The Engineering Society
For Advancing Mobility
Land Sea Air and Space

A Product of the
Cooperative Engineering Program

SAE J1352 APR87

Compression and Recovery of Insulation Paddings

SAE Recommended Practice
Reaffirmed April 1987

Submitted for Recognition as an American National Standard

SAE The Engineering Society For Advancing Mobility Land Sea Air and Space

400 COMMONWEALTH DRIVE, WARRENDALE, PA 15096

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MATERIALS PRACTICE

SAE J1352

Issued May 1981
Reaffirmed April 1987

Reaffirms J1352 MAY81

COMPRESSION AND RECOVERY OF INSULATION PADDINGS

1. SCOPE: This test method is applicable for determining the relative compression and recovery of various insulation paddings.

2. PURPOSE: The purpose of this testing method is to establish a means of measuring the ability of insulation composites to retain their resiliency when compressed, dry or wet.

3. APPARATUS:

3.1 Platen:

3.1.1 Method A, 100 x 100 mm with a mass of 300 g.

3.1.2 Method B, 100 x 100 mm with a mass of 100 g.

3.2 Compression Machine: Capable of compressing the specimen at a rate of 50 mm/min without impact.

4. TEST SPECIMEN: From the material to be tested, cut enough specimens 100 x 100 mm to achieve a minimum thickness of 25 mm when plied together.

5. CONDITIONING: Tests for material classification and for arbitration purposes shall be made on material conditioned to a constant weight in a controlled atmosphere of 21 ± 1°C and 50 ± 5% relative humidity. Quality control tests can be conducted on unconditioned specimens unless otherwise specified by the user.

6. PROCEDURE - METHOD A, NORMAL:

6.1 Ply sufficient layers of the specimen together to achieve a minimum thickness of 25 mm.

6.2 Add the 300 g platen and place in the compression apparatus.

6.3 Apply a load of 2.25 kg for 1 min. Remove the load and measure the thickness of the specimen at the center of the four sides and record the average as T_1.

6.4 Apply a load of 35 kg at the rate of 50 mm/min. Measure the average thickness as soon as the full load is attained and record as T_2.

6.5 Hold this load for 5 min, then remove the load and allow specimen to recover for 5 min with the platen on the specimen.

6.6 Measure the average thickness and record as T_3.

7. PROCEDURE - METHOD B, NORMAL:

7.1 Ply sufficient layers of the specimen together to achieve a minimum thickness of 25 mm.

7.2 Add 100 g platen and measure the thickness of the specimen at the center of the four sides of the platen. Record the average as T_1.

7.3 Apply a load of 3 kg for 1 min. Measure the average thickness as soon as full load is attained and record as T_2.

7.4 Remove the load and allow the specimen to recover for 3 min.

7.5 Measure the average thickness and record as T_3.

8. PROCEDURE - METHOD C; COMPRESSION AND RECOVERY - WET:

8.1 Determine and record T_1 as described in paragraphs 7.1 and 7.2, Method B.

8.2 Immerse specimen in distilled water at 21 ± 1°C for 30 min.

8.3 Shake out excess water and follow Method B for determining T_2 and T_3.

9. PROCEDURE - METHOD D; RECOVERY - WET:

9.1 Determine and record T_1 as described in paragraphs 7.1 and 7.2, Method B.

9.2 Immerse specimen in distilled water at 21 ± 1°C for 30 min.

9.3 Determine T_2 as in Method C.

9.4 After T_2 is measured, remove load and platen and dry separated samples in a 102°C oven for 1 h. Remove from oven and bring back to standard conditions.

9.5 Stack the samples, apply the 100 g platen and after 3 min measure and record T_3.

10. REPORT: Calculate the percent compression and recovery dry or wet, as follows:

$$\% \text{ Compression} = \frac{T_1 - T_2}{T_1} \times 100$$

$$\% \text{ Recovery} = \frac{T_3 - T_2}{T_1 - T_2} \times 100$$