



SURFACE VEHICLE RECOMMENDED PRACTICE

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(R) Tire Pressure Systems - Management (CTIS) Type
for Medium- and Heavy-Duty Highway Vehicles

RATIONALE

This document was reviewed and has been revised as part of the SAE Five-Year Review process.

Updates (including corrections and clarifications) have been made to the scope and Sections 2, 5, 6, and 7.

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Documents

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1. SCOPE

This SAE Recommended Practice defines the system and component functions, measurement metrics, and testing methodologies for evaluating the functionality and performance of ground vehicle central tire inflation systems (CTIS), also known as tire pressure management systems or tire pressure control systems (TPCS). Systems of this type allow the driver to select the operational tire pressure set point (TPSP) based on vehicle load and surface type (highway, off-highway, off-road, etc.) and maintain the inflation pressure to the vehicle specified level.

These systems are recommended to address all serviceable tires as originally installed on a vehicle by the OEM and/or specialty vehicle manufacturer, and for the aftermarket (including replacement or spare parts) are recommended (but optional) to address all tire/rim combinations installed after initial vehicle sale or in-use dates.

Systems for use by military and some other very rigorous off-road applications require such extreme performance requirements, particularly at very high and low temperature and other combat-based extremes that such applications may fall outside the recommended parameters of the subject document. In those cases, it is the responsibility of the procuring customer, vehicle OEM, and applicable component(s) OEM to determine what compromises might be required, and the suitability of design and performance solutions that may be outside of those recommended here.

This document is applicable to all axle and all wheel combinations for the following vehicle types, but does not preclude its use on other vehicle types—single unit powered vehicles exceeding 7257 kg (16000 U.S. pounds) gross vehicle weight rating (GVWR) and multi-unit vehicle combinations, up to three towed units, which use an SAE J560 connector for power and/or communication, or equivalent successor connector technology. For combination vehicles including two or more trailers, the dolly axles are also included. The included vehicles can be newly manufactured vehicles or existing vehicles, fitted with air or hydraulic braking systems.

SPECIAL NOTE: Equipment known as “dual tire equalizers” are commonly used with this category of vehicles. When installing a CTIS system, dual tire equalizers systems are not recommended as they run counter to the purpose of the management system.

NOTE: The following systems are not being addressed in this edition of the subject document:

1. Tire pressure monitoring systems: These systems have been addressed under SAE J2848-1.
2. Tire pressure maintenance systems: These systems have been addressed under SAE J2848-2.

1.1 Purpose

The installed systems for the management of tire inflation pressure defined herein are on-board vehicle systems only. The management type systems described herein may be controlled mechanically, electronically, and/or a combination of both, and should include sensing, restoring, and indicating/communicating, and recording (when specified by the OEM or user) capabilities. The design approach taken is expected to support the purpose and performance objectives of a management type system, and to function within the intended operating environment and design configuration of the vehicle itself.

Tire pressure systems of the management type (CTIS) are intended to:

1. Allow the driver, or an alternative control system, to select the tire pressure set point (TPSP) based on the operational load, speed, terrain, and conditions, within the defined constraints.
2. Maintain the operational TPSP level for the typical range of ambient conditions.
3. Return all tire/wheel assemblies to the vehicle's SSP level upon returning to highway conditions, and to maintain this specified pressure level within the acceptable operating pressure range (AOPR).
4. Provide the driver with indications of system malfunctions and uncorrected pressure levels.
5. Provide the driver with indications of overspeed conditions and automatically inflate tires to match operating conditions.

2. REFERENCES

2.1 Applicable Documents

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 J560	Primary and Auxiliary Seven Conductor Electrical Connector for Truck-Trailer Jumper Cable
SAE J1455	Recommended Environmental Practices for Electronic Equipment Design in Heavy-Duty Vehicle Applications
SAE J2721	Recommended Corrosion Test Methods for Commercial Vehicle Components
SAE J2848-1	Tire Pressure Monitoring Systems - for Medium and Heavy Duty Highway Vehicles
SAE J2848-2	Tire Pressure Systems - Maintenance (ATIS) Type for Medium and Heavy Duty Highway Vehicles

2.1.2 ATA Publications

Available from American Trucking Associations Headquarters, 950 North Glebe Rd., Suite 210, Arlington, VA 22203-4181, Tel: 703-838-1700, www.truckline.com.

ATA/TMC RP-235A	Guidelines for Tire Inflation Pressure Maintenance (2008)
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2.1.3 Code of Federal Regulations (CFR) Publications

Available from the United States Government Printing Office, 732 North Capitol Street, NW, Washington, DC 20401, Tel: 202-512-1800, www.gpo.gov.

49 CFR Part 393	Federal Motor Carrier Safety Administration - Parts and Accessories Necessary for Safe Operation
49 CFR Part 571	Federal Motor Vehicle Safety Standards
FMVSS 121	Air Brake Systems

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 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 J1211	Handbook for Robustness Validation of Automotive Electrical/ Electronic Modules
SAE J1609	Air Reservoir Capacity Performance Guide - Trucks and Buses
SAE J1939	Serial Control and Communications Heavy Duty Vehicle Network - Top Level Document
SAE J2334	Laboratory Cyclic Corrosion Test
SAE J2402	Road Vehicles - Symbols for Controls, Indicators, and Tell-Tales

2.2.2 ASTM Publications

Available from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, www.astm.org.

ASTM B117-09	Standard Practice for Operating Salt Spray (Fog) Apparatus
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2.2.3 Code of Federal Regulations (CFR) Publications

Available from the United States Government Printing Office, 732 North Capitol Street, NW, Washington, DC 20401, Tel: 202-512-1800, www.gpo.gov.

47 CFR Part 15	Telecommunications - Federal Communications Commission - Radio Frequency Devices
FMVSS 101	Controls and Displays
FMVSS 120	Tire Selection and Rims - Tire Selection and Rims for Motor Vehicles with a GVWR of more than 4,536 kilograms (10,000 pounds)

2.2.4 FMCSA Publications

Available from Federal Motor Carrier Safety Administration, United States Department of Transportation, 1200 New Jersey Avenue - SE, Washington, DC 20590, Tel: 1-800-832-5660, www.fmcsa.dot.gov.

Commercial Vehicle Tire Condition Sensors (December 2003)

Tire Pressure Monitoring and Maintenance Systems Performance Report (January 2007)

2.2.5 Tire and Rim Association Publications

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

Tire and Rim Yearbook