



AEROSPACE RECOMMENDED PRACTICE

ARP6812™

Issued

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Aircraft Brake Temperature Monitoring

RATIONALE

There is a need for a document to provide additional recommendations for future brake temperature monitoring systems and equipment when aircraft brake temperatures and a dispatch indication are required. This is because the previous document covering Aircraft Brake Temperature Monitoring Systems (AS1145) has been stabilized. This ARP document meets this need.

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Documents

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1. SCOPE

This SAE Aerospace Recommended Practice (ARP) provides recommendations for the function, design, construction, and testing of an on-aircraft Brake Temperature Monitoring System (BTMS), sometimes referred to as a Brake Temperature Indication System (BTIS).

NOTE: This ARP does not address:

- Cockpit ergonomics and Aircraft operating procedures.
- Various handheld methods of temperature sensing or readouts, as these are not associated with transport aircraft during normal operation.
- Temperature sensitive paints as a means to indicate exceedance of a landing gear axle temperature threshold due to brake temperature.

1.1 Purpose

The recommendations in this ARP are intended to be incorporated in the aircraft and/or systems/equipment specifications.

2. 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 RTCA Publications

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

DO-160	Environmental Conditions and Test Procedures for Airborne Equipment
DO-178	Software Considerations in Airborne Systems and Equipment Certification
DO-254	Design Assurance Guidance for Airborne Electronic Hardware

2.2 U.S. Government Publications

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

MIL-DTL-38999	General Specification for Connectors, Electrical, Circular, Miniature, High Density, Quick Disconnect (Bayonet, Threaded, and Breech Coupling), Environment Resistant, Removable Crimp and Hermetic Solder Contacts
MIL-STD-810	Environmental Engineering Considerations and Laboratory Tests

2.3 Other Standard Publications

ASTM E230	Standard Specification for Temperature-Electromotive Force (emf) Tables for Standardized Thermocouples Available at https://www.astm.org/Standard/standards-and-publications.html
IEC 60584	EMF specifications and tolerances Available at https://webstore.iec.ch/

2.4 Related Publications

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

2.4.1 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.

ARP4102 Flight Deck Panels, Controls, and Displays

ARP4102/4 Flight Deck Alerting System (FAS)

ARP1870 Aerospace Systems Electrical Bonding and Grounding for Electromagnetic Compatibility and Safety

3. PERFORMANCE RECOMMENDATIONS

3.1 General

The primary purpose of the BTMS is to provide brake temperature information to the crew in the cockpit. The brake temperature sensor is located within the brake assembly but usually not in direct contact with the heat sink as it is impractical to mount the sensor on the heat sink itself. The Brake Temperature Sensor (BTS) is typically installed on the piston or actuator plate housing and senses the temperature of the inside of the torque plate assembly as shown in Figure 1.

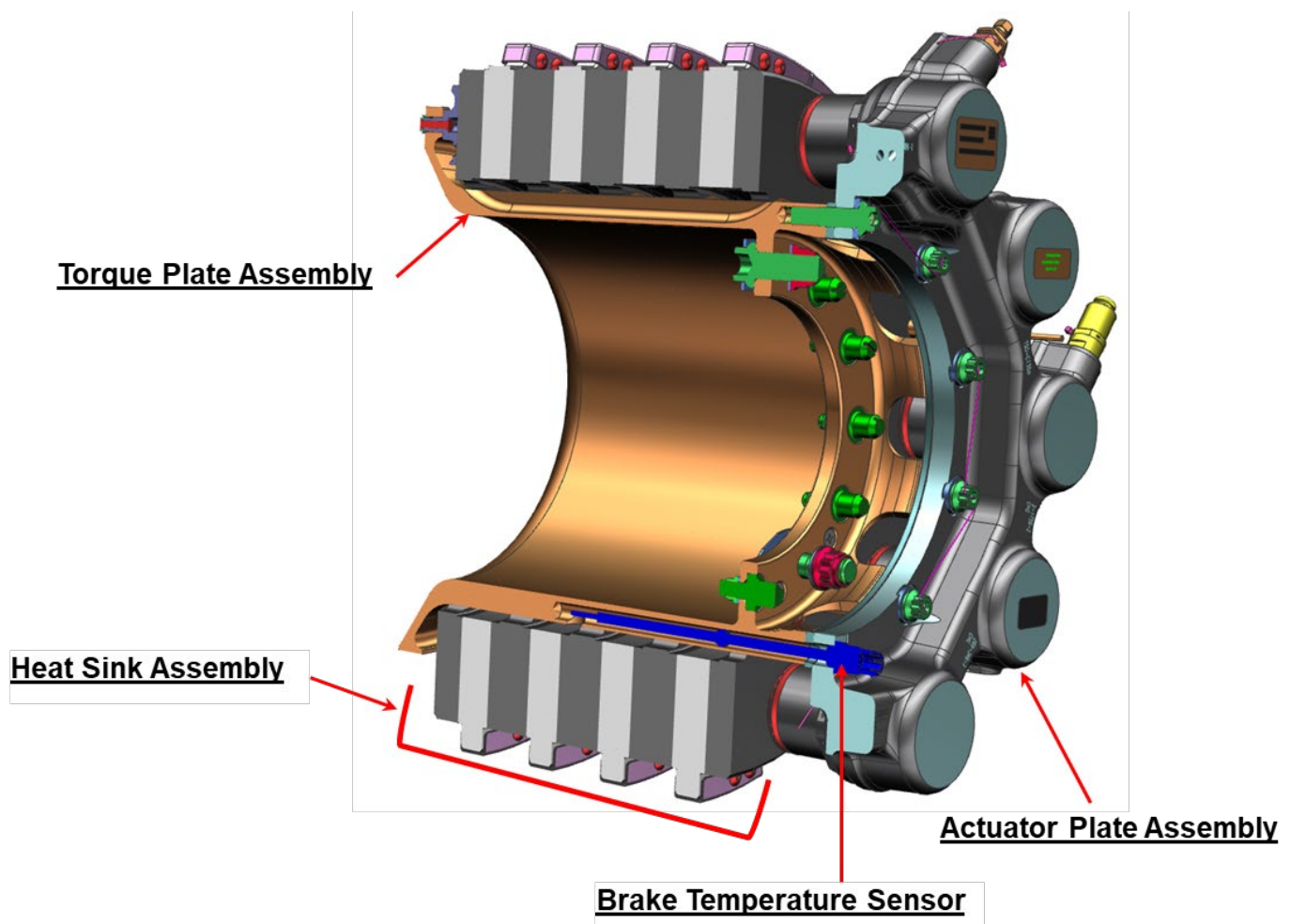


Figure 1 - Typical carbon brake assembly

A typical BTS Line Replaceable Unit (LRU) is shown in Figure 2:



Figure 2 - Typical BTS thermocouple LRU

A consequence of the BTS sensing location is that the temperature measured is only an approximation of the heat sink temperature and its peak temperature can lag by 5 to 10 minutes after landing. Depending on the design and placement of the BTS as well as the airplane and brake system sizing, lag times can increase up to 20 minutes. An example of a heatsink (R1) and BTS (BTMS) temperature profiles after landing is shown in Figure 3: