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AEROSPACE RECOMMENDED PRACTICE

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Superseding ARP4101/4

Flight Deck Environment

RATIONALE

This document has been determined to contain basic and stable technology which is not dynamic in nature.

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This document has been declared "Stabilized" by the SAE S-7, Flight Deck & Handling Qualities Stds. for Transport Aircraft Committee, and will no longer be subjected to periodic reviews for currency. Users are responsible for verifying references and continued suitability of technical requirements. Newer technology may exist.

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1. SCOPE:

This document is intended to specify the environmental conditions for transport aircraft necessary to permit the crew to perform their duties and functions in comfort, with minimum fatigue and no distraction. Environmental conditions should cause no short or long-term effects deleterious to health or physical well-being, nor significantly impair ability to perform normal or abnormal crew functions.

2. REFERENCES:

This annex should be used in conjunction with the ARP4101 Core Document. The following documents may also be applicable:

- SAE S-7 ARP4102, Flight Deck Panels, Controls and Displays
- SAE ARP85, Air Conditioning Equipment, General Requirements for Subsonic Aircraft

3. OPERATIONAL REQUIREMENTS:

3.1 Ventilation:

3.1.1 General: These recommendations apply to all flight regimes. However, it should be noted that some circumstances, for example, extended ground holding on taxiways, may impose conditions which are difficult to meet. Careful consideration should be given to such items as: location of ventilating air inlets when other than engine bleeds are used; location of APU exhaust; placement of ground support equipment; and provision for alternate sources of breathing air for the crew.

3.1.2 Air Flow: A minimum flight deck air flow rate as specified in ARP 85, as amended, is recommended for all operating regimes. Each individual crew member should be provided with a fully controllable (force and direction) source of air flow to the face and body area. Additional airflow may be required for instrument and electronic equipment located within the flight deck.

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3.1.3 Temperature Control:

3.1.3.1 Flight deck temperature control should be capable of maintaining a stable, uniform and comfortable temperature on the flight deck throughout the operational envelope of the aircraft. Night and day differences in temperature radiation effects through flight deck windows and from aircraft skin/window frames should be considered. Proper insulation of the critical area is required in order to reduce or eliminate condensation.

Suitable transparent blinds or sunshades should be provided to prevent greenhouse effect of extended exposure to sunlight.

Sunshade/blind design shall be sufficiently adjustable to control sunlight from any angle and held rigidly even in severe turbulence.

3.1.3.2 The flight deck temperature control capability shall be independent of the passenger or cargo cabin temperature control system.

3.1.3.3 As an objective, the ground air conditioning system, whether external or self-contained, shall be capable of bringing the flight deck temperature to 24°C (75°F) from 40°C (105°F) (cooling) and to 27°C (80°F) from -40°C (-40°F) (heating) within 30 min after the system has been turned on.

3.1.3.4 The temperature control sensors should be in a location to sense the average flight station air and not be subject to temperature variation from sunlight or convection/radiation from conditioned supply air or instrument panels.

3.1.4 Humidity Control: Means shall be available to alleviate the problem of drying out of skin and mucous membranes during flight of more than 10 hours' duration at high altitude, where excessively low humidity may be encountered.

3.1.5 Smoke Control: Normal airflow should be such that the smoke of a smoking crew member is not circulated to the area of the other crew members.

3.2 Noise:

3.2.1 Operational Safety: Adequate intelligibility of vocal communications between crew members is requisite for operational safety. Flight deck soundproofing shall be provided to ensure that ambient noise levels during any phase of normal flight operations are sufficiently low as to permit reliable unaugmented voice communication. Communication equipment shall be provided for speech augmentation under conditions of excessive ambient noise.

3.2.2 Health Effects: In order to prevent undue fatigue and to minimize permanent noise-induced hearing loss and temporary noise-induced threshold shift, the flight deck continuous ambient noise level midway between the pilot's design eye positions should not exceed 75 dBa. Peak noise levels up to 90 dBa may be tolerated for short periods such as TAKE-OFF or GO-AROUND power setting.

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