The Engineering Society For Advancing Mobility Land Sea Air and Space®
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SURFACE VEHICLE RECOMMENDED PRACTICE

Submitted for recognition as an American National Standard

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LOAD DEFLECTION TESTING OF URETHANE FOAMS FOR AUTOMOTIVE SEATING

Foreword—This reaffirmed document has been changed only to reflect the new SAE Technical Standards Board format.

1. *Scope*—Cellular foam products have been traditionally checked for load deflection by determining the load required to effect a 25% deflection. In seating, on the other hand, the interest is in determining how thick the padding is under the average passenger load (a measurement of padding left for "ride" and seated height), a second measurement to give an indication of initial softness, and a final figure to indicate resiliency. To most easily fulfill these requirements, load deflection on flexible urethane foams for automotive seating is determined here by measuring the thickness of the pad under fixed loads of 1 lb, 25 lb, and 50 lb on a 50 in^2 circular indentor foot.

2. *References*

2.1 Applicable Document—The following publication forms a part of this specification to the extent specified herein.

2.1.1 ASTM PUBLICATION—Available from ASTM, 1916 Race Street, Philadelphia, PA 19103-1187.

ASTM D 1564—Specifications and Methods of Test for Flexible Urethane Foam

3. *Test Conditions*—Material must be at least 96 h old before testing. Tests shall be conducted under known conditions of temperature and humidity with 73.4 °F ± 2 °F and 50% ± 2% relative humidity for a minimum of 16 h, the standard in case of disputes, ASTM D 1564.

4. *Test Specimens*—When possible, the completed manufactured product shall be used with top and bottom skins, if present, intact. In the case of tapered pads, location of area for measurement is to be agreed upon by parties concerned. In the case a finished part is not feasible for test, by mutual agreement, 15 in x 15 in x average pad thickness specimens may be used. In the case of tapered or irregularly surfaced pads, by mutual agreement, 15 in x 15 in pieces may be cut to uniform thickness and plied up (no cement is to be used).

5. *Apparatus*—An apparatus having a flat circular indentor foot 50 in^2 in area, and dead weight loaded through a swivel joint with loads of 1 lb, 25 lb, 50 lb, and 75 lb is mounted over a level horizontal platform (which is perforated with 1/4 in holes on 3/4 in centers to allow for rapid escape of air during test). The distance between indentor foot and platform is variable to compress sample under test (at a speed of 2 in/min for deflection measurements, 4 in/min for preflexing) and is equipped with a device for measuring distance between plates.

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6. Procedure

a. One specimen is sufficient for a test. Sample to be checked is placed in machine with distance from edge of indentor foot to edge of sample not less than the pad thickness. Sample is deflected twice with a 75 lb load on a 50 in^2 indentor foot (at 4 in/min) and allowed to rest 5 min ± 1 min. It is advisable to mark test area (around indentor foot) with a ball point pen.

b. Indentor foot is brought into contact with previously preflexed area and height of specimen determined with 1 lb load on the 50 in^2 indentor foot.

c. The 25 lb load is applied to indentor foot and specimen compressed at 2 in/min until load is carried by pad. Thickness is then determined after maintaining load for 1 min.

d. The 50 lb load is applied to indentor foot and after 1 min under load, thickness of pad is determined.

e. Finally the weight is reduced to 25 lb (at a rate of 2 in/min) and after maintaining the load for 1 min the thickness is measured.

PREPARED BY THE SAE TEXTILE/FLEXIBLE PLASTICS COMMITTEE