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

SURFACE VEHICLE RECOMMENDED PRACTICE

SAE J175 | REV. JUL96

Issued 1970-07
Revised 1996-07

Superseding J175 JUN88

Submitted for recognition as an American National Standard

(R) WHEELS—IMPACT TEST PROCEDURE—ROAD VEHICLES

1. ***Scope—***The SAE Recommended Practice establishes minimum performance requirements and related uniform laboratory test procedures for evaluating axial (lateral) curb impact collision properties of all wheels intended for use on passenger cars and light trucks. It is equivalent to ISO 7141-1981 with the exception of the Definitions section which cites SAE J393.

2. ***References***

2.1 **Applicable Publications—**The following publications are provided for information purposes only and are not a required part of this document.

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

SAE J393—Nomenclature—Wheels, Hubs, and Rims for Commercial Vehicles

2.2 **Related Publications—**The following publications are provided for information purposes only and are not a required part of this document.

2.2.1 ISO PUBLICATIONS—Available from ANSI, 11 West 42nd Street, New York, NY 10036-8002.

ISO 7141—Road vehicles—Wheels—Impact test procedures
ISO 3911—Wheels/rims—Nomenclature, designation, marking and units of measurement

3. ***Definitions—***See SAE J393.

4. ***Test Procedures***

4.1 **Wheels for Test—**Only fully-processed new wheels which are representative of wheels intended for passenger car and light truck applications shall be used for each test. Tires and wheels used for test should not be used subsequently on a vehicle.

4.2 **Equipment—**The test machine shall be one in which an impact loading is applied to the rim flange of a wheel complete with tire. The wheel shall be mounted with its axis at an angle of 13 degrees ± 1 degree to the vertical so that its highest point is presented to the vertically acting striker. The impacting face of the striker system shall be at least 125 mm wide and at least 375 mm long. (See Figure 1.)

QUESTIONS REGARDING THIS DOCUMENT: (412) 772-8512 FAX: (412) 776-0243
TO PLACE A DOCUMENT ORDER; (412) 776-4970 FAX: (412) 776-0790

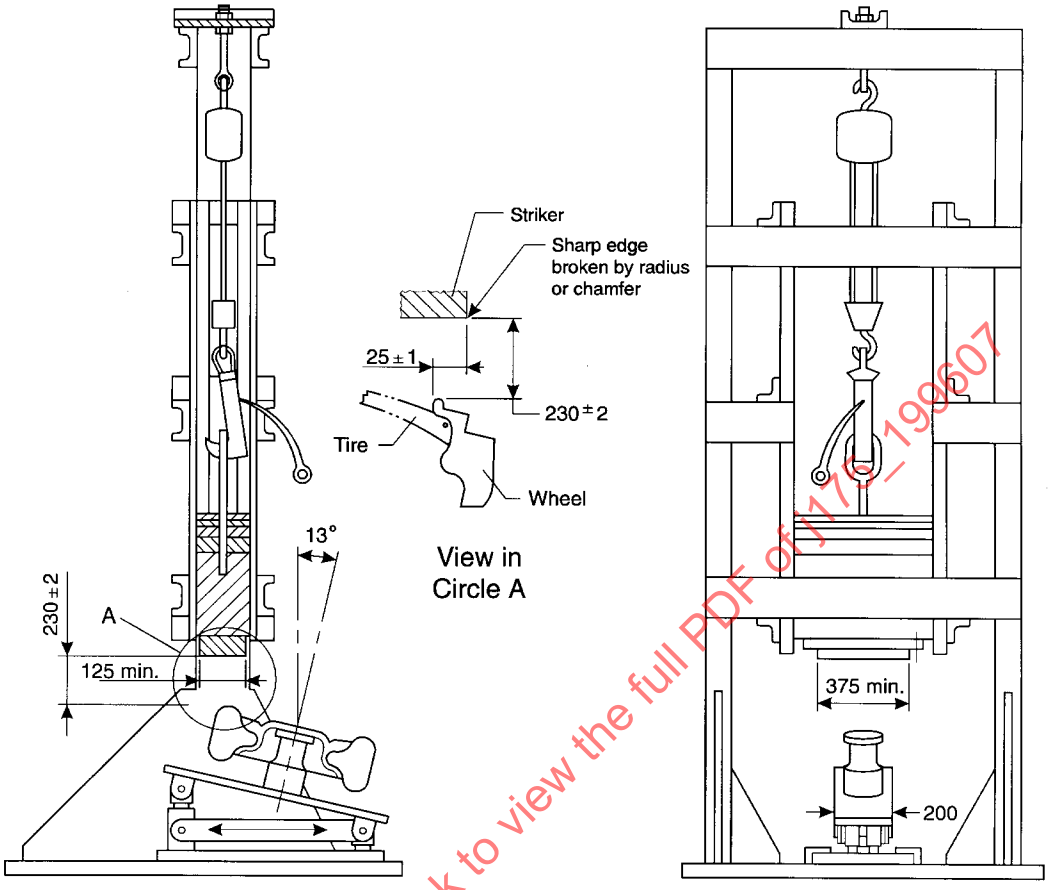

FIGURE 1—IMPACT LOADING TEST MACHINE

The wheel mount fixture dimensions are shown in Figure 2. The width of the support beam is 200 mm. Although the specified material for the beam is steel, high yield strength steel is recommended to prevent deformation. All pivot joints in the wheel mount fixture should be free to rotate. Shoulder bolts are recommended to prevent binding. With the test calibration adapter located at the mid-span of the beam, a vertical mass of 1000 kg shall be applied to the center of the wheel mount as shown in Figure 2. The vertical central deflection of the test fixture shall be 7.5 mm ± 0.75 mm when measured at the center of the beam.

