JASO

M 329-83

Japanese Automotive Standard

Asphalt Sheet for Automotives

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In the event of any doubt, the original
standards in Japanese should be referred.

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Asphalt Sheet for Automotives

1. Scope

This standard specifies heat-fusion type asphalt materials (hereinafter referred to as Sheet) used for the damping material for the body (mainly for the upper surface of the floor) of automobiles.

Remark: In this standard, units and numerical values given in { } are based on the International System of Units (SI), and are given for reference.

2. Purpose

This standard aims to establish the testing method of the Sheet and to ensure the proper quality of the Sheet attached to the body (mainly to the upper surface of the floor) of automobiles.

3. Quality

3.1 Appearance

The Sheet shall be black colored and free from defects that injure practicableness, such as marked distortion, breakage, flaws, and cracks.

3.2 Storability

The Sheet shall not cause brocking during being piled as specified or during storage, and shall be free from notable change in size, and shall not cause breakage, cracks, etc. during transportation and work.

3.3 Workability

The Sheet shall not soften in a baking oven, nor fuse along the undulant surface of floors, etc., and shall be free from notable blisters, wrinkles, etc. In addition, the Sheet shall not generate a toxy gas in an oven nor odors giving workers objectionable feeling.

3.4 Performance

The Sheet with standard thickness specified in **3.6** shall be subjected to a test according to the testing method specified in **5.**, and shall conform to the performance shown in **Table 1.**

Table 1

Item	Performance	Testing method Item No.
Specific gravity	Subject to an agreement between parties	5.1
Volatile loss %	0.6 or less	5.2
Sinking mm	Not sunken out at 6 or more	5.3
Thermal flow resistance	To be free from running out and within 15 mm in flow down	5.4
Cold impact resistance	To be free from cracks and peeling	5.5
Shrinkage percentage %	3 or less	5.6
Shear strength kgf/cm² { MPa }	5{0.49}or more	5.7
Smoking temperature °C	140 or more	5.8
Flammability mm/min	80 or less	5.9
Damping factor	Damping factor (d): 8×10^{-2} or more	5.10

3.5 Composition

The Sheet shall be composed of the bituminous main gradient with which synthetic resin, fiber materials, inorganic fillers, reinforcements, etc. are mixed, and shall be rolled to the sheet form and specified thickness.

3.6 Standard thickness

The standard thickness of the Sheet shall be 1.4 to 2.0 mm. When the Sheet in thickness other than the standard thickness is required, such Sheet shall be subject to an agreement between parties.

4. Testing conditions

4.1 General conditions of testing

(1) Standard atmospheric conditions for testing
Unless otherwise specifically stipulated, stand-

Applicable Standard:

JIS G 3141	Cold Rolled Carbon Steel Sheets and Strip
JIS K 2207	Petroleum Asphalt
JIS K 6350	Method of Analysis for Rubber Goods
JIS Z 8703	Standard Atmospheric Conditions for Testing

Reference Standard:

ISO 3795-1976	Road Vehicle-Determination of burning behavior of interior materials for motor vehicles

ard atmospheric conditions for testing shall be in accordance with **JIS Z 8703**, standard atmospheric conditions for testing, standard temperature state, Class 3 (20 ± 5°C), and standard humidity state, Class 3 (65 + 20%).

(2) Specimen taking method

Specimens used for the test shall be cut from the Sheet to the specified direction[Note] and size.

Note: As to the direction of the Sheet, the direction parallel to the flow direction of the Sheet is defined as "longitudinal" and the width direction of the Sheet as "lateral."

(3) Repetition and arrangement of test

The test shall be repeated three times, as a rule. For the test in which values are obtainable, the average value of three values shall be obtained to qualify the test specimen. For the test in which qualification is made every time, the test specimen that passes two tests out of three shall be qualified.

4.2 Preparation of test plate

(1) Material of test plate

The material of the test plate shall be a cold rolled carbon steel sheet of 0.8 mm in thickness specified in **JIS G 3141**, Cold Rolled Carbon Steel Sheets and Strip, SPCC-D, which shall be subjected to electrophoretic coating, provided that the material for the damping property test shall be a cold rolled carbon steel sheet, 0.8 ± 0.02 mm in thickness and 200 x 200 mm in size, which shall not be subjected to electrophoretic coating.

