Chrysler Group LLC
Laboratory Procedure
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LOAD DEFLECTION TEST – INTERIOR SURFACES

1.0 GENERAL

1.1 Purpose

This procedure describes the method for determining the foam deflection for interior soft padded components.

1.2 Coverage of this Standard

This method is appropriate in the evaluation of interior components designed with a soft flexible surface.

1.3 Limitations on Usage

This method is intended for use on arm rests, bolsters, instrument panel surfaces, or other interior padded components. This method is not intended for measuring seat foam deflection.

2.0 SPECIAL TEST EQUIPMENT & MATERIALS

The testing device and equipment required for this test can be found in Table 1.

TABLE 1: SPECIAL TEST EQUIPMENT***

Name Of Item	Description	Make/Model
Test Machine	Capable of compressing material	Instron or similar device
Recording Device	Capable of recording compression readings and generating a force/deflection curve.	Blue Hill software program or similar.
Holding Fixture	Capable of setting and retaining test piece normal (90°) to the test mandrel and at 45° from horizontal.	
Mandrel	25 mm diameter solid aluminum rod with a 3-5 mm rounded edge toward the sample.	
Nested Fixture	Capable of resisting the test piece substrate from deflecting during the loading application.	Bondo or similar device

3.0 SUMMARY OF METHOD

This test is designed to give a numerical representation of how soft or firm an interior padded component is. The test sample will be subjected to a compression load by a mandrel at a defined rate. The compression force is collected and will be compared to the amount of compression into the test piece. The force vs. compression load will be compared to a scale to determine the softness of the test sample.

This test has two applications.

1. 90° Vertical load test to the test surface is intended to determine the firmness of a flat surface, such as the horizontal surface found on an arm rest, door trim panel, or instrument panel.

2. 45° load to the test surface is intended to determine the firmness of the corner of a door surface or arm rest surface.

4.0 SAFETY PRECAUTIONS

This procedure may involve hazardous operations and equipment. This standard does not purport to address all of the safety problems associated with its use. It is the responsibility of the user of this standard to consult and establish the appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

5.0 CONDITIONING

Unless otherwise specified, samples should be stored at room temperature (23° C ± 2°) for 24 hours prior to the test. The test shall be conducted at room temperature unless otherwise specified. For samples made from urethane foam or similar composition, the sample foam will need to be fully cured prior to this test.

6.0 SAMPLING

Samples to be tested shall be flat plaques or regions cut from the actual part. The samples shall be approximately 100 mm x 100 mm in size. A nested fixture shall be used to prevent the substrate material from flexing during the test. Samples will be subjected to loading three times in the same location.

7.0 PROCEDURE

The following procedure is the same whether the test sample is subjected to a 90° load to the surface or a 45° load to the surface.

A. Attach the compression mandrel to the Instron cross head.

B. Mount the holding fixture onto the base of the Instron tester. Position the holding fixture to the desired test angle.

C. Align the nested test sample to the compression mandrel so that the mandrel will contact the middle of the test sample. Secure the nested test sample to the holding fixture. Reference to Figure 1 for the 90° load test and Figure 2 for the 45° test.

