



AEROSPACE RECOMMENDED PRACTICE

ARP6137™

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Superseding ARP6137

Functional, Performance, and Safety Guidelines for Tire Pressure Monitoring Systems
(TPMS) for Aircraft

RATIONALE

This document has been revised:

- To update recommended practice for the design, development, and testing of tire pressure monitoring systems installed on an aircraft.
- To make the terminology used in this document consistent with ARP5265.
- To update the regulatory authority requirements and guidance material.

FOREWORD

A Tire Pressure Monitoring System (TPMS) is a means to electronically measure and report the current tire pressure and sometimes the tire gas temperature.

The system should visually indicate the tire inflation pressure status.

Some systems are capable of transmitting the information to the flight deck while other systems are for use on the ground only.

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1. SCOPE

This SAE Aerospace Recommended Practice (ARP) establishes the overall component and system function guidelines and minimum performance levels for a TPMS. These guidelines include, but are not limited to:

- a. Design recommendations for system components, which:
 1. Monitor tire inflation
 2. Are located in/on the tire/wheel assembly, landing gear axle, and/or aircraft avionics compartment
- b. Recommended performance and safety guidelines for a TPMS.

2. REFERENCES

2.1 Applicable Documents

The following publications form a part of this document to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order. In the event of conflict between the text of this document and references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

2.1.1 SAE Publications

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

AIR5699	A Guide for the Damaging Effects of Tire and Wheel Failures
ARP4102/3	Flight Deck Tire Pressure Monitoring System (TPMS)
ARP4102/4	Flight Deck Alerting System (FAS)
ARP4754	Guidelines for Development of Civil Aircraft and Systems
ARP4761	Guidelines for Conducting The Safety Assessment Process on Civil Aircraft, Systems, and Equipment
ARP5265	Minimum Operational and Maintenance Responsibilities for Aircraft Tire Usage

2.1.2 FAA Publications

Available from Federal Aviation Administration, 800 Independence Avenue SW, Washington, DC 20591, Tel: 866-835-5322, www.faa.gov.

AC 20-97B	Aircraft Tire Maintenance and Operational Practices
TSO-C135	Transport Airplane Wheels and Wheel and Brake Assemblies
TSO -C142b	Non-Rechargeable Lithium Cells and Batteries
TSO-C179b	Rechargeable Lithium Batteries and Battery Systems

2.1.3 EASA Publications

Available from European Union Aviation Safety Agency, Konrad-Adenauer-Ufer 3, D-50668 Cologne, Germany, Tel: +49 221 8999 000, www.easa.europa.eu.

AMC 25.733(f)	Tyre Inflation Pressure Check
CS 26.201	Tyre Inflation Pressure
ETSO-C135	Transport Aeroplane Wheels and Wheel and Brake Assemblies
ETSO-C142b	Non-Rechargeable Lithium Cells and Batteries
ETSO-C179b	Rechargeable Lithium Batteries and Battery Systems

2.1.4 RTCA Publications

Available from RTCA, Inc., 1150 18th Street NW, Suite 910, Washington, DC 20036, Tel: 202-833-9339, www.rtca.org.

RTCA DO-160	Environmental Conditions and Test Procedures for Airborne Equipment
RTCA DO-227	Minimum Operational Performance Standards (MOPS) for Non-Rechargeable Lithium Batteries
RTCA DO-311	Minimum Operational Performance Standards for Rechargeable Lithium Batteries and Battery Systems

2.1.5 U.S. Government Publications

Copies of these documents are available online at <https://quicksearch.dla.mil>.

MIL-STD-461E	Requirements for the Control of Electromagnetic Interference Characteristics of Subsystems and Equipment
MIL-STD-464C	Electromagnetic Environmental Effects Requirements for Systems
MIL-STD-810G	Department of Defense Test Method Standard, Environmental Engineering Considerations and Laboratory Tests
MIL-STD-1472	Human Engineering

2.1.6 Other Publications

The Tire and Rim Association (TRA) Aircraft Tire Year Book and Other Publications

2.2 Definitions

COLD INFLATION PRESSURE: This is the cold pressure of the tire for which the temperature of the contained gas has been conditioned to the local ambient conditions for at least 3 hours.

FUNCTIONALITY: This is the operation within the parameters as defined by the specification of the device under test.

MAXIMUM AIRCRAFT WEIGHT: The value specified by the aircraft manufacturer as the maximum weight of the aircraft.

MINIMUM THRESHOLD PRESSURE: The minimum pressure is the tire pressure level below which the TPMS will annunciate a fault to indicate a low tire pressure condition.

TIRE PLACARD: A placard permanently affixed to the aircraft.

NOTE 1: The placard displays, among other information, the aircraft manufacturer's recommended cold tire inflation pressure.

NOTE 2: If a tire placard is not provided, the information should be provided in the Aircraft Maintenance Manuals (AMMs).

TIRE PRESSURE MONITORING SYSTEM (TPMS): This is a means to remotely measure and report the current tire pressure. It may also directly measure the temperature of the gas in the tire or the temperature where the sensor interfaces with the wheel.

NOTE: Some systems are capable of transmitting the information to the flight deck while other systems are for use on the ground only.

SPECIFIED SERVICE PRESSURE (SSP): This is the tire inflation pressure target defined by the airframe manufacturer, specific to an aircraft model and gross weight, as read on a pressure gauge in any ambient temperature.

NOTE: This is always a "cold" pressure value.

OPERATIONAL SERVICE PRESSURE (OSP): This is the expected tire inflation pressure, as read on a pressure gauge, influenced by thermal conditions (e.g., brake heating or rolling effects) when referenced from the SSP.

UNDERINFLATED TIRE: A pneumatic tire that is 10% or more under SSP.

2.3 Abbreviations

AC	Advisory Circular
AMC	Acceptable Means of Compliance
AMM	Aircraft Maintenance Manual
ASIC	Application Specific Integrated Circuit
BIT	Built-in Test
CAS	Crew Alerting System
DAL	Development Assurance Level
DO	Document
DUT	Device Under Test
EASA	European Union Aviation Safety Agency
ETSO	European Technical Standard Order
FAA	Federal Aviation Administration
FDAL	Functional Development Assurance Level
HMI	Human Machine Interface
IDAL	Item Development Assurance Level
LRU	Line Replaceable Unit