



U.S. Department
of Transportation
**Federal Aviation
Administration**

Memorandum

Aircraft Certification Office
c/o American Embassy
APO New York 09667-1011

Subject: ACTION: Equivalent Level of Safety Piaggio P-180,
Air speed Indicator, Finding No. ACE-90-1

Date: January 29, 1990

From: Manager, Aircraft Certification Office, AEU-100

**Reply to
Attn. of:** CMittag/0329:90

To: Manager, Aircraft Certification Service, ACE-100

Background:

Rinaldo Piaggio, manufacturer of the P-180 "Avanