SAE The Engineering Society For Advancing Mobility Land Sea Air and Space®
INTERNATIONAL
400 Commonwealth Drive, Warrendale, PA 15096-0001

SURFACE VEHICLE STANDARD

SAE J1454 | REV. JAN95

Issued 1986-01
Revised 1995-01

Superseding J1454 JAN86

Submitted for recognition as an American National Standard

(R) DYNAMIC DURABILITY TESTING OF SEAT CUSHIONS FOR OFF-ROAD WORK MACHINES

1. ***Scope—***This SAE Standard describes a laboratory test procedure for comparatively evaluating the durability and fatigue life qualities of a complete seat cushion by submitting the seating surface of the cushion to repetitive compressive and rotational loading with a simulated human buttocks.

1.1 Purpose—This document provides a uniform method of dynamically testing the durability of seat cushions on a comparative basis.

2. ***References***

2.1 Applicable Publications—The following publications form a part of this specification to the extent specified herein. The latest issue of SAE publications shall apply.

2.1.1 SAE PUBLICATIONS—Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

SAE J1051—Deflection of Seat Cushions for Off-Road Work Machines
SAE J1163—Determining Operator Seat Location on Off-Road Work Machines

2.1.2 MILITARY PUBLICATION—Available from Standardization Document Order Desk, 700 Robbins Avenue, Building #4, Section D, Philadelphia, PA 19111-5094.

Military Standard CCC-C-419 Type 1

3. ***Definition***

3.1 Test Specimen—A finished upholstered seat cushion assembly, including support structure, in an unused condition (with packaging or protective bag removed). Raw materials such as foam or elastic components used in the manufacture of the product should be cured for a minimum of 96 h at a temperature of 22 °C ± 5 °C before the test is conducted.

4. ***Test Procedure***

4.1 Test Apparatus

4.1.1 A simulated human buttocks (see Figure 1) covered with new untreated No. 10 cotton duck material to Military Standard CCC-C-419 Type 1. Securely attach the cotton duck material with a drawstring or similar means such that there are not wrinkles where the cloth meets the seat cushion (see Figure 2).

QUESTIONS REGARDING THIS DOCUMENT: (724) 772-8512 FAX: (724) 776-0243
TO PLACE A DOCUMENT ORDER; (724) 776-4970 FAX: (724) 776-0790
SAE WEB ADDRESS http://www.sae.org

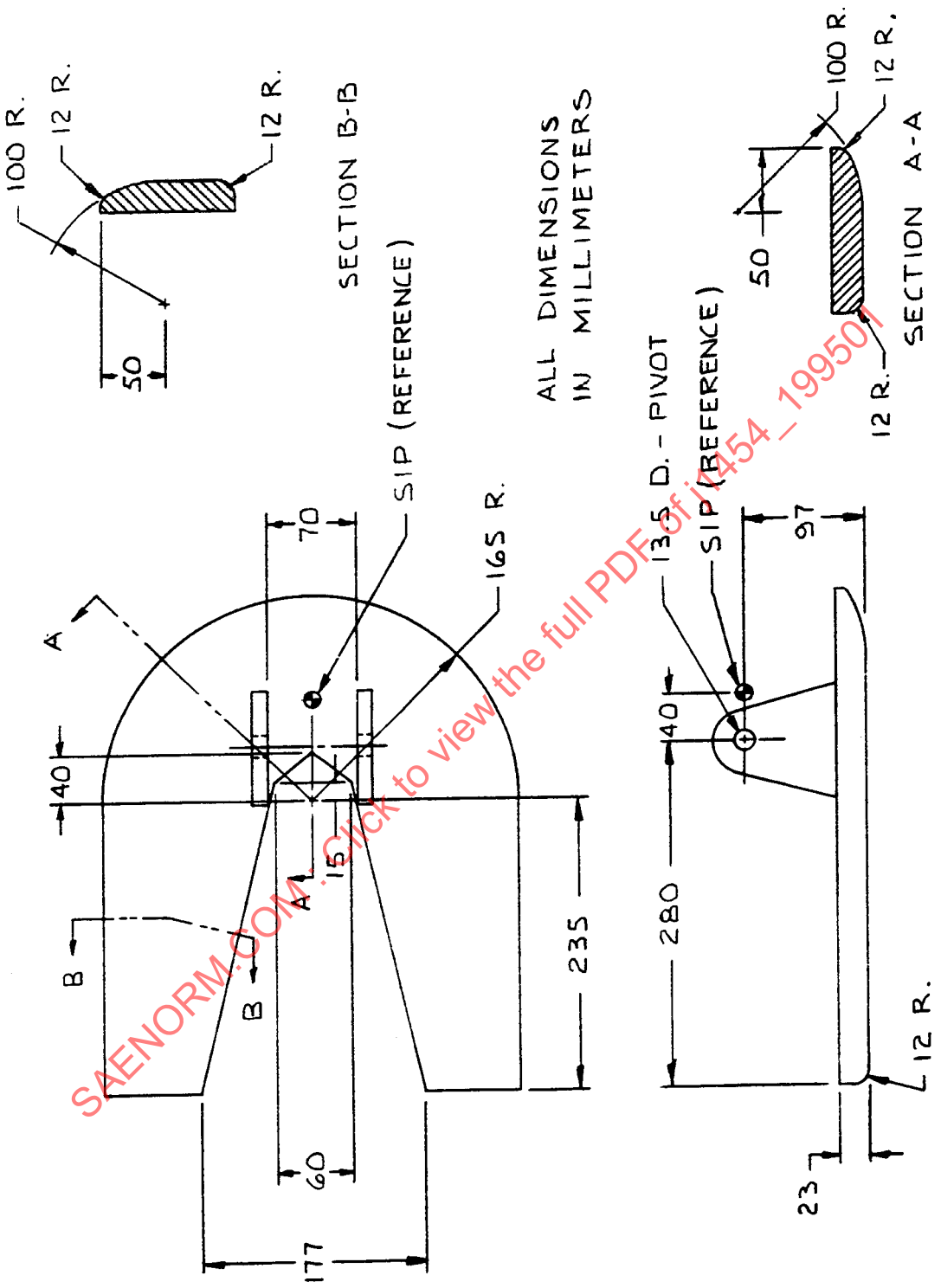

FIGURE 1—SIMULATED HUMAN BUTTOCKS

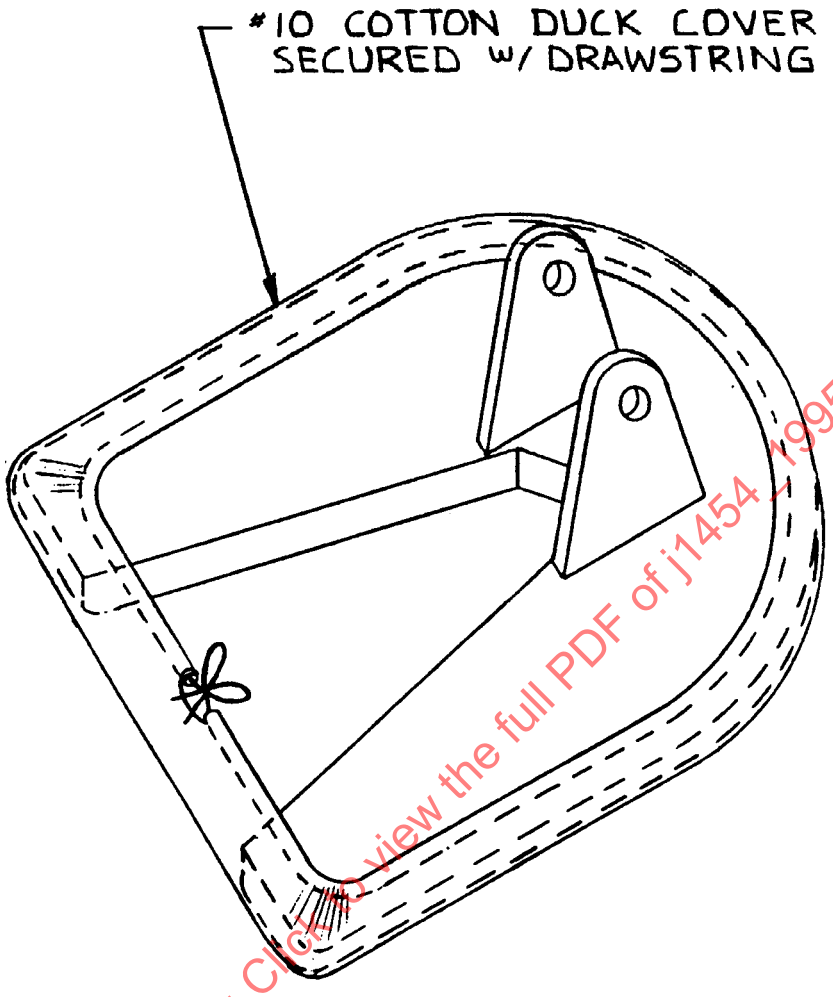

FIGURE 2—EXAMPLE OF SEAT CUSHION

4.1.2 An apparatus capable of securing and providing motion and force to the simulated human buttocks or the seat cushion to achieve the relative movements and applied forces as outlined under procedures in 4.3 and 4.4.

4.2 Condition the test specimen, undeflected and undistorted, at a temperature of 22 °C ± 5 °C for a minimum of 12 h. All subsequent tests should be conducted at this temperature condition unless simulation of extreme conditions is necessary for certain applications.

4.3 Mount the test specimen to the supporting platform in the same position horizontally that it is installed in the seat assembly or machine (see Figure 3). In the case of cushions which have angle adjustments, this position should correspond to the center adjustment position. When no center position is available, use the position corresponding to the nearest adjustment which increases the angle of rearward slope to the seat cushion joint. The specimen should be mounted so that the swivel joint on the simulated buttocks through which the force is applied is centered laterally and 40 mm ahead of the seat index point (SIP), as determined by the procedure in SAE J1163. In the case where a SIP cannot be determined, such as a seat cushion without an accompanying backrest, the simulated buttocks should be centered front to rear on the test specimen. The test specimen should be positioned so that the front to rear centerline coincides with the front to rear centerline of the simulated buttocks when it is in the center position of its rotational travel (see Figure 3) as outlined in 4.4.

