material

No	Item	Application item					
		Type I	Type II	Type III	Type IV	Type V	Type VI
1	Thickness	☐	☐	☐	☐	☐	☐
2	Specific gravity	☐	☐	☐	☐		☐
3	Hardness		☐		☐		☐
4	Tensional strength	☐	☐	☐	☐		☐
5	Stretching rate		☐		☐		☐
6	Compressing rate, restoration rate	☐	☐	☐	☐	☐	☐
7	Weight down ratio by heating	☐				☐	
8	Floating property	☐	☐	☐		☐	
9	Pliableness	☐	☐	☐	☐	☐	
10	Compression permanent transformation	☐	☐	☐	☐	☐	☐
11	Adherence property	☐	☐	☐	☐	☐	☐
12	Corrosion property	☐	☐	☐	☐	☐	☐
13	Stress relief rate	☐	☐	☐	☐	☐	☐
14	Heating test	☐					
15	Heat aging test	☐	☐	☐	☐	☐	☐
16	Precipitation test	☐	☐	☐	☐	☐	☐
17	Leakage test	☐	☐	☐	☐	☐	☐
18	Anti-permeant leakage property	☐	☐	☐		☐	
19	Fracture test	☐	☐		☐	☐	☐
20	Heat shock test	☐	☐	☐	☐	☐	☐
21	Sealability property	☐	☐	☐	☐	☐	☐
22	Blow out property	☐	☐	☐	☐	☐	☐
23	Heat conductivity	☐	☐	☐	☐	☐	☐

However, the above evaluation items can be changed under the discussion between the supplier and the receiver.

5. Test

The size and shape of the test sample of each item shall follow table1 and table 2.

