

AEROSPACE INFORMATION REPORT

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SAE AIR1963

REV.
A

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Superseding AIR1963

Cockpit Information Required for Helicopter Turbine Engine Operation and Maintenance

FOREWORD

Changes in this revision are format/editorial only.

1. SCOPE:

This SAE Aerospace Information Report (AIR) identifies Propulsion Engineer's recommendations for the instrumentation that is required for the safe operation and maintenance of turbine engines as installed in helicopters. It should be used as a guide for cockpit layout, as well as a reference for maintenance considerations throughout the propulsion area. Propulsion instruments should receive attention early in the design phase of the helicopter. Maintenance and diagnostics recorders are not considered within the scope of this document. (See ARP1587, "Aircraft Gas Turbine Engine Monitoring System Guide".)

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 SAE Publications:

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

ARP1217 Instrumentation Requirements for Turboshaft Engine Performance Measurement
ARP1587 Aircraft Gas Turbine Engine Monitoring System Guide

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2.2 FAR Publications:

Available from Federal Aviation Administration, 800 Independence Avenue, SW, Washington, DC 20591.

FAR 29 Airworthiness Standards: "Transport Category" and "Rotorcraft"

3. RECOMMEND INSTRUMENTS:

Discussion:

3.1 Measured Gas Temperature:

This instrument may be analog and/or analog digital. Normally this instrument has a scale from 100 to 1000 °C or higher. It has coded on it the maximum operating temperature of the hot gas in the engine for the various modes of operation (i.e., starting temperature allowables, maximum short time temperature allowable, continuous temperature allowable, etc.). It may be advantageous to expand the scale in the higher region of operation to improve readability and/or accuracy.

3.2 Engine Torque:

Engine torque indication is extremely important to the pilot for safe operation of the helicopter drive train.

It is the only direct measurement of the power output (when used in conjunction with shaft speed) of the engine and it is used for engine thermodynamic health monitoring as well as drive train loading.

3.3 Gas Producer Speed Indicator:

This instrument also may be analog and/or analog digital. Its normal scale is from 0 to 110%. It is used by the pilot to monitor speed of the compressor rotor and maintain the operation of the engine within its approved limitations.

3.4 Power Turbine Speed:

The power turbine speed in some cases is not provided and the helicopter rotor speed is utilized in lieu of it. It can be used by the pilot to indicate function of the drive train freewheeling unit or as a backup in case of failure of the helicopter rotor speed indication. It may also be used to check the power turbine overspeed protection system.

3.5 Engine Oil Temperature:

This parameter is normally used to indicate proper functioning of the oil temperature control system. Loss of cooling capability is usually obvious to the pilot; however, in many applications (especially civil), a high temperature warning device is provided. In some cases, abnormal increases indicate that a failure is in progress or has already occurred.