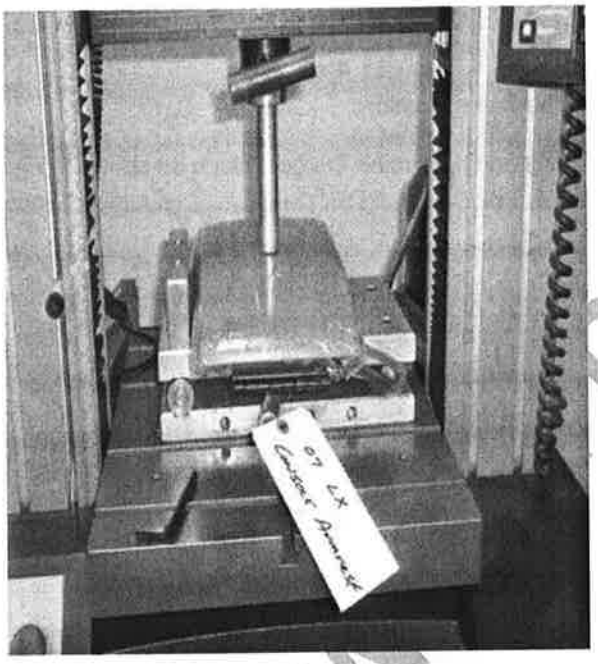

FIGURE 1: 90° COMPRESSION TEST

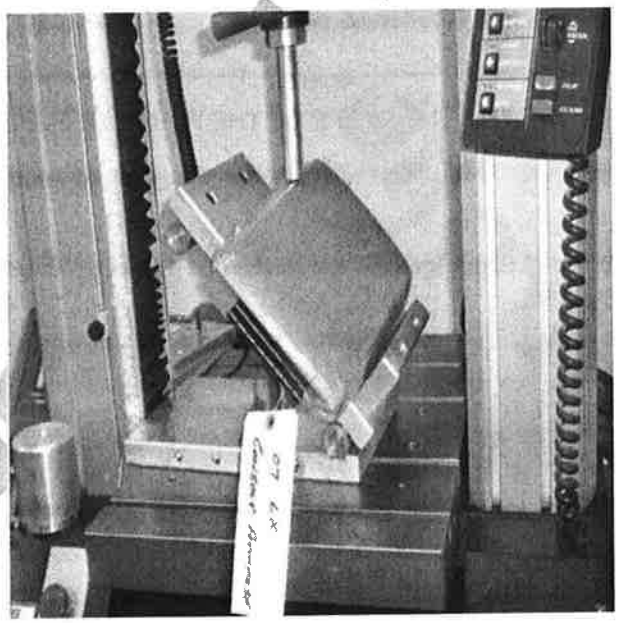

FIGURE 2: 45° COMPRESSION TEST

D. Lower the mandrel to the test sample surface such that the mandrel just contacts the test piece. This is the zero reference point for the machine and chart.

E. Set the compression rate of the test machine to 20 mm/minute.

F. Establish a test stop condition when the test machine has recorded 100 N being applied to the test sample.

G. Compress the test sample and measure the force applied and the amount of compression.

H. Repeat the test 3 times at the same location.

I. Take an average of the 3 tests and determine the best slope as shown in Figure 3.

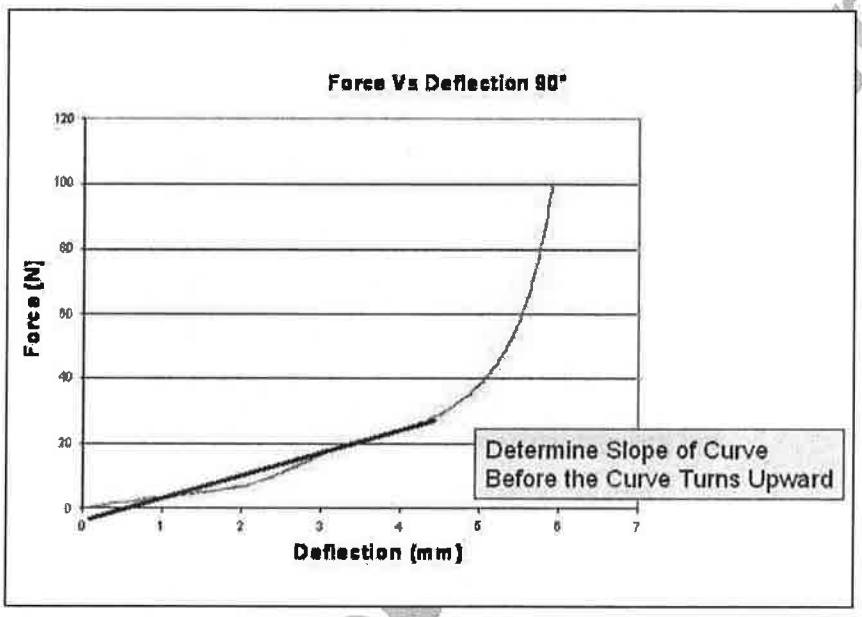

FIGURE 3: DETERMINING THE SLOPE OF THE FORCE DEFLECTION CURVE.