(2) Baking of specimen

The specimen for baking shall be cut to the size specified for each test item and shall be baked in an air circulating oven. Unless otherwise specifically stipulated, the baking shall be performed at 150 ± 2°C for 30 minutes.

5. Testing method

5.1 Specific gravity

Specific gravity shall be measured in accordance with **JIS K 6350**, Method of Analysis for Rubber Goods, **6.1.**

5.2 Volatile loss

Volatile loss shall be measured in accordance with **JIS K 2207**, Petroleum Asphalt, **5.9.**

5.3 Sinking

A specimen of 100 x 100 mm shall be placed on a test plate of 150 x 150 x 0.8 mm the center of which shall be bored 60 mm in diameter. The specimen shall be held horizontal as illustrated in **Fig. 1**, and shall be baked. The specimen shall then be left cooled to room temperature in order to measure the sinking depth of the Sheet and to check for sinking out.

5.4 Thermal flow resistance

Specimens of 80 x 220 mm shall be taken both in longitudinal direction and in the lateral direction of the Sheet. The specimens shall be loaded on a test plate with a surface slanted at an angle of 75° as illustrated in **Fig. 2** and shall be baked. The specimen shall then be left cooled to room temperature in order to check for cutting by flowing and to measure flowing-down length.

Fig. 1

Unit: mm

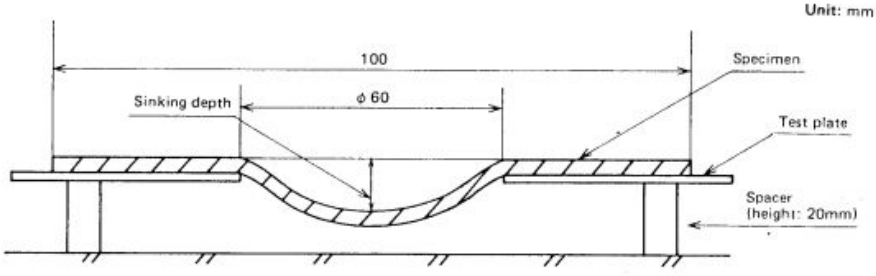


Fig. 2

Unit: mm

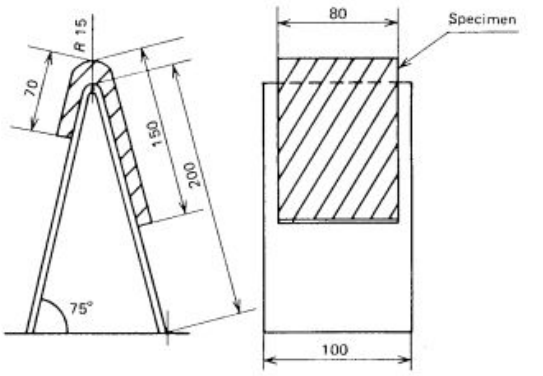
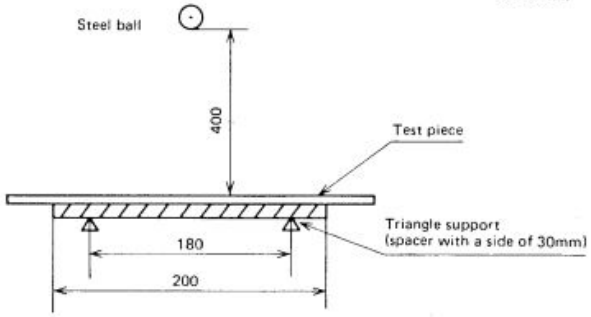


Fig. 3

Unit: mm



5.5 Cold impact resistance

A specimen of 200 x 100 mm shall be taken in the longitudinal direction of the Sheet and baked on a test plate of 250 x 150 mm and then shall be left cooled to room temperature to be used as a test piece. This test piece shall be supported by a pair of spacers spanned at an interval of 180 mm and shall be kept in a constant low temperature vessel for 30 minutes. Within 5 seconds after the test piece is taken out, a steel ball having mass of 50 g shall be allowed to fall from a height of 400 mm on to the center of the test piece supported in order to check to see if cracks and peeling take place.

