

SURFACE VEHICLE RECOMMENDED PRACTICE

SAE J1329

CAN-
CELLED
FEB2002

Issued 1989-07
Cancelled 2002-02

Superseding J1329 JUL1989

Minimum Performance Criteria for Braking Systems for Specialized Rubber-Tired, Self-Propelled Underground Mining Machines

- 1. Scope**—This document applies to self-propelled, rubber-tired specialized mining machines, identified in SAE J1116, with a maximum travel speed of 32 km/h and limited to underground applications. Service braking, secondary braking, and parking brake systems are included.
- 1.1 Purpose**—This document specifies braking system performance and test criteria for underground mining machines as defined in the scope. This document is a manufacturer's guideline and not a mine site test procedure.
- 2. References**
 - 2.1 Applicable Publications**—The following publications form a part of the specification to the extent specified herein. Unless otherwise indicated the latest revision of SAE publications shall apply.
 - 2.1.1 SAE PUBLICATIONS**—Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

SAE J1057 SEP88—Identification Terminology of Earthmoving Machines
SAE J1116 JUN86—Categories of Off-Road Self-Propelled Work Machines
 - 2.1.2 ISO PUBLICATIONS**—Available from ANSI, 11 West 42nd Street, New York, NY 10036-8002.

ISO 3450 OCT85—Earthmoving Machinery—Wheeled Machines—Braking System Performance Requirements and Test Procedures
ISO 6165 DEC87—Earthmoving Machinery—Basic Types—Vocabulary
- 3. Definitions**
 - 3.1 Specialized Rubber-Tired Mining Machines**—Rubber-tired underground mining machines as defined in SAE J1116.
 - 3.2 Braking Systems**—All the elements that participate in stopping and holding the machine. Such systems consist of a control, means of power transmission, and the brake.
 - 3.2.1 SERVICE BRAKE SYSTEM**—The primary system used for stopping and holding the machine.
 - 3.2.2 SECONDARY BRAKE SYSTEM**—The system used for stopping the machine in the event of any single failure in the service brake system.

SAE Technical Standards Board Rules provide that: "This report is published by SAE to advance the state of technical and engineering sciences. The use of this report is entirely voluntary, and its applicability and suitability for any particular use, including any patent infringement arising therefrom, is the sole responsibility of the user."

SAE reviews each technical report at least every five years at which time it may be reaffirmed, revised, or cancelled. SAE invites your written comments and suggestions.

TO PLACE A DOCUMENT ORDER: +1 (724) 776-4970 FAX: +1 (724) 776-0790
SAE WEB ADDRESS <http://www.sae.org>

3.2.3 **PARKING BRAKE SYSTEM**—The system used to hold a stopped machine in a stationary position.

3.2.4 **BRAKE SYSTEM COMPONENTS**

3.2.4.1 **Control**—The part directly activated by the operator to cause a force to be transmitted to the brake(s).

3.2.4.2 **Power Transmission Means**—All of the elements between the control and the brake(s), which connect(s) them(it) functionally.

3.2.4.3 **Brake(s)**—The component that directly applies a force to oppose movement of the machine.

3.2.4.4 **Retarder**—An energy absorption device normally used to control machine speed while descending grades.

3.3 **Common Component**—A component that performs a function in two or more braking systems.

3.4 **Machine Mass**—The operating mass of the machine, which includes the heaviest combination of equipment and payload approved by the manufacturer of the machine. Units requiring an operator shall include an operator weight of 75 kg. The machine shall be fully fueled and serviced.

3.5 **Stopping Distance**—The distance traveled by the machine from the point on the test course where the machine brake control actuation begins to the point where the machine is fully stopped.

3.6 **Mean Deceleration**—The average rate of change of velocity from the instant the brake control actuation begins until a full stop is achieved. It may be determined from the formula:

$$a = (V^2 / (2)) / L \quad (\text{Eq. 1})$$

where:

a = mean deceleration in m/s²

V = velocity in m/s of the machine immediately prior to brake control actuation

L = stopping distance in meters

3.7 **Burnish**—A procedure to condition the frictional surfaces of the machine brake(s).

3.8 **Brake System Pressure**—The gas or hydraulic pressure available at the brake mechanism.

3.9 **Test Course**—The surface the test is conducted on.

3.10 **Cold Brakes**—The brakes shall be considered cold when they have not been used for at least 1 h, other than in preparing for tests per 6.9, or have been cooled to 100 °C, or less, when measured on the brake disc or the outside of the brake drum.

4. Instrumentation

4.1 A means to measure and record test parameters within the specified accuracy.

PARAMETER	INSTRUMENT ACCURACY
Braking system pressure	±3.0%
Machine speed	±3.0%
Machine mass	±2.5%
Stopping distance	±1.0%
Brake control actuating force	±3.0%
Grade	±1.0%

5. General Brake Requirements

5.1 **Required Braking Systems**—All machines shall be equipped with the following:

5.1.1 A service braking system.

5.1.2 A secondary braking system.

5.1.3 A parking brake system.

5.2 **Common Components**—The braking systems may use common components; however, in the event of a failure of any single component, the braking systems shall provide machine stopping capability meeting the secondary braking system performance requirements specified in Table 1.

5.3 **Service Braking System**—All machines shall meet the service braking performance requirements specified in Table 1 (see 7.6). All machines shall have either a driveline brake or a minimum of one braked wheel on each side of the vehicle.

5.4 **Secondary Braking System**—All machines shall meet the secondary braking performance requirements (see 7.6). The secondary braking system shall be automatically applied whenever the machine has been de-energized or shut down by any means.

5.4.1 Automatic application of the secondary braking system is not required of machines that travel less than 4.0 km/h.

5.4.2 On machines equipped with a panic bar, the secondary braking system shall automatically apply when the panic bar is activated.

5.5 **Parking Brake System**—The parking brake shall be applied automatically whenever the machine has been: (1) stopped and de-energized or (2) shut down by any means. The parking brake shall be capable of being manually applied without shutting down the machine. After being applied, this system shall not be dependent on an exhaustible energy source. The parking brake system may use common components with other braking systems provided the requirements of 8.5.2 and 8.5.3 are met.

5.5.1 Automatic application of the parking brake system is not required of machines that travel less than 4.0 km/h.

5.5.2 A means shall be provided to release the parking system from the operator's station to allow intentional movement of the machine without supplying power to the machine. The system shall be arranged so that it cannot be released unless immediate reapplication can be made from the operator's station.