Table 1 Dimension and shape of a test sample

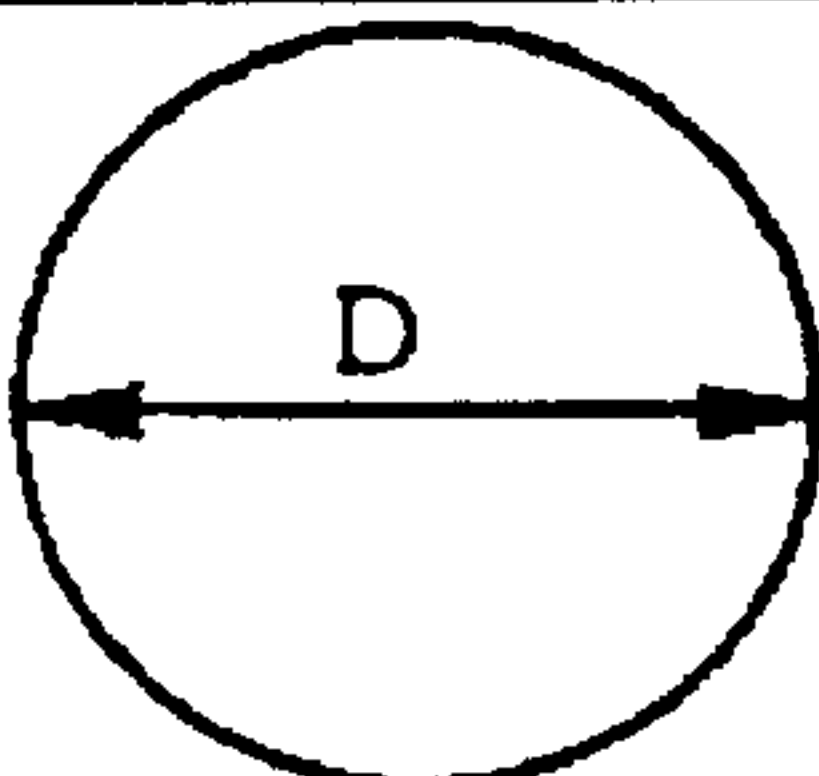
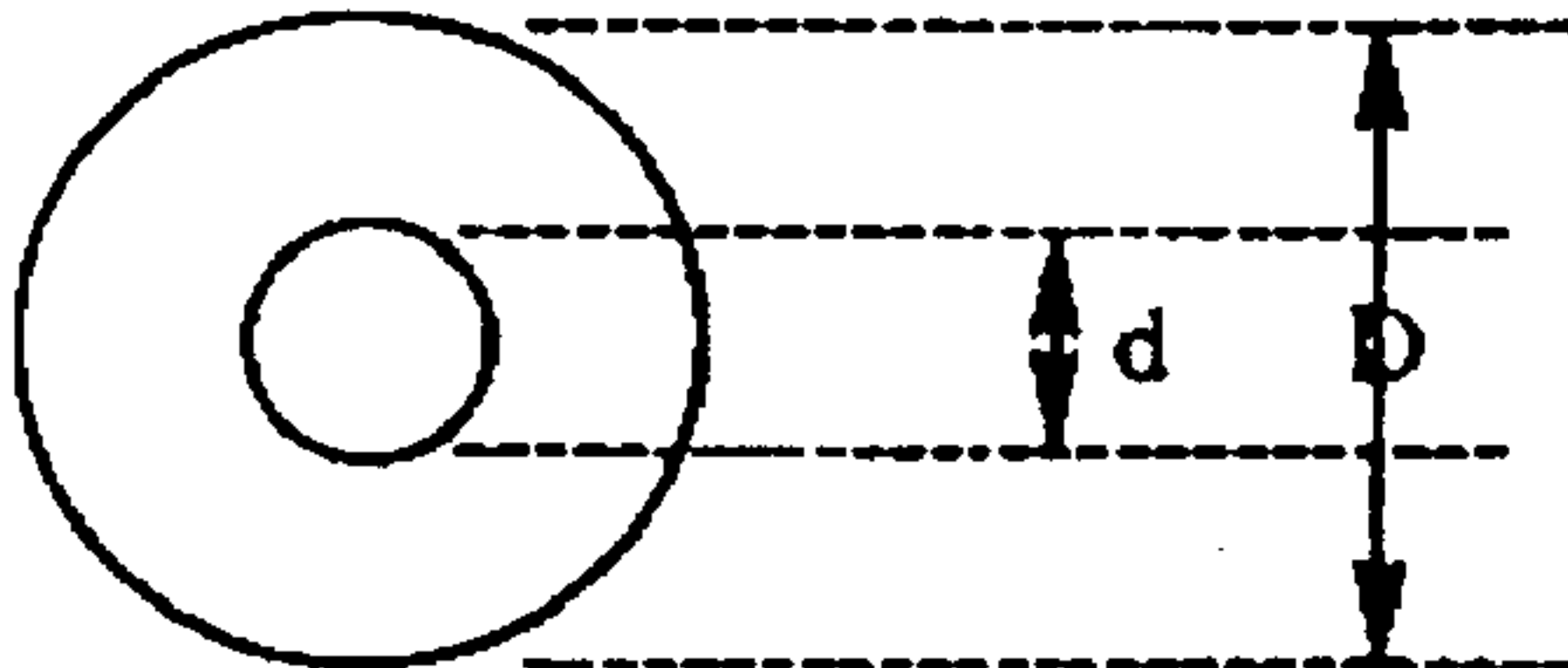
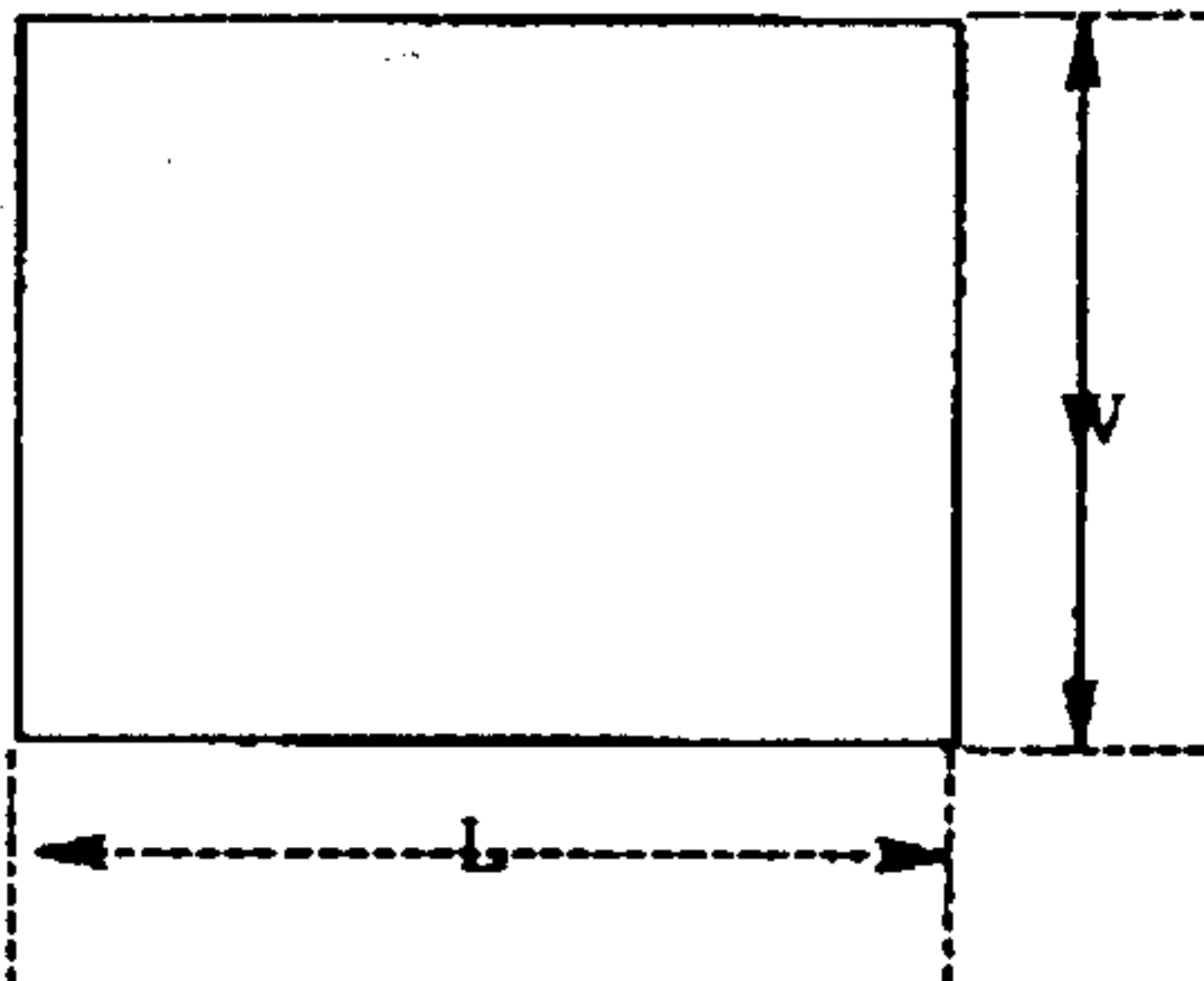
Test sample	D	d	W	L	Shape
1	25				 mm
2	50				
3	38	23.5			
4	75	14			
5			10	30	
6			13	150	
7			25	25	
8			25	50	
9			25	150	
10			50	50	
11			50	100	
12	dumbbell shape 1 of a rubber tensional test sample				
13	dumbbell shape 3 of a rubber tensional test sample				