5.6 Shrinkage percentage

A specimen of 200 x 200 mm shall be loaded on a test plate of 220 x 220 mm and baked. The specimen shall be left cooled to room temperature and the size of each side shall be measured. The shrinkage percentage shall be calculated from the following equations. The test result shall be expressed by a value, whichever greater.

$$S = \frac{A_0 - A_1}{A_0} \times 100$$

or $$S = \frac{B_0 - B_1}{B_0} \times 100$$

Where: S = shrinkage percentage (%)
A_0 = size of specimen in the longitudinal direction before baking (mm)
B_0 = size of specimen in the lateral direction before baking (mm)
A_1 = size of specimen in the longitudinal direction after baking (mm)
B_1 = size of specimen in the lateral direction after baking (mm)

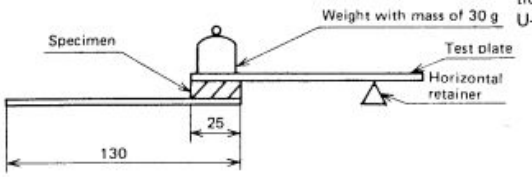
5.7 Shear strength

Two test plates of 130 x 25 mm shall be prepared. A test piece of 25 x 25 mm shall be placed on the test plate as shown **Fig. 4** thus prepared and baked, and then shall be left cooled to room temperature to be used as test piece. The test piece shall be mounted on a Shopper type tension tester or an equivalent tester so that the bonding surface of the test piece shall be parallel to the tension direction. The test piece shall be pulled at a speed of 200 mm/min to check a maximum load applied while the test piece is being pulled. The shear strength shall be calculated from the following equation.

$$T = \frac{F}{A}$$

where, T = shear strength (kgf/cm^2) {MPa}
F = maximum, load (kgf/cm^2) {N}
A = bonding area (cm^2)

Fig. 4 Unit: mm



5.8 Smoking point

A specimen of 50 x 50 mm shall be placed on a test plate of 100 x 100 mm and baked, and shall then be left cooled to room temperature to be used as test piece. A thermocouple shall be embedded in the test piece by means of a soldering-iron. The test piece shall be slowly heated from the steel plate side of the test piece at a temperature-rise rate of 20 ± 2°C/mm using an electric heater or the like. The temperature at which the test piece starts smoking shall be recorded.

5.9 Flammability

For the purpose of this test, a specimen shall be conditioned by being left at a temperature of 23 ± 2°C and at a relative humidity of 50 ± 5% for a period within from 24 hr to 7 days. The test shall be conducted in a metal box as shown in **Fig. 5** in a laboratory whose temperature and humidity are kept at said values. The box shall be provided with an access window of a heat resistant glass plate in the front, and, a door that shall allow two U-shape metal plates (hereinafter referred to as U-shape Clamp) as shown in **Fig. 6** to enter the box, and a hole for passing a hose from a gas burrer, on the side. The box shall also be provided with 4 slits of 15 mm in width on the upper part of all sides an the bottom plate shall have 10 bores of 19 mm in diameter.

The box shall be fitted with legs and the bottom part shall be raised by 10 mm. The test piece of 100 mm in width, 356 mm in length, and as shown in **Fig. 7** shall be chucked in the U-shape Clamp. Where the burning end of the test piece is softened and deflected, a 0.25 mm heat resistant wire shall be passed over the U-shape Clamp spaced at an interval of 25 mm to support the test piece. The U-shape Clamp shall be held horizontal in the center of the box and a Bunsen burner shall be so placed that the center of the nozzle of the burner shall be positioned about 19 mm lower than the center of the opening of the test piece. The Bunsen burner shall be 10 mm in inside diameter and the total calorific value of the gas for the test shall be about 9080 kcal/m^3 {38MJ/m^3}. The burner shall be held vertical so as to generate a flame of 38 mm in length and the air vent shall be kept closed. A flame shall be allowed to strike the test piece for 15 seconds and the time from the time when the flame reaches the first bench-mark to the time when the flame reaches the second bench-mark shall be measured. The burning velocity shall be calculated from the following equation. On starting the test the burning apparatus and U-shape Clamp shall be kept at 30°C or lower.