4.4 The test apparatus should be adjusted so that there is a total force equal to 638 N including the mass of the simulated buttocks and any of the mechanism that would affect this force on the cushion. This force should remain constant during the entire cushion compression portion of the test. Test at 10 to 12 cpm, using the following sequence, for the desired number of cycles:

a. Apply the 638 N force with the simulated buttocks rotated 30 degrees counterclockwise
b. Rotate 60 degrees clockwise
c. Rotate 60 degrees counterclockwise
d. Raise the simulated buttocks off the cushion

NOTE—The counterclockwise and clockwise rotation order is of no consequence, therefore the second cycle may consist of a clockwise rotation off center, 60 degrees counterclockwise, 60 degrees clockwise, etc.

The duty cycle shall be 70% on the cushion and 30% off the cushion. Some types of cushion covering materials may wear the cotton duck cover rapidly and replacement may be necessary during the test if any of the threads break and a hole appears. Each new test should use a new piece of No. 10 cotton duck cover.

4.5 Data Required

4.5.1 Description of test specimen (manufacturer's name, part number, covering material, and foam specification).

4.5.2 Deviations or special test conditions.

4.5.3 Location of simulated buttocks on test specimen.

4.5.4 Force deflection data per SAE J1051 before and after test.

4.5.5 Description and photos of general condition of cushion assembly and covering material after the desired number of cycles have been completed.