Table 5 Test item of each item

Test item		Gasket Type	Application condition	
State test	Thickness	All Types	No regulation	
	Specific gravity	Type I, II, III, IV, V, VI	10	
	Hardness	Type II, IV, VI	10	
	Tensional strength	Type I, II, III, IV, V, VI	12,13	Set the longitudinal direction of a test sample to be perpendicular to the direction of a fiber
	stretching rate	Type I, II, III, IV,V, VI	12,13	Set the longitudinal direction of a test sample to be perpendicular to the direction of a fiber
	Compressing rate, restoration rate	Type I, III, IV	1, 7	Thickness 1.5~6.5mm
			2, 10	Thickness 3.0~8.0mm
	Weight down ratio by heating	Type I, V	No regulation (5 ~ 10gr)	
	Floating property	Type I, II, III, IV	7	
	Pliableness	Type I, II, III, IV V	6	Set the longitudinal direction of a test sample to be perpendicular to the direction of a fiber
	Compression permanent deformation	All Types	10	
	Adherence and corrosion property	All Types	4	
	Stress relief rate	All Types	5	A set shall consist of 4.
	Heating test	Type I	12, 13	
	Leakage test	All Type	No regulation (suitable for the size of a tester)	
	Anti-permeant leakage property	Type I, II, III, V, VI	No regulation (suitable for the size of a tester)	
	Fracture test	Type I, II, IV, V, VI	12,13	
	Sealability	All Type	No regulation (suitable for the size of a tester)	
	Blow out property	All Type	No regulation (suitable for the size of a tester)	
	Heat conductivity	All Type	No regulation (suitable for the size of a tester)	
After aging	Weight increase	All Type	8	
	Volume change	All Type	8	
	Surface change	All Type	8	

6. General Condition of Gasket Material Test

6.1 Test sample picking method

Pick the test samples for each test item more than 3 according to table 4 and 5.

