U.S. Department
of Transportation

Federal Aviation Administration

Memorandum

Subject: **ACTION**: Equivalent Level of Safety to § 23.1326; Pitot Heat Indication System in Cirrus Design SR24, ACE-05-03

Date: 4/14/2005

From: Manager, Chicago Aircraft Certification Office

Reply to Attn. of: Wesley Rouse (847) 294-8113

To: Acting Manager, Small Airplane Directorate, ACE-100

This memorandum requests your office to review and concur with the proposed Equivalent Level of Safety (ELOS) finding to the Pitot Heat Indication System requirements of § 23.1326(b)(1). The proposed ELOS will allow for the elimination of the continuous amber caution indication whenever the pitot heat is turned off.

Background:

The Cirrus Design SR24 is a 3400 pound single engine, 4 place, airplane powered by a 220 horsepower Rotax engine. The service ceiling of the airplane is below 18,000 feet and the airplane is certified for IFR flight. The SR24 is not certified for flight into known icing conditions.

Section 23.1326 was added to 14 CFR by Amendment 23-49. The section was first proposed under Notice of Proposed Rulemaking (NPRM) Notice No. 94-21, issued on 07/14/94. The proposal was adopted as final rule in Docket No. 27806, issued on 01/29/96 and became effective on 03/11/96.

Part 23 airplanes certificated for flight under instrument flight rules or for flight in icing conditions are required by current § 23.1323(d), to have a heated pitot system, or an equivalent means of preventing an airspeed indicating system malfunction due to ice accumulation. Section 23.1326 requires such airplanes equipped with a heated pitot tube under the requirements of § 23.1323(d) to also be equipped with a Pitot tube heat indicating system.

When pitot tube heating system requirements were added to part 25, the Federal Aviation Administration (FAA) noted the occurrence of at least one accident and several incidents in which an airspeed indicating error occurred that might have been avoided, if a pitot tube heat indicating system had been installed. Part 23 airplanes operate at lower airspeeds and lower altitudes than do part 25 airplanes; therefore, their exposure to moisture and temperature conditions where icing may

occur is higher than it is for transport category airplanes. Because of this environmental exposure, the FAA believes that the potential for an inoperative heated pitot tube becoming a hazard to part 23 airplanes is greater. This requirement also responded to the National Transportation Safety Board (NTSB) recommendation A-92-85, which recommended requiring a modification to certain part 23 airplanes to provide for a pitot heat operating light similar to the light required by § 25.1326 for transport category airplanes. NTSB issued the safety recommendation, among others, as a result of a special investigation and analysis of a series of fatal accidents that occurred from May 31, 1989, through March 17, 1991.

Applicable Regulations:

Section 23.1326 states that:

> **"**If a flight instrument pitot heating system is installed to meet the requirements specified in § 23.1323(d), an indication system must be provided to indicate to the flight crew when that pitot heating system is not operating. The indication system must comply with the following requirements:
>
> (a) The indication provided must incorporate an amber light that is in clear view of a flightcrew member.
> (b) The indication provided must be designed to alert the flight crew if either of the following conditions exist:
> (1) The pitot heating system is switched "off."
> (2) The pitot heating system is switched "on" and any pitot tube heating element is inoperative.**"**

Regulations Requiring an ELOS:

In considering the current design, the applicant has requested an ELOS for § 23.1326(b)(1), Pitot Heat Indication System, and the FAA has determined that an appropriate level of safety can be provided by the issuance of an ELOS, in accordance with the provisions of 14 CFR, part 21, § 21.21.

As discussed above, this ELOS is applicable to the Cirrus SR24 airplane. Should Cirrus Design at a later date apply for a follow-on model aircraft on the same type certificate, Cirrus may request an extension of this ELOS to the later model.

Description of Compensating Features:

The design of the SR24 Pitot Heat Indication system meets the intent of 14 CFR 23.1326(b)(1), by following the guidance in FAA Advisory Circular (AC)23-17A and Policy Memorandum, PS-ACE100-2002-07. Therefore, an Equivalent Level of Safety Finding to 14 CFR 23.1326(b)(1), Amendment 23-49 can be made. The Policy Memorandum states that: "An aircraft design that does not include a caution annunciation when the pitot heat is Off may be eligible for an ELOS

finding that preserves a "dark cockpit" provided a placard or flight manual prescribes when to operate the pitot heat." In other words, the ELOS would allow for a placard or Aircraft Flight Manual (AFM) instructions to provide direction regarding when to operate pitot heat and would not require caution annunciation when pitot heat is Off. In developing the guidance in AC 23-17A, the FAA did not intend that the above guidance would be applicable to all small airplanes with a certification basis that included Amendment 23-49. The ELOS offered in AC 23-17A is appropriate for the class of airplanes whose mission is primarily in the training environment or similar operation, where exposure to conditions conducive to icing of the pitot tube is minimal. For airplanes in that class, an ELOS to § 23.1326, allows the pitot heat be selected OFF with no annunciation (maintaining the "dark cockpit"). Also, in this class of aircraft, the safety provided by the annunciated system is outweighed by the potential maintenance issues related to requiring or encouraging that pitot heat be ON during the extensive ground training operation, which may shorten the life of the system.

The SR24 design uses AFM instructions to provide direction regarding when to operate pitot heat and would not require caution annunciation when pitot heat is Off.

Explanation of Compensating Features:

The continuous amber indication becomes an annoyance during normal VFR or non-icing IFR flight and is in conflict with the "dark cockpit" concept used to enhance pilot awareness and safety.

The SR24 Airplane Flight Manual prescribes when to operate the Pitot heat. Additionally, the Emergency Checklists, Inadvertent Icing Encounter, Pitot Tube Blocked, and Normal Checklists Before Takeoff and Balked Landing/Go-Around will specify proper Pitot heat operation. The Preflight Checklist will contain a Pitot heat operational check.

ACO [or PROJECT OFFICE] RECOMMENDATION:

Recommendation:

FAA approves the applicant's proposal.

Concurred by:

Royce H. Prather *3-31-05*
Manager, Chicago Aircraft Certification Office, ACE-115C Date

John R. Colomy *5-09-05*
Acting Manager, Standards Office, ACE-110 Date

David R. Showers *5-13-05*
Acting Manager, Small Airplane Directorate, ACE-100 Date