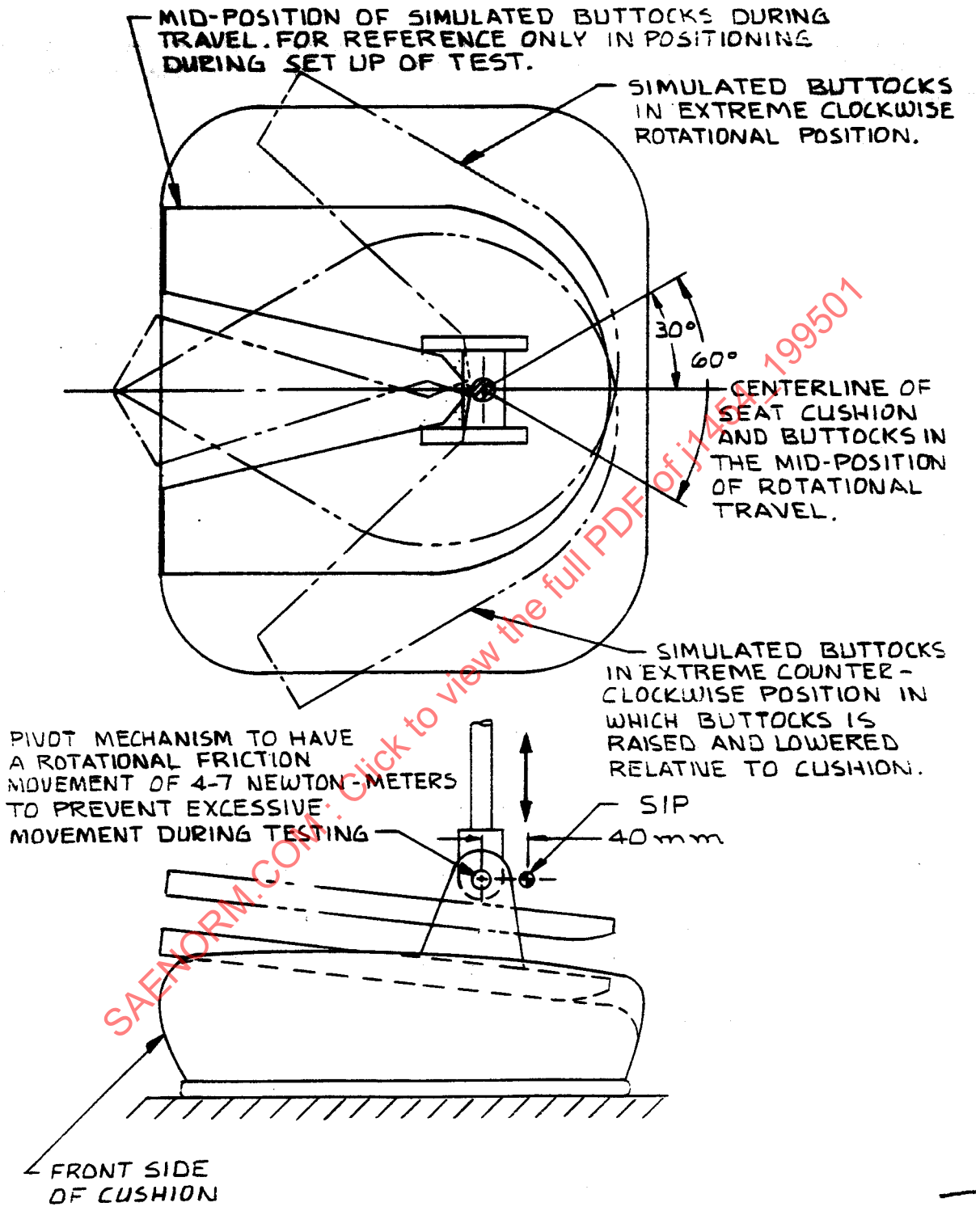

FIGURE 3—MOUNTING OF TEST SPECIMEN