

**Overspeed Warning Instrument
(Turbine Powered Subsonic Aircraft)**

FOREWORD

This document has been declared "NONCURRENT". It is recommended, therefore, that this document not be specified for new designs. "NONCURRENT" refers to those documents which have previously been widely referenced and may continue to be required on some existing designs. "NONCURRENT" documents are available from SAE upon request.

1. PURPOSE:

This Aerospace Recommended Practice establishes performance standards for overspeed warning instruments primarily for use with turbine powered subsonic transport aircraft, the operation of which may subject the instruments to the environmental conditions specified in paragraph 3.4.

2. SCOPE:

This ARP covers an electro-mechanical pneumatic device which is calibrated to provide control contacts that can be made to operate a warning device whenever the indicated airspeed (IAS) reaches a maximum value as defined by the operating limit speed curve for the specific model aircraft.

3. GENERAL REQUIREMENTS:

3.1 Materials and Workmanship:

3.1.1 Materials: Materials should be of a quality which experience and/or tests have demonstrated to be suitable and dependable for use in aircraft instruments.

3.1.2 Workmanship: Workmanship should be consistent with high-grade aircraft instrument manufacturing practice.

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.

Copyright © 2008 SAE International

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of SAE.

TO PLACE A DOCUMENT ORDER: Tel: 877-606-7323 (inside USA and Canada)
Tel: 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: CustomerService@sae.org
http://www.sae.org

SAE WEB ADDRESS:

3.2 Power Variation:

The instrument should function properly with $\pm 15\%$ variation in d-c voltage and/or $\pm 10\%$ variation in a-c voltage and $\pm 5\%$ variation in frequency.

3.3 Electrical Circuit:

The electrical circuit should be such that, should the aircraft exceed the maximum allowable airspeed, the external control circuit should be activated.

3.4 Altitude and Differential Pressures:

Altitude pressure values should be in accordance with those specified in U.S. Standard Atmosphere 1962.

Differential pressure values should be per NASA Technical Note D-822, "Tables of Airspeed, Altitude, and MACH Number Based on Latest International Values for Atmospheric Properties."

4. DETAIL REQUIREMENTS:

4.1 Warning Circuits:

The instrument's relay contacts which operate the warning circuit should be capable of passing a resistive load of 10 amperes.

4.2 Identification:

The following information should be legibly and permanently marked on the instrument or nameplate attached thereto:

- a. Name of instrument.
- b. SAE ARP 435 (and revision letter, if applicable).
- c. Manufacturer's part number.
- d. Manufacturer's serial number or date of manufacture.
- e. Manufacturer's name and/or trademark.
- f. Range (if applicable).
- g. Rating (electrical, vacuum, etc., if applicable).
- h. Explosion category (if applicable).
- i. Aircraft identification.

4.3 Compatibility of Components:

If components are individually acceptable, but require matching for proper operation, they shall be identified accordingly.

SAE ARP435

4.4 Environmental Conditions:

The following conditions have been established as minimum design requirements. Tests should be conducted as specified in paragraphs 5, 6, and 7 to insure compliance with this ARP.

- 4.4.1 Temperature: When installed in accordance with the instrument manufacturer's instructions, the instrument should function over the range of ambient temperature shown in Column A below and should not be adversely affected following exposure to the range of temperature shown in Column B below:

<u>Instrument Location</u>	<u>A</u>	<u>B</u>
Pressurized Areas (Temperature Controlled)	0 to 70 C	-65 to 70 C
Non-Pressurized or External Areas	-55 to 70 C	-65 to 70 C

- 4.4.2 Altitude (Turbine Powered Subsonic Aircraft): When installed in accordance with the instrument manufacturer's instructions, the instrument should function from sea level up to the altitudes and temperatures listed below; altitude pressure values are per U.S. Standard Atmosphere 1962. The instrument should not be adversely affected following exposure to extremes in ambient pressure of 50 and 2 in. Hg abs, respectively, when the pressure connection(s) is vented to ambient pressure.

<u>Instrument Location</u>	<u>Altitude</u>	<u>Temp.</u>
Pressurized Areas	15,000 ft.	50 C
Non-pressurized Areas	50,000 ft.	40 C

- 4.4.3 Vibration: When installed in accordance with the instrument manufacturer's instructions, the instrument should function and should not be adversely affected when subjected to vibrations of the following characteristics:

<u>Fuselage</u>	<u>Frequency Cycles Per Sec.</u>	<u>Maximum Double Amplitude (In.)</u>	<u>(Peak) Maximum Acceleration</u>
Fwd of Spar Area	5-1000	.020	2 g
Center of Spar Area	5-1000	.020	3 g
Vibration Isolated	5-55	.020	----
Rack	55-1000	----	.75 g
Flight Deck Area	5-1000	.020	.5 g

- 4.4.4 Humidity: The instrument should function and should not be adversely affected following exposure to any relative humidity in the range from 0 to 95% at a temperature of approximately 70 C.

4.5 Explosion Category:

The instrument component, when intended for installation either in uninhabited areas of non-pressurized aircraft or in non-pressurized areas of pressurized aircraft, should not cause an explosion when operated in an explosive atmosphere. The component should meet the requirements applicable to the explosion category below. Specifically, any instrument component which can be in an ignition source and is intended for installation in an area in which combustible fluid or vapor may result from abnormal conditions (e.g., fuel line leakage) should meet the requirements of Category I. If the intended location is an area where combustible fluid or vapor can occur during normal operation (e.g., fuel tank) the instrument component should meet the requirements of Category II, listed below:

<u>Category</u>	<u>Definition</u>	<u>Requirement</u>
I	Explosion-proofed: case not designed to preclude flame or explosion propagation.	Paragraph 7.5.1
II	Explosion-proofed: case designed to preclude flame or explosion propagation.	Paragraph 7.5.2
III	Instrument not capable of causing an explosion.	Should not be capable of producing a spark of more than 1.0 millijoule of energy and should not have a short circuit current of more than 100 milli-amperes.