

ENERGY ABSORPTION OF PADDING MATERIALS

Application

This procedure is used to test the energy absorption characteristics of cotton, foam rubber, felt and similar padding materials used for interior trim applications.

Scope

This procedure consists of subjecting a test specimen of the padding material to cyclic loading under closely controlled conditions and calculating the energy absorption of the sample at the completion of the specified number of cycles. Thickness, weight and energy absorption may be determined on the same instrument.

Apparatus Required

Electronic Testing Machine

Instron Model 7M or equivalent.*

Accessories

Compression Load Cell CC - Catalog No. A-17
Gage Length and Rapid Return Controls - Catalog No. A-36
Extension Cycling Controls - Catalog No. A-37
Load Cycling Controls - Catalog No. A-38
Automatic Integrator - Catalog No. A-80
Reference - Operating Manual

* Instron Engineering Corporation
2500 Washington Street
Canton, MA

Conditioning and Test Conditions

All test values indicated herein are based on material conditioned in a controlled atmosphere of 23 +/- 2 °C and 50 +/- 5 % relative humidity for not less than 24 h prior to testing and tested under the same conditions unless otherwise specified.

Date	Action	Revisions
2001 08 22	Revised	Editorial – no technical change A. Cockman
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Procedure

1. Die cut a 4 by 4 inch sample of the padding material.
2. Condition after cutting for 24 h at 65 +/- 2 % relative humidity and 70 +/- 2 °F.
3. Calibrate the instrument and the integrator following the directions in the instruction manual, then proceed as follows:
 - (a) Balance the instrument and integrator and calibrate for weight by placing a 1 lb weight on the load cell and making adjustments as necessary.
 - (b) Turn the integrator counter switches to "On" position and turn Manual - Automatic switch to "Automatic" position.
 - (c) Set the load cam for 25 lb compression load cycling (see manual).
 - (d) Set crosshead speed to 1 inch/minute by using proper gear combination as shown in gear selection chart for various crosshead speeds (see manual).
 - (e) Slowly lower crosshead until no clearance exists between crosshead and load cell. (Final zero clearance should be made by turning the manual positioning control knob and adjusting distance by observing "no load" on recorder chart – see manual).
 - (f) Set "Return" dials on control panel to zero, set "Gage Length" dials for required number of inches to allow for placement of sample, then raise crosshead to that position.
4. With scale setting at 1 lb, place the test specimen on the loading cell and read weight from chart. The chart recorder indicates in pounds. Weight should be converted to ounces per square foot.
5. Again balance the instrument, using the "Fine" balance knob to offset the weight of the sample.
6. Apply a load of 0.1 lb at 1 inch/minute and stop the machine.
7. Read the thickness of the test specimen under 0.1 lb load directly from the "Return" dials. Record as (T₁) in inches.
8. Set "Upper" extension cycle dials to zero.
9. Set full scale load to 50 lb range.
10. Clear counters on the integrator.
11. With the Instron set for compound cycling between "load" as the upper limit and "extension" as the lower limit, switch the "Manual - Automatic" control knob to "Automatic" (or "load cycle control") and push the "Down" button to start the test.