



U.S. Department
of Transportation

**Federal Aviation
Administration**

Memorandum

Subject: ACTION: Project No. TC1616SE-A -- Pacific Aviation Composites USA (PACUSA) Lancair LC40-550FG Requesting Review of and Concurrence with Equivalent Level of Safety (ELOS), FAR 23.1443, Minimum mass flow of supplemental oxygen; **ACE-98- 4**

Date: NOV 16 1998

From: Manager, Seattle Aircraft Certification Office,
ANM-100S

Ref.
No.: 98-190S-735

To: Manager, Small Airplane Directorate, ACE-100
ATTN: S. M. Nagarajan

Reply to J. Shelden
Attn. of: (425) 227-2624

Background:

PACUSA plans to show compliance with the undiluted oxygen requirements of Federal Aviation Regulations (FAR) 23.1443(b) for the LC40-550FG via equivalent level of safety (ELOS).

Applicable Regulations Requiring an ELOS:

FAR 23.1443, Minimum mass flow of supplemental oxygen FAR 23.1443(b) states, "If demand equipment is installed for use by flight crew members, there must be a means to allow crew members to use undiluted oxygen at their discretion."

Proposed System and Compensating Features Description:

The system is a "pulse demand" system (described in more detail below) in the primary operating mode feeding cannulas or masks at any of four stations. The "backup mode" is a continuous flow mode, wherein all electronic control/regulation is terminated. Each in use station outlet will dispense oxygen at a flow rate of not less than 2.0 liters per minute at cabin pressure altitudes to 18,000 feet, per the figure referenced by FAR 23.1443(a)(3). If the primary pulse-demand systems malfunctions, there are three means of indication to the crew that there is an oxygen flow problem. First, and most prevalent, is a warning light illumination on the master caution panel. Second is a warning light on the overhead oxygen distribution console. Third is an in-line flow indicator installed between the console and the cannula/mask. The switchover to continuous flow is done by rotating a manual valve located in the control panel in the overhead console to the placarded position for continuous flow. Cannula/mask changeover to another distribution outlet is not required in the mode changeover.

"Pulse demand" means that in the primary mode of operation, electronic logic senses the start of user inhalation efforts. Almost immediately the distribution unit sends a pulse or burst of oxygen commensurate to cabin pressure altitude to all active cannulas/masks.

Explanation How Features Provide ELOS:

A demand system is not required for this airplane's flight envelope by regulation. In the envelope only a continuous flow system is required. The Seattle ACO agrees that an equivalent level of safety exists for FAR 23.1443(b) based on the ability of the system to provide at least 2 liters per minute in the back-up continuous flow mode in the event of a 'pulse-demand' system malfunction, and that TSO/flight tests of the demand mode with its three failure annunciations will be reviewed and approved by the FAA, and that the system will have a maximum altitude limitation of 18,000 feet.

ACO Recommendation:

We concur that the PACUSA proposal detailed above provides an equivalent level of safety as envisioned by the regulations and thus meets the requirements of FAR 23.1443.

Recommended by:



D.L. Riggan

 Manager, Seattle Aircraft Certification Office, ANM-100S

11/16/98

 Date

Concurred by:

for

Larry Malei

 Manager, Standards Office, ACE-110

11/27/98

 Date

for

Larry Malei

 Manager, Small Airplane Directorate,
 Aircraft Certification Services, ACE-100

11/27/98

 Date