

SURFACE VEHICLE RECOMMENDED PRACTICE

Submitted for recognition as an American National Standard

SAE J328

REV.
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Superseding J328a

(R) WHEELS-PASSENGER CARS-PERFORMANCE REQUIREMENTS AND TEST PROCEDURES

1. SCOPE:

This SAE Recommended Practice provides minimum performance requirements and uniform procedures for fatigue testing of ferrous disc wheels intended for normal highway use on passenger cars, light trucks, and multipurpose passenger vehicles. For procedures and minimum performance requirements for wheels used on medium and heavy trucks, see SAE J267. For wheels used on trailers drawn by passenger cars, light trucks, or multipurpose vehicles, see SAE J1204. Wheels intended for temporary use and nonferrous road wheels are not included in this document.

2. REFERENCES:

SAE J267, Wheels/Rims-Trucks-Test Procedures and Performance Requirements

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

SAE J1204, Wheels-Recreational and Utility Trailer Test Procedures

SAE J1982, Under development

ISO 3911, Wheels/Rims-Nomenclature, Designation, Marking, and Units of Measurement

3. DEFINITIONS:

See Figure 1.

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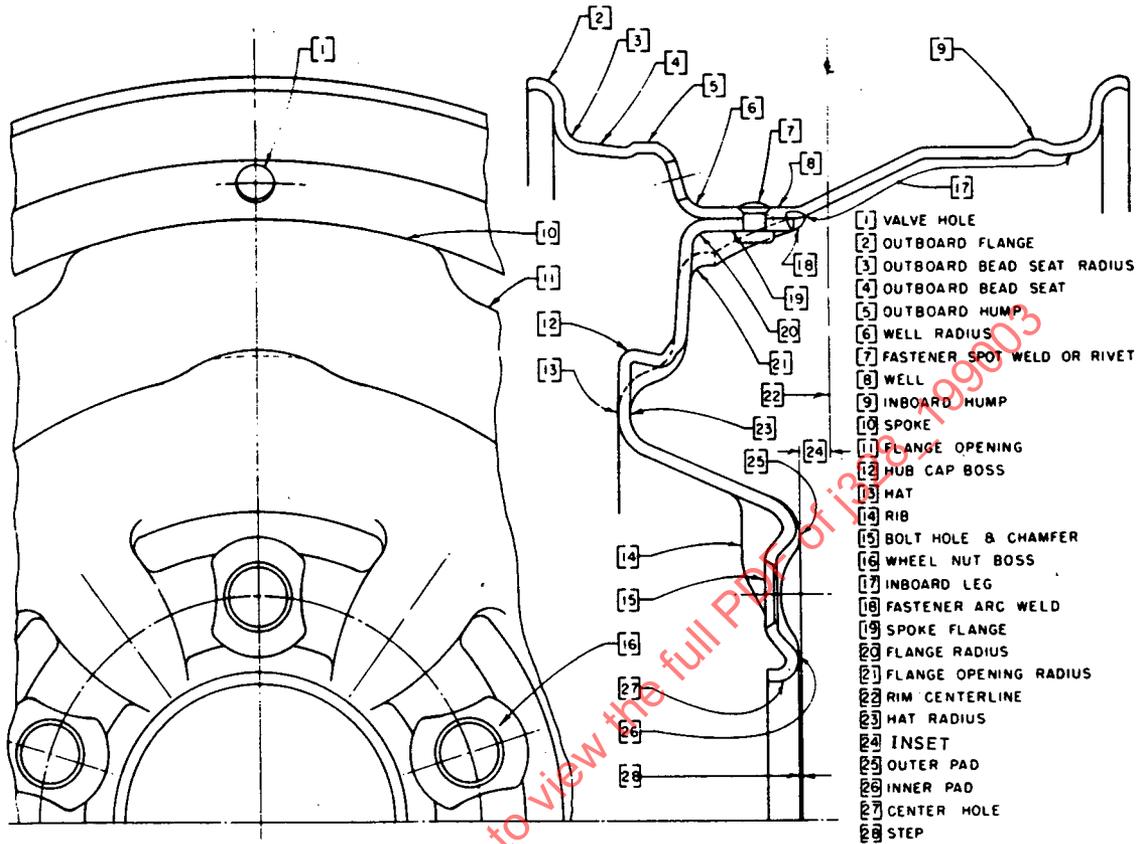


FIGURE 1

4. PERFORMANCE REQUIREMENTS:

The test wheels, when subjected to the test procedures described in Section 5 shall meet the following minimum performance requirements:

4.1 Dynamic Cornering Fatigue:

4.1.1 Minimum Cycles: After being subjected to 18 000 test cycles, there shall be no evidence of failure, as indicated by propagation of a crack existing prior to test, new visible cracks penetrating through a section, or the inability of the wheel to sustain load.

