



SURFACE VEHICLE RECOMMENDED PRACTICE

J3229™

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Wheels/Rims - Performance Requirements and Test Procedures
Agriculture and Light Construction

RATIONALE

This SAE Recommended Practice provides the minimum performance requirements and uniform laboratory procedures for fatigue testing of ferrous wheels and demountable rims intended for off road use on agricultural and light construction machines.

1. SCOPE

This SAE Recommended Practice provides the minimum performance requirements and uniform laboratory procedures for fatigue testing of ferrous wheels and demountable rims intended primarily for off road use on agricultural machines (e.g., agricultural tractors, harvesters, trailers, and implements) and light construction machines (e.g., wheel loaders, backhoe loaders, dumpers, mobile excavators, and telehandlers). For other wheels intended for normal highway use and temporary use on passenger cars, light trucks, and multipurpose vehicles, refer to SAE J328. For wheels used on trailers drawn by passenger cars, light trucks, or multipurpose vehicles, refer to SAE J1204. For wheels intended for normal highway use on trucks, buses, truck-trailers, and multipurpose vehicles, refer to SAE J267. For bolt together military wheels, refer to SAE J1992. This document does not cover other special application wheels and rims.

2. REFERENCES

2.1 Applicable Publications

The following publications form a part of this specification to the extent specified herein. Unless otherwise indicated, the latest issue of SAE publications shall apply.

2.1.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

SAE J328 Wheels - Passenger Car and Light Truck Performance Requirements and Test Procedures

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

SAE J694 Disc Wheel and Hub or Drum Interface Dimensions – Truck and Bus

SAE J1204 Wheels - Recreational and Utility Trailer Fatigue Test Procedure and Performance Requirements

SAE J1992 Wheels/Rims - Military Vehicles Test Procedures and Performance Requirements

SAE HS 3300 Wheels Standards Manual

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Documents

Document Sharing Hub

2.1.2 Tire and Rim Association Publications

Available from Tire and Rim Association, Inc., 4000 Embassy Parkway, Suite 390, Akron, OH 44333, www.us-tra.org.

Yearbook, The Tire and Rim Association, Inc.

2.2 Related Publications

The following publications are provided for information purposes only and are not a required part of this SAE Technical Report.

2.2.1 OSHA Publications

Available from U.S. Department of Labor/OSHA, 200 Constitution Avenue, Washington, DC 20210, Tel: 800-321-6742, www.osha.gov/pls/publications/pubindex.list.

OSHA Standard 29 CFR Part 1910.177, Servicing of Multi-Piece and Single-Piece Rim Wheels

2.2.2 EUWA Publications

Available from EUWA Operative Office: c/o ALCAR Ruote SA, Via Violino 4 CH-6928 Manno/ Lugano, Switzerland, www.euwa.org.

ES-3.12 Test Requirements for Agricultural Wheels

ES-3.24 Test Requirements for Light Construction Machine Wheels

3. DYNAMIC CORNERING FATIGUE TEST (FOR DISC WHEELS ONLY)

The test wheels, when subject to the following test procedures, shall meet the minimum performance requirement specified in Table 1.

Table 1 - Cornering fatigue test load factors and cycle requirements

Application	Tire Service Speed		Friction Coefficient	Performance Requirement Minimum Cycle Life
Self-Propelled Agricultural Equipment (Fixed Disc Wheel)	A8	40 km/h (25 mph)	0.25	100000
	B	50 km/h (30 mph)	0.30	100000
	D or G	65-90 km/h (40-55 mph)	0.35	100000
Self-Propelled Agricultural Equipment (Adjustable Disc Wheel)	A8	40 km/h (25 mph)	0.25	75000
	B	50 km/h (30 mph)	0.30	75000
	D or G	65-90 km/h (40-55 mph)	0.35	75000
Agricultural Trailer/Implement (All Disc Wheels)	A8	40 km/h (25 mph)	0.25	200000 ⁽¹⁾
	B	50 km/h (30 mph)	0.28	200000 ⁽¹⁾
	D or G	65-90 km/h (40-55 mph)	0.35	200000 ⁽¹⁾
Light Construction Equipment (All Disc Wheels)	Load & Carry Load & Excavating	10-25 km/h (5-15 mph)	0.25	300000

⁽¹⁾ It is permissible to reduce the minimum cycle life by 50% for cyclic loading conditions where the wheel load varies by a factor of 2 or more between laden and unladen conditions and the duty cycle is 50% in a laden condition and 50% in an unladen condition.

3.1 Equipment

Use a test machine that:

- a. Imparts a constant rotating bending moment to the wheel. See Figure 1A or 1B.
- b. Maintains the test load within $\pm 3\%$.
- c. Monitors and measures the deflection of the system.
- d. Has a rigid load arm shaft.

3.2 Procedure

- a. Use a test adapter, studs, and nuts representative of those specified for the wheel.
- b. Verify the mating surfaces of the adapter are free of foreign material or excessive wear.
- c. Attach the wheel to a rigid load arm shaft and test adapter.
- d. Tighten the nuts to the torque recommended by the vehicle or wheel manufacturer. Torque should be checked and reset two to three times during the first 10000 cycles. If cycle life required is greater than 100000 cycles, torque should also be checked after 50000 cycles.
- e. Clamp the rim securely to the test machine.
- f. Adjust the system so that shaft runout is not more than 0.25 mm (0.010 inch) total indicator reading at the point of loading.
- g. The cornering test speed does not affect the life of the wheel and can be adjusted to accommodate the capabilities of the test machine. The corner test speed is measured in revolutions per minute (RPM) or hertz (Hz). Typical test speed is 150 to 300 RPM or 2.5 to 5 Hz.

Cornering Fatigue - 90 Degree Loading Method

Eccentric Loading Mass - Typical Setup

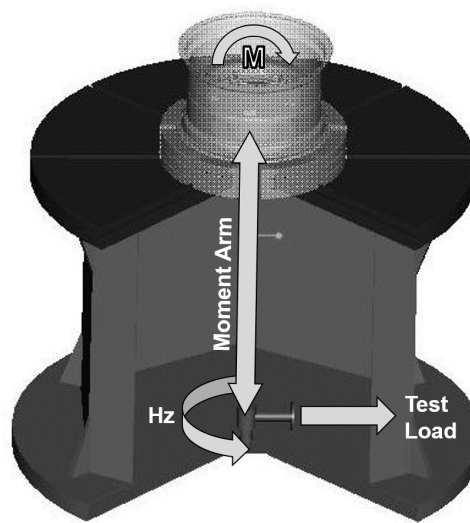


Figure 1A - Hydraulic actuated - typical setup