$$V = 60 \times \frac{D}{T}$$

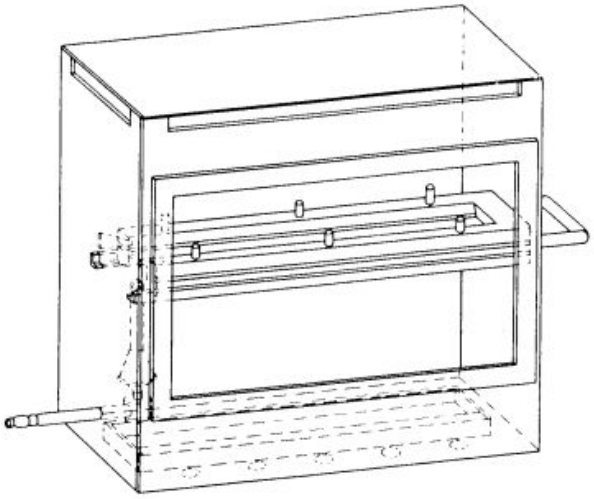
Where: V = burning velocity (mm/min)
D = burning distance (mm)
T = time (s) required for burning over a distance of Dmm

The test shall be conducted under such conditions as to lead to the most disadvantageous results. If a flame goes out before reaching the second bench-mark, the time required for the flame to go out shall be measured. Even if a flame is started but if it does not reach the first bench-mark, the burning velocity shall be regarded as 0 mm/min.

5.10 Damping factor

Each two test specimen of 170 x 20 mm shall be taken in the longitudinal and lateral directions of the Sheet and shall be placed on a test plate of 200 x 20 mm at a distance of 30 mm from an end of the test plate and shall be baked and then left cooled to be used as test piece. The test piece end to which specimen has not been baked shall be securely fixed to a tester illustrated in **Fig. 8.** The test plate shall be resonated by passing a current of 130–140 Hz to an electromagnetic oscillator. When the amplitude of the test plate becomes maximum, the frequency shall be measured. In the next, frequency shall be measured on both sides of the test plate where an amplitude becomes $\frac{1}{\sqrt{2}}$. The damping factor shall be obtained from the following equation.