8.0 REPORT

The slope determined in Section 7.0, paragraph I above shall be plotted on the chart shown in Figure 4 to determine the level of softness.

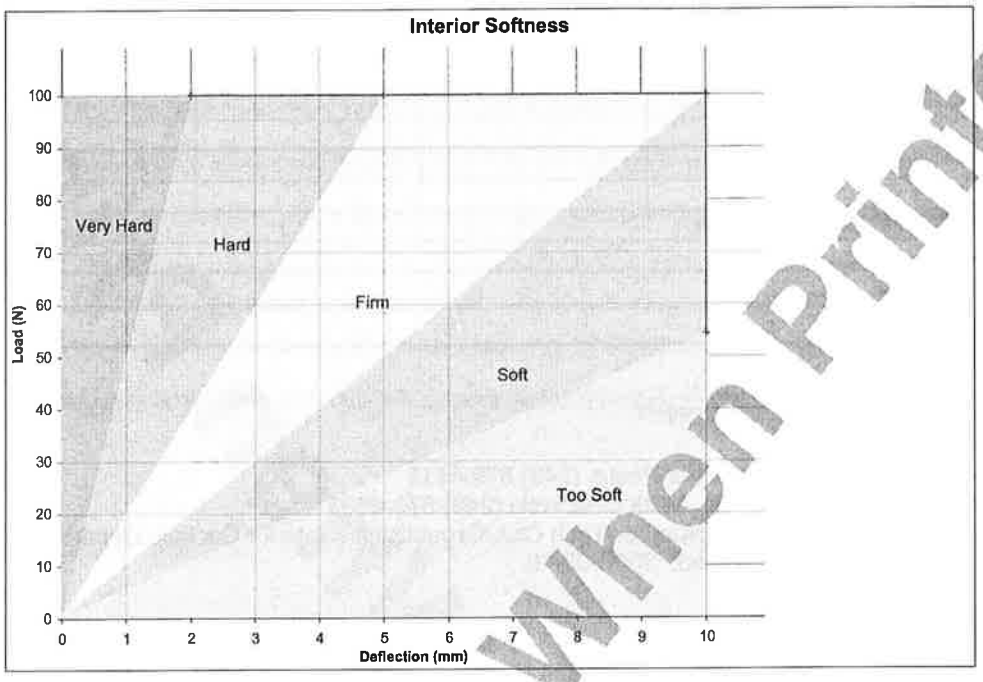

FIGURE 4: FORCE – DEFLECTION CHART TO DETERMINE INTERIOR SOFTNESS

9.0 DEFINITIONS/ABBREVIATIONS/ACRONYMS

ADRESS. An acronym for "Automated Document Retrieval and Engineering Standards System."

10.0 GENERAL INFORMATION

Three asterisks "***" after the section/paragraph header denotes single or multiple technical changes to the section/paragraph. Specific technical changes within a section, subsection, table, or figure may be highlighted in yellow.

Certain important information relative to this Laboratory Procedure has been included in separate standards. To assure the materials submitted meet all of Chrysler requirements, it is mandatory that the requirements in the following standards be met.

CS-9800 - Application of this procedure, the subscription service, and approved sources
CS-9003 - Regulated substances and recyclability

For specific information on this document, please refer to the contact person shown in the "Publication Information" Section of this document. For general information on obtaining Engineering Standards and Laboratory Procedures, see CS-9800 or contact the Engineering Standards Department at engstds@chrysler.com.

11.0 REFERENCES

Chrysler Standards	ASTM Standards	ISO Standards	SAE Standards	Federal Standards
CS-9800				
CS-9003				
Quality and Reliability Documents				
Other Documents				

12.0 PUBLICATION INFORMATION***

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- Removed 75 mm mandrel in Section 2.0.
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