



Determining the Resistance to Odor Propagation of Interior Materials

1 Introduction

Note: Nothing in this standard supercedes applicable laws and regulations.

Note: In the event of conflict between the English and domestic language, the English language shall take precedence.

1.1 Purpose. This standard shall be used to determine the odor propagation of automotive interior materials (e.g. fabric, coated fabrics (vinyls), carpets, padding, insulators, felts, plastic parts, interior paints etc.) when subjected to elevated temperatures and high humidity.

1.3 Applicability. Automotive interior materials (e.g. fabric, coated fabrics (vinyls), carpets, padding, insulators, felts plastic parts, interior paints, etc.).

1.3 Remarks. This standard is written to communize the determination of odor propagation within GM.

2 References

Note: Only the latest approved standards are applicable unless otherwise specified.

2.1 External Standards/Specifications.

None

2.2 GM Standards/Specifications.

None

2.3 Additional References.

VDA 270

3 Resources

3.1 Facilities.

3.1.1 Calibration. The test facilities and equipment shall be in good working order and shall have a valid calibration label.

3.1.2 Alternatives. Alternative test facilities and equipment may also be used. However, all measuring variables as specified in this standard shall be determined correctly with respect to their physical definition.

3.1.3 Air circulating oven capable of maintaining the required temperature to within $\pm 2^\circ\text{C}$.

3.2 Equipment.

3.2.1 One (1) test container is required for each coding plus a control container. The test container, lid and rack shall not release or absorb any odorous volatiles. Do not use plastic containers or plastic lids. Only containers and lids of metal or containers of glass shall be used. The recommended metal containers (paint style cans) are ≈ 1 l. The lids may be pressure sealed for each test. If all glass containers are used, the lid shall be sealed by means of a plain ground joint. Sealing grease or sealing rings shall not be used. Use of tape to keep desiccators lids from sliding off the desiccators during the oven exposure is recommended if necessary.

Any necessary support shelves or racks within the container shall be made of glass/glazed ceramics or stainless steel. Make sure that if glazed ceramics are used, that the plates are fully covered but the glaze so that no odor absorption will occur.

The test container including lid and possibly the insert shall be cleaned carefully prior to each test. It shall have no individual smell.

3.2.2 Suitable cutting tools for preparation of test specimens.

3.2.3 Distilled or deionized water.

3.3 Test Vehicle/Test Piece. The size of the test specimens shall be governed by the amount of the material used in the vehicle, and shall be selected to give the approximate ratios of test specimen volume and test container volume according to Table 1 for cut goods (e.g. textiles, plastic roll good, leather, etc.), for weighable parts (e.g. speaker panels, instrument panel, door panel) use the formula in Table 2.

For parts that consist of more than one individual part (e.g. door panel) the test shall be performed individually for each material.

Typical composite materials shall be evaluated as a composite.

Table 1: Coding for Cut Goods

Coding	Test specimen volume	:	Test container volume	Example of materials for test
1	1	:	20	Padding felts
2	1	:	50	Carpets, fabrics
3	1	:	100	Plastic films
4	1	:	500	Parts for paneling
5	1	:	1000	Small parts as speaker panels
6	1	:	to specification	to requirements

Table 2: Formulas for Weighable Parts

P	T
< 500 g	$= \frac{4}{1000 \text{ l}} \times P \times V$
500 g < P < 1000 g	$= \left(\frac{3}{1000 \text{ l}} \times P + 0.5 \frac{\text{g}}{\text{l}} \right) \times V$
1000 g < P < 3000 g	$= \left(\frac{2}{1000 \text{ l}} \times P + 1.5 \frac{\text{g}}{\text{l}} \right) \times V$
3000 g < P	$= \left(\frac{1}{1000 \text{ l}} \times P + 4.5 \frac{\text{g}}{\text{l}} \right) \times V$

P = Mass of the part in g

V = Volume of the test container in l

T = Mass of the test piece in g

The specific coding will be shown on the individual engineering drawings, material specifications etc. The coding system is defined in paragraph 8.