Fig. 5 Example of Burning Test Apparatus



Unit: mm

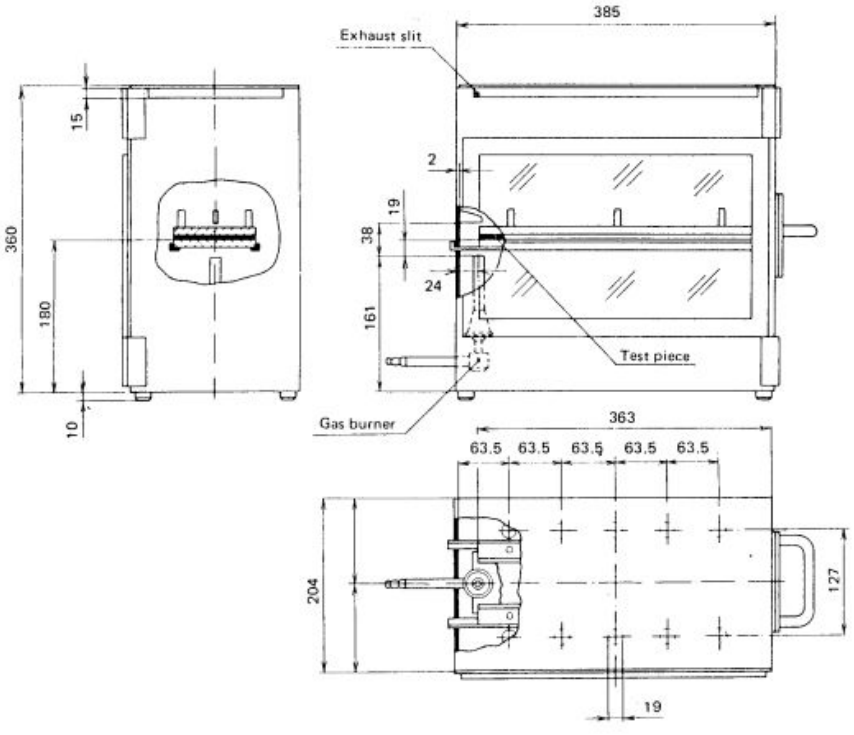


Fig. 6 Example of U-shape Clamp

Unit: mm

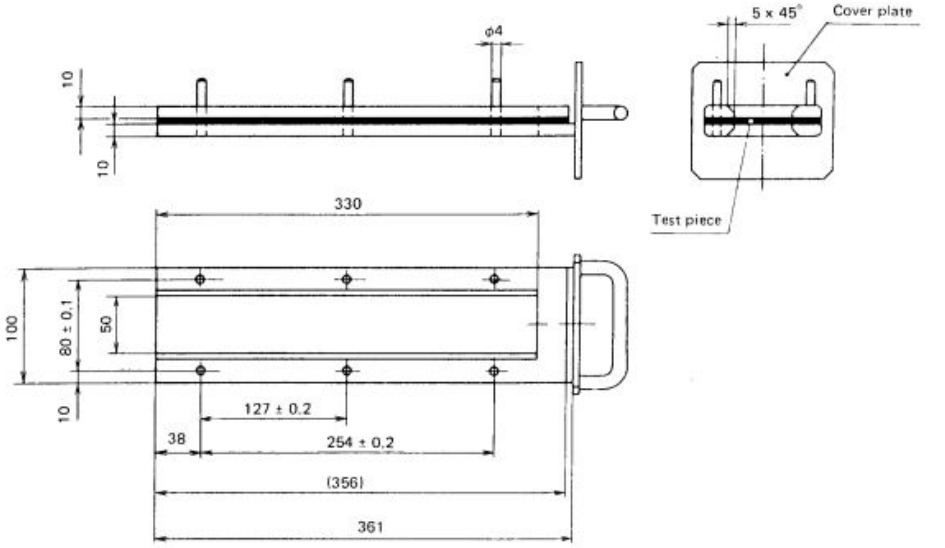


Fig. 7 Test Piece

Unit: mm

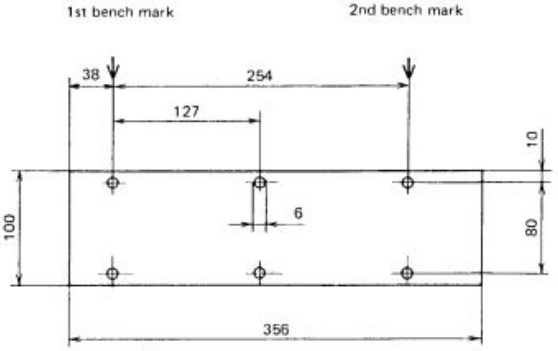
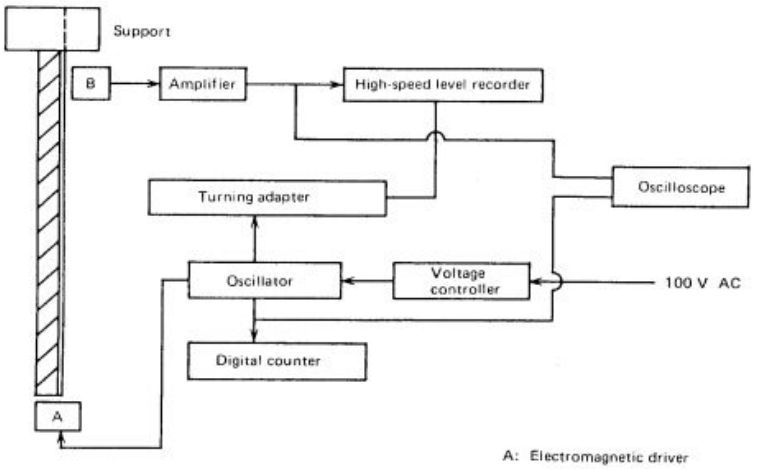


Fig. 8



A: Electromagnetic driver

B: Variable oscillation pickup

Resonance frequency secondary 130 ~ 140 Hz

(Steel sheet)

$$d = \frac{f_2 - f_1}{f_0}$$

Where: d = damping factor

f_0 = Frequency Hz at resonance point

f_1, f_2 = frequency Hz at which an amplitude becomes $\frac{1}{\sqrt{2}}$ of the peak value at the common point on both sides of the resonance point