6.2 Standard condition of test room

If the regulation does not exist, the temperature of a test room shall be 20~30℃ and the humidity shall be 50~55%. Fill in the test result with the temperature and humidity of a test room.

6.3 Pre-process of test sample

The pre-process condition of a test sample shall follow table 6 according to the gasket Types.

Table 6 Pre-process condition according to the gasket Types

Type	Condition
Type I, V	After drying in the drying furnace that can maintain the temperature of 100 ± 2℃ for an hour and leaving it cool in desicater use it as a specimen.
Type II, IV	After leaving in the sealed enclosure with the relative humidity of 50 ~ 55% at the room temperature for 46hours use it as a specimen.
Type III, VI	After drying previously in the sealed enclosure with dryer at the room temperature for 4hours leave it at the state with the relative humidity of 50 ~ 55% for 20hours.

6.4 Finishing the numerical data

Follow the KS A 0021 (Finishing the numerical data).

However, in the case of a tensional strength calculate the second digit below a decimal point and finish the first digit below a decimal point for the average. In the case of a compression rate, restoration rate, oil-resisting property, fuel-resisting property, heating test and 강열감량, calculate the first digit below a decimal point and set then to be a fixed number for the average

7. Test Method

7.1 Thickness

(1) Equipment

Use the JIS B 7503 (0.01mm scale dial gauge) and the diameter of measuring part is 6.4 ± 0.1 mm of a circular shape. The cross section and the surface of a anvil should be flat.

(2) Measurement method

When measuring a thickness, select a point within 10~20mm from a lengthwise and crosswise end of a test sample and measure it with a dial gauge at 4 points located with a space of more than 30 cm along the side from the point.

Put the test sample on the anvil and move the ruler to the test sample smoothly.
Then read the scale.

Table 7 Preload of ruler according to Type

Type	Preload of ruler gr
Type I, VI	260 ± 2
Type II, IV	115 ± 2
Type III	180 ± 2
Type V	260 ± 2

(3) Disposal of test results

The measured data should be 2nd digit below a decimal point
Measure at the other 3 sides in the same way and calculate the average of the data at 4 sides to 1 digit below a decimal point. Then report it.

7.2 Specific gravity

7.2.1 Test

Testing the specific gravity follow table 4, 5.

7.2.2 Method

Measuring the specific gravity of a gasket material shall be calculated by the following method. However, if there is measure of the specific gravity, it can be measured by measurer of the specific gravity.

- (1) In the case of the specific gravity more than 1.00

Weigh the material in the air. (W1)

Weigh the material in the liquid at constant temperature of t °C with a string. (W2)

Weigh the string in the air. (W3)

At this time, measure the data to 4th digit below a decimal point.

The specific gravity is calculated by the following equation.

$$\text{The specific gravity (t/4 °C)} = [(W1/W2 - (W2 - W3)) (S - 0.0012) + 0.0012$$

- (2) In the case of the specific gravity loss than 1.00

Weigh the material in the air. (W1)

Weigh the material in the liquid by binding a weight to the material. (W'2)

Weigh the weight in the liquid. (W'3)

- (3) In the case of the specific grabity loss than 1.00

Weigh the material in the air. (W1)

Weigh the material in the liquid by binding a weight to the material. (W'2)

Weigh the string in the air. (W'3)

$$\text{The specific gravity (t/4 °C)} = [(W1/W2 - (W2 - W3)) (S - 0.0012) + 0.0012$$

- (4) In the case of steel Bestos

Make the material in the rectangular with each side more than about 10mm and without a burr and in cination and measure the weight to 1/100 gr and the length of each side to 1/100mm using a dial gauge. Also calculate the specific gravity following equation and report it

$$\text{Specific gravity} = W - (\text{thickness of steel plate} \times A \times B) / (t\text{-thickness of central steel plate}) \times A$$