4.1.2 Bending Moment: The bending moment (force X moment arm) to be applied to the test wheel shall be determined as follows:

$$M = W(R_{\mu} + d)S \quad (\text{Eq. 1})$$

where:

- M = bending moment lbf ft (N·m)
- W = 1/2 of the maximum vertical static load on the front or rear axle as specified by the vehicle manufacturer or the load rating of the wheel as specified by the wheel manufacturer lbf (N)

4.1.2 (Continued):

- R = Static loaded radius of the largest tire to be used on the wheel as specified by the vehicle manufacturer and/or wheel manufacturer ft (m)
 μ = coefficient of friction developed between the tire and the road
 $M = 0.7$
d = the inset or outset of the wheel ft (m); use positive sign for inset and negative sign for outset
S = load factor S = 1.6

4.2 Dynamic Radial Fatigue:

- 4.2.1 Minimum Cycles: After being subjected to 400 000 cycles, there shall be no evidence of failure, as indicated by propagation of a crack existing prior to test, new visible cracks penetrating through a section, or the inability of the wheel to sustain load.
- 4.2.2 Radial Load: The radial load to be applied to the wheel shall be determined as follows:

$$F_r = Wk \quad (\text{Eq.2})$$

where:

F_r = radial load: use F_{r1} or F_{r2} whichever is greater as determined by the following formulas:

$$F_{r1} = W_1 k_1 \quad (\text{Eq.3})$$

where:

W_1 = 1/2 of the maximum static load on the front axle
 K_1 = load factor = 2.25
 $F_{r2} = W_2 k_2$

where:

W_2 = 1/2 of the maximum static load on the rear axle
 K_2 = load factor = 2.0

5. TEST PROCEDURES:

5.1 Wheels for Test:

Use only fully processed new wheels, which are representative of wheels intended for the vehicle and ready for road use. Separate wheels are to be used for each test.

5.2 Dynamic Cornering Fatigue Test:

- 5.2.1 Equipment: The test machine shall be one with a driven rotatable device and a means to impart a constant bending moment to a wheel.
- 5.2.2 Procedure: The rim shall be clamped securely to the rotatable device. A rigid load arm shaft with a test adaptor shall be attached to the mounting surface of the wheel using studs and nuts representative of those specified for the wheel. These wheel nuts shall be torqued at the beginning of the test to 85 lbf ft \pm 5 (115 N·m \pm 7). The mating surface of the test adaptor and wheel shall be free of buildup of paint, dirt, wear, or foreign matter. The final clamped position of the wheel to the rotating device without load shall not exceed an eccentricity of 0.010 in (0.25 mm) total indicator reading normal to the shaft axis at the point of loading. The application of the test load will be parallel to a plane through the center of the rim. The loading system should maintain the bending moment within \pm 2.5%.

5.3 Dynamic Radial Fatigue Test

- 5.3.1 Equipment: The test machine shall be one with a driven rotatable drum which presents a smooth surface wider than the loaded test tire section width. The suggested diameter of the drum is 67.23 in (300 rev/mile) [1707.6 mm (187.5 rev/Km)]. The test wheel and tire must provide loading normal to the surface of the drum and in line radially with the center of the test wheel and the drum. The axis of the test wheel and the drum must be parallel. Equipment should maintain the test load within \pm 2.5%.
- 5.3.2 Procedure: Tires selected for this test must be representative of the maximum size and type of tire approved by the vehicle or wheel manufacturer for the wheel under test. The test adaptor, studs and nuts shall be representative of those specified for the wheel. The wheel nuts shall be torqued at the beginning of test to 85 lb ft \pm 5 (115 N·m \pm 7). The recommended cold inflation pressure of the test tire is 65 psi \pm 2 (448 kPa \pm 14). There may be an increase in pressure during test operation. This increase is normal.

The (R) is for the convenience of the user in locating areas where technical revisions have been made to the previous issue of the report. If the symbol is next to the report title, it indicates a complete revision of the report.

RATIONALE:

Not applicable.

RELATIONSHIP OF SAE STANDARD TO ISO STANDARD:

Not applicable.

REFERENCE SECTION

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APPLICATION:

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