Where test specimens are taken from large components, they shall be cut to a thickness of 20 mm max.

A test specimen may consist of several individual pieces.

Run a minimum of one test for each required coding.

3.3.1 To calculate the test specimen size according to Table 1, first define the test specimen area that will fit flat on the support shelf or rack. Define the thickness of the material and calculate the volume in mm³. Multiply the test specimen volume by 10⁻⁶ to convert to l (Liters). Define the air volume of the test container in l. Divide the test container volume by the test specimen volume. If the ratio does not equal the required ratio, then cut a second test specimen the same size, double the thickness value and calculate the ratio as above. Use the number of test specimens that comes the closest to the required ratio.

To calculate the test specimen weight according to Table 2: Weight the part to be tested in g and calculate according the applicable formula.

3.4 Test Time. (24± 0.5) h heating and 2 h cool down plus 168 h conditioning at room temperature before the test can be started.

3.5 Test Required Information. For test required information see GMW16853, "3.1.7 Test Required information".

3.6 Personnel/Skills. Not applicable.

4 Procedure

4.1 Preparation. See paragraph 3.3.

4.2 Conditions.

4.2.1 Environmental Conditions. See paragraph 4.3.

4.2.2 Test Conditions. Deviations from the requirements of this standard shall have been agreed upon. Such requirements shall be specified on component drawings, test certificates, reports, etc.

4.2.2.1 Test specimens shall be produced immediately upon receipt of parts or materials and tested shortly thereafter. In the event that testing cannot begin immediately, the pieces or parts to undergo testing shall be wrapped in an impermeable, odorless material such as aluminum foil until testing begins. This way the as-received or installation condition is checked.

4.2.2.2 If the received part has an odor rating < 6, when evaluated per the odor panel procedure, no testing is required. The sample does not meet the requirements.

4.3 Instructions.

Note: This Test Procedure depends on coding A, B or C for test specimen conditioning.

To obtain consistent data, carefully select your odor panel. Odor panelists shall not smoke heavily, wear cologne or perfume, chew gum or tobacco or have sinus problems. The odor test shall be performed in an area that is odor free. Persons evaluating odor shall rate the specimens individually and not share information before the last odor panelist has evaluated the specimens.

4.3.1 Wet Condition - Coding A.

4.3.1.1 Sufficient distilled or deionized water shall be placed in the test container, so as to ensure that some water remains at end of test.

If a 1 l metal can is used, place ≈ 2 ml of distilled or deionized water in the can.

If an all glass container is used, the container size may vary. Calculate the volume of the glass container and use enough distilled or deionized water to fit it ≈ 10 % by volume.

4.3.1.2 For a glass container the test specimen shall be placed on a support shelf or rack in the test container to exclude direct contact by the test specimen with the water. It is not necessary to reduce the container volume by the volume occupied by the support rack.

To prevent direct contact of the test specimen with the water when using the can, the water (2 ml) shall be put in a small ceramic crucible on the bottom of the can.

4.3.1.3 Pressure seal the lid of the metal can. If a desiccator is used, tape the lid closed to prevent the lid from sliding during storage. The test container shall then be placed in the oven for (24 ± 0.5) h at (+70 ± 2) °C.

4.3.2 Dry Condition - Coding B.

4.3.2.1 The test specimen shall be placed in the test container. For a 1 liter can, pressure seal the lid. If a desiccator is used, avoid specimen contact with the bottom, and tape the lid closed to prevent the lid from sliding during storage.

4.3.2.2 The test container shall then be placed in the oven operating for (24± 0.5) h at (+70 ± 2) °C.

4.3.3 High Temperature Condition - Coding C.

4.3.3.1 The test specimen shall be placed in the test container. For a 1 l can, pressure seal the lid. If a desiccator is used, avoid specimen contact with the bottom, and tape the lid closed to prevent the lid from sliding during storage.

4.3.3.2 The test container shall then be placed in the oven operating for (24 ± 0.5) h at (+105 ± 2) °C.