$f_2 > f_1$

Explanatory Note
on
JASO M 329-83 Asphalt Sheet

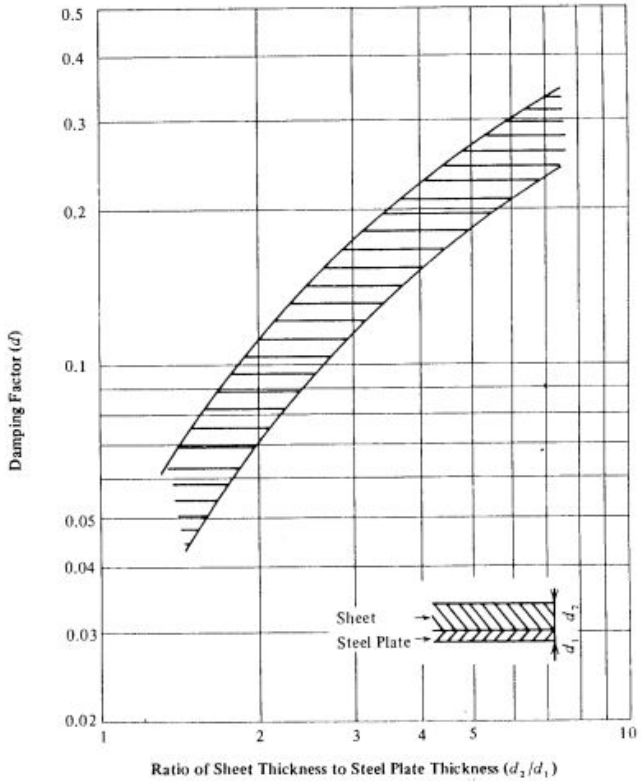
5.9 Smoking property

In regard to the flammability of interior materials for automobiles, the standard **FMVSS-No. 302** has been established in the U.S.A. In the countries other than the U.S.A., the regulation for the flammability has been reviewed. The testing method is stipulated by **ISO 3795-1976** (E), which is in compliance with **FMVSS-No. 302**. Matching of **JASO** standard has been a major subject since **JASO** standard was stipulated. At this time, the standard has made reference to the provisions of **ISO 3795**. The burning velocity of the Sheet is approximately 20–30 mm/min.

5.10 Damping factor

This standard has employed the one-end-fixed, forced oscillating resonance method, which is most commonly used by automobile manufacturers, among various damping factor measuring methods. This method, known as Oberst Method II, is a method of finding the loss factor from the width of the resonance curve. In the preparation of the test plate, it is essential to keep steel plate thickness within a given range (0.8 ± 0.02 mm) and to make the steel plate completely flat. Variations in steel plate thickness result in larger errors in the ratio of the steel plate thickness to the Sheet thickness. In addition, such defects as the distortion on the cut face and barrs of the trim of the steel plate cause the rigidity and damping effect of the steel plate to be increased; Increase in rigidity and damping effect produces larger errors as well, for which careful attention should be given. Relationship between the basic thickness and damping property of the material is as shown in the graph attached hitherto.

Ratio of thickness and Damping Factor



Properties Test of Visel™

No	ITEM	QUALITY REQUAREMENT JASO M329-83	TEST RESULT
1	Specific Gravity	Report it	1.55 ± 0.1
2	Volatile Loss (%)	0.6 or less	0.1
3	Sinking (mm)	Not sunken out at 6 or more	12
4	Thermal Flow Resistance	To be free from running out and within 15 mm in flow down	3
5	Cold Impact Resistance	To be free from cracks and peeling	no crack,no peel
6	Shrinkage Rate (%)	3 or less	2.3
7	Shear Strength (kgf/cm^2) (Mpa)	(5) (0.5) or more	(9) (0.9)
8	Smoking Temperature (°C)	160 min	200
9	Flammability (mm/min)	80 or less	Self extinguish
10	Damping Factor (d) Surface Density : 2.4 Temp 20°C	8×10^{-2} or more	15×10^{-2}
11	Ash Content	-	58
12	Thermal Deformation (%) at 140°C	-	10
13	Corrosion Resistance	-	No discoloration
14	Odor generation Temperatur (°C)	-	200
15	Carpet colour change	-	No discoloration

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