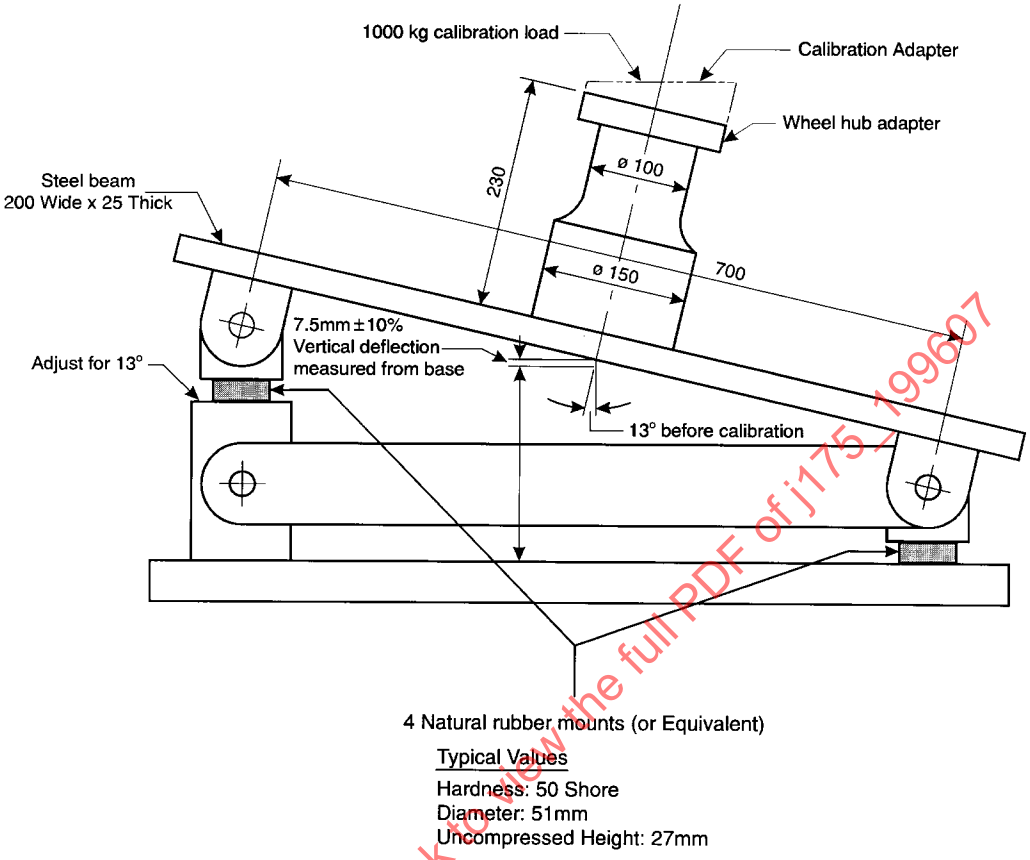

FIGURE 2—APPLICATION OF LOADING TO THE CENTER OF THE WHEEL MOUNT

4.3 Procedure—Adjust the striker mass to the magnitude calculated in 4.3.3. It is necessary to rigidly constrain any weights added to the striker mass so that is acts as one mass. The wheel shall be mounted on the hub fixture by a means dimensionally representative of attachment used on the vehicle. The wheel attachment system shall be manually tightened to 115 N·m ± 7 N·m or the torque recommended by the vehicle or wheel manufacturer.

The tubeless tire selected for the test wheel shall be the smallest nominal section width tire intended for use with the wheel, by the vehicle or wheel manufacturers. The inflation pressure shall be that specified by the vehicle manufacturer; in the absence of such specification, it shall be 200 kPa.

Because the design features of the wheel may vary, a sufficient number of locations on the circumference of the rim shall be tested to ensure that the integrity of the wheel is investigated. A separate wheel shall be used for each test.

The test should be conducted at room temperature (10 to 38 °C).

4.3.1 DROPPING HEIGHT—The dropping height for the striker weight shall be 230 mm ± 2 mm above the highest part of the rim flange.

4.3.2 ALIGNMENT OF STRIKER—The striker shall be over the tire and the edge must overlap the rim flange by 25 mm ± 1 mm.

4.3.3 MAGNITUDE OF STRIKER MASS

$$D = 0.6W + 180 \qquad \text{(Eq. 1)}$$

where

D = mass of striker ±2%, expressed in kilograms;
W = maximum static wheel loading as specified by wheel and/or vehicle manufacturer, expressed in kilograms.

5. Failure Criteria—(See Notes 1 and 2.)

5.1 The failure criteria are:

5.1.1 Visible fracture(s) penetrating through a section of the center member of the wheel assembly.

5.1.2 Separation of the center member from the rim.

5.1.3 Total loss of the air pressure within one minute after impact.

NOTE—Deformation of the wheel assembly, or fractures in the area of the rim section contacted by the face plate of the weight system, do not constitute a failure.

6. Notes

6.1 The change bar (l) located in the left margin is for the convenience of the user in locating areas where technical revisions have been made to the previous issue of the report. An (R) symbol to the left of the document title indicates a complete revision of the report.

PREPARED BY THE SAE PASSENGER CAR WHEEL SUBCOMMITTEE
OF THE SAE WHEEL COMMITTEE