AIS-087

AUTOMOTIVE INDUSTRY STANDARD

Guidelines for Analysis of Electromeric Sound Deadner (Under Seal) Silencer

PRINTED BY
THE AUTOMOTIVE RESEARCH ASSOCIATION OF INDIA
P.B.NO.832, PUNE 411 004

ON BEHALF OF
AUTOMOTIVE INDUSTRY STANDARDS COMMITTEE

UNDER
CENTRAL MOTOR VEHICLES RULES – TECHNICAL STANDING COMMITTEE

SET-UP BY
MINISTRY OF SHIPPING, ROAD TRANSPORT & HIGHWAYS
(DEPARTMENT OF ROAD TRANSPORT & HIGHWAYS)
GOVERNMENT OF INDIA

December 2005

Status chart of the standard to be used by the purchaser for updating the record

Sr. No.	Corr-igenda.	Amend-ment	Revision	Date	Remark	Misc.

General Remarks :

INTRODUCTION

The Government of India felt the need for a permanent agency to expedite the publication of standards and development of test facilities in parallel when the work on the preparation of the standards is going on, as the development of improved safety critical parts can be undertaken only after the publication of the standard and commissioning of test facilities. To this end, the erstwhile Ministry of Surface Transport (MoST) has constituted a permanent Automotive Industry Standard Committee (AISC) vide order No. RT-11028/11/97-MVL dated September 15, 1997. The standards prepared by AISC will be approved by the permanent CMVR Technical Standing Committee (CTSC). After approval, the Automotive Research Association of India, (ARAI), Pune, being the Secretariat of the AIS Committee, has published this standard. For better dissemination of this information ARAI may publish this document on their Web site.

The present automotive standard is prepared to provide Guidelines for Sound Deadner / Silencer incorporating construction, quality control and performance requirements.

Considerable assistance has been taken from the following International standard:

JASO-M329	Asphalt Sheet for Automobiles

The Automotive Industry Standards Committee (AISC) responsible for preparation of this standard is given in Annex I.

Guidelines for Analysis of Electromeric Sound Deadner (Under Seal) Silencer

1. SCOPE

This specification applies to Floor Silencer/Sound Deadner being used for automobile floors interior mainly to protect steel plate from noise, Vibration, rust and water in respect of quality.

2. REFERENCES

Asphalt sheets for automobile body floor as

2.1. JIS KI 2533 – 1971 Testing Method for Loss on Heating of Petroleum Asphalt

2.2. JIS Z 2371-1971 Methods of Salt Spray Testing

2.3. JASO M 306-70 Under Body Coatings

3. GENERAL REQUIREMENT

3.1. Composition :

Silencers shall be composed mainly of asphalt and unvulcanized rubber and shall be cast/formed of uniform thickness by combining resui degeneration and fillers.

3.2. Workability

1) Silencers, shall be free of defects detrimental to normal work at temperature of 10 to 38°C.
2) Silencer shall be free from uncomfortable odors in normal work.

3.3 Shelf Stability

Silencers allowed to stand one month in a box keeping away from direct sunlight shall be free from deterioration, uncomfortable odors & other visual defects.

3.4 Appearance

Silencers shall be black in colour and free from defects deterimental for practical use such as excessive distortion, flaws or wrinkles.

3.5 Properties requirement

Based on type of vehicle, nominal thickness, weight and specific gravity requirement varies and shall be defined as an agreement between supplier and purchaser. The property requirements for sound deadner / silencer is given in Table-1.

TABLE 1
Property Requirements for Sound Deadner / Silencer.

Property	Requirement		Test Method
Ash Content %	40 Max. (760 deg.C / 1 hr)		4.3
Loss on heating	0.6 (max.)		4.4
Shrinkage %	2.0 (max.)		4.5
Pull Strength (kgf / sq cm)	1.5 min.		
Heat Sagging (mm)	7 min. (140^0C / 30 min.)	6 min. (150^0C / 30 min.)	
Combustibility (mm / min)	80 max.		
Cold impact resistance @	No Cracking and Peeling allowed (-20 degree C / 2 hrs.)		
Heat fluidity (mm)	10.0 (Max.)		4.6
Corrosion resistance	No visual defect such as rust, etc.		4.7
Impact resistance (cm) at 5°C and 20°C	35 (min.)		4.8
Heat deflection mm	10 (max.) or no drop off		4.9
Heat Adhesion %	50 (max.)		4.10
Odor	No excessive stink		4.11
Surface tack and deformation	No surface tack or contamination. No excessive deformation or cracks		4.12
Smoke temperature °C	160 or higher		4.13
Damping Resistance at 20^0 C	0.12 min.		4.14
Damping Resistance at 40^0 C	0.22 min.		
Damping Resistance at 60^0 C	0.33 min.		

4. TESTING

4.1 General Status

Unless otherwise specified, normal state of testing shall be at temperatures of 20 ± 2°C and relative humidity of 65 ± 5 %. Specimens shall be condition for 24 hours in normal state before test.

4.2 Weight

Weigh each of three sheets of silencer (100 x 100 mm). The average of the weight per 1 m² shall be considered as the result.

4.3 Ash contents

Take a specified amount of silencers into a ceramic crucible whose weight is known. Weigh it exactly and heat it slowly. After the silencer is volatilized or carbonized, open the lid of the crucible. Heat it strongly under good ventilation and reduce it to ashes. Allow it to cool in a desiccator. Then weigh it and determine the ash content to the original weight of the specimen in percentage.

4.4 Loss on Heating

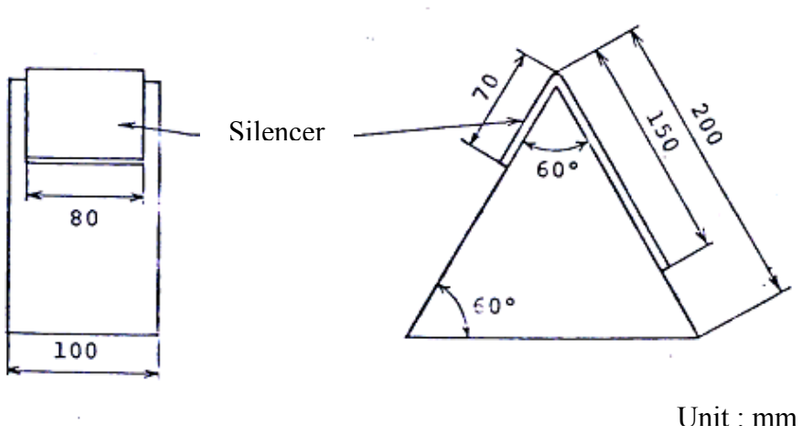
Shall conform to JIS K 2533 : Testing Method for Loss On Heating of Petroleum Asphalt.
Silencers shall be cut into pieces smaller than 10 mm square. Use 10g of them for test.

4.5 Shrinkage

Place a silencer (150 x 150 mm) on an under coated steel panel [1] (hereinafter called "Panel") [300 x 300 x 0.8 mm]. Heat it for 30 mins. in a hot-air furnace conditioned at 150 ± 2°C.
Allow it to cool to room temperature. Obtain the shrinkage by measuring the silencer.

4.6 Heat Fluidity

Place a silencer (80 x 220 mm) on a panel bended with an angle of 60 deg as shown in Figure 1. Heat it for 30 mins. in a hot-air furnace conditioned at 160 ± 2°C.
Remove it from the furnace and measure the silencer for the length of hanging and tearing.



Unit : mm

Figure 1

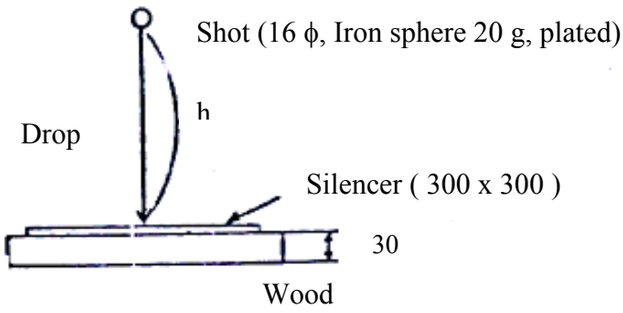
4.7 Corrosion Resistance

Degrease and clean a panel (100 x 150 mm).
Place a silencer of the same area on the panel. Heat it for 30 mins. at 150 ± 2°C until the silencer sticks to the panel. Coat the reverse side of the panel and its edges with melted paraffin. Thus the specimen is prepared. The specimen shall be subjected to a salt spray test for 120 hrs in accordance with JIS Z 2371:Salt Spray Test. Remove the silencer and gasoline clean the panel. Inspect the panel for corrosion.

4.8 Impact Resistance

Arrange as shown in the Figure below. Allow the set to stand 1 hr in the ambient air at 5° and 20°C.

Then, drop a shot. Inspect the silencer at each temperature for cracks. Record the height.

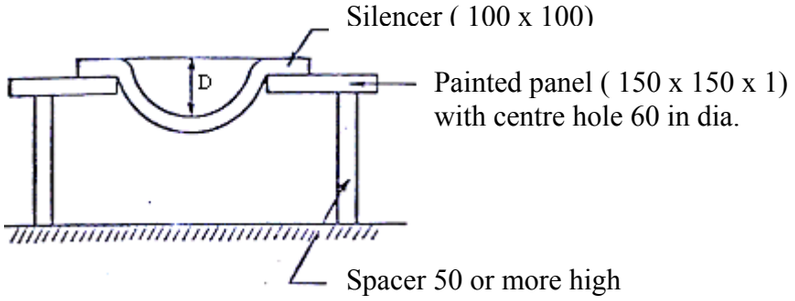


Unit : mm

4.9 Heat Deflection

The specimen is composed of a silencer (100 x 100 mm) placed on a painted panel 9150 x 150 mm) having a circular hole 60 mm in dia. in the middle as shown in Figure 2. Place the specimen 50 mm or higher above the floor in a hot-air furnace at 150°C ± 2 ° C for 30 mins.

Allow it to cool to room temperature. Then measure the deflection (D).



Unit : mm

Figure 2

4.10 Heat Adhesion

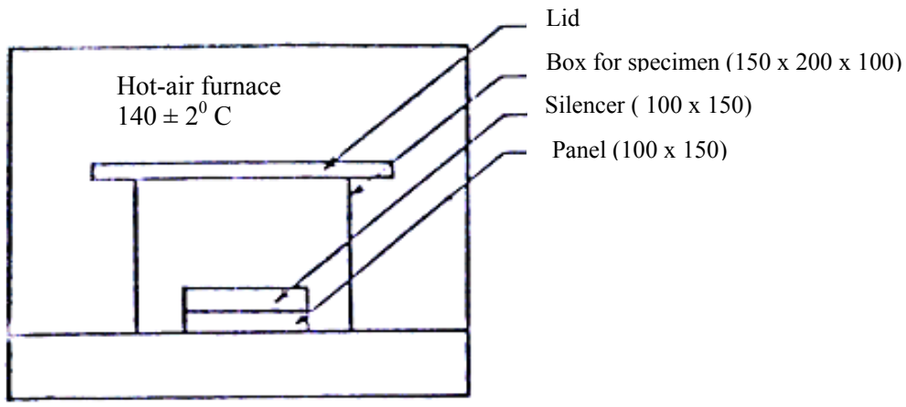
Place a silencer (100 x 120mm) on a glass plate (150 x 150 x2 mm). Heat it for 30 mins. in a hot-air furnace at 150 ± 2°C. Allow it to cool to room temperature. Then, inspect the silencer visually from reverse side of glass for area of adhesion. Apply test twice.

4.11 Odor

Heat a silencer (100 x 150 mm) on a panel in hot-air furnace at 150 ± 2°C until the silencer sticks to the panel. Allow it to cool to room temperature. Immerse it for 24 hrs in water at 20 ± 5°C. On the other hand keep the like specimen composed of a silencer sticked to a panel for 3 hrs in a hot-air furnace at 140 ± 2°C (as in Figure 3). Remove the box with the specimen from the furnace. Open the lid of the box. Quickly compare the specimen with the specimen removed from the water described above for odor.

Use an apparatus as in Figure 3 for determining odor.

Decision on the odor shall be made by evaluation of three or more persons.



Unit : mm

Figure 3

4.12 Surface Tack and Deformation

Place a silencer (70 x 70 mm) on a panel (100 x 100 mm). Heat it for 30 mins. in a hot-air furnace at 150 ± 2°C until the silencer sticks to the panel. Allow it to cool to room temperature. Spray a finish coat approved by MMC to a thickness of 10μ on the silencer.

Dry and bake for 30 mins. at 150 ± 2°C.

Place two sheets of gauze (60 x 60 mm) on the silencer. Put a weight (500g x 40ϕ) thereon.

Heat it for 2 hrs in a hot-air furnace at 140 ± 2°C.
Remove it from the furnace and allow it to cool to room temperature. Then, remove the weight and gauze. Visually inspect the asphalt for tack the gauze for contamination, and the coat on the silencer for deformation and cracks. Apply test twice.

4.13 Smoke Temperature

Place a silencer (120 x 30 x 3mm) on a panel (180 x 90 x 0.7-1.0 mm). Heat it for 30 mins. at 150°C until the silencer foams and sticks to the panel.

Allow it to cool for 10 mins. Insert a thermocouple in silencer by a soldering iron. Record the temperature. Increase temperature at the rate of 10°C per minute by bringing the soldering iron into contact with the silencer. Measure the temperature at which the sheet begins to smoke. Apply test three times.

4.14 Damping resistance

Shall conform to clause 5.21 in JASO M 306-70 (UNDERBODY COATING). Use a steel panel of 0.8 ± 0.02 mm thick, 400 mm long by 40 mm wide or 200 mm long by 20mm wide. Ambient state shall conform to clause 4.1 of this standard. Measure damping resistance by means of the second order resonance frequency.

5 Inspection

Apply the tests required in this specification to every lot of samples specified by the agreement with the inspection Department of MMC. The lot shall conform to all items of testing.
When otherwise made agreement with the Inspection Department of MMC, the requirement shall conform to the agreement.

6 Test Report

Unless otherwise specified, manufacturers shall submit two copies of test report per lot on requirement here at the time of delivery of trial products. About commercial production, make agreement with the Inspection Department of MMC.

7 Designation in the Drawing

The silencer shall be designated in the drawing as follows :
ES-X 62223 FLOOR SILENCER ---- FLOOR INTERIOR (LOW EXTENSION).

ANNEX I

(See Introduction)

COMMITTEE COMPOSITION *

Automotive Industry Standards Committee

Chairman	
Shri B. Bhanot	Director The Automotive Research Association of India, Pune
Members	**Representing**
Shri Alok Rawat	Ministry of Shipping, Road Transport & Highways, New Delhi
Shri Sushil Kumar	Department of Heavy Industry, Ministry of Heavy Industries & Public Enterprises, New Delhi
Shri Chandan Saha	Office of the Development Commissioner, Small Scale Industries, Ministry of Small Scale Industries, New Delhi
Shri S. Dasgupta Shri S. K. Bhatia (Alternate)	Bureau of Indian Standards, New Delhi
Shri. A. S. Lakra Shri D. P. Saste (Alternate)	Central Institute of Road Transport, Pune
Director	Indian Institute of Petroleum, Dehra Dun
Dr. C. L. Dhamejani Dr. N. Karuppaiah (Alternate)	Vehicles Research & Development Establishment, Ahmednagar
Shri Dilip Chenoy	Society of Indian Automobile Manufacturers
Shri T.C. Gopalan Shri Ramakant Garg (Alternate)	Tractor Manufacturers Association, New Delhi
Shri K.N.D. Nambudiripad	Automotive Components Manufacturers Association New Delhi
Shri G. P. Banerji	Automotive Components Manufacturers Association New Delhi

Member Secretary
Mrs. Rashmi Urdhwareshe
Deputy Director
The Automotive Research Association of India, Pune

* At the time of approval of this Automotive Industry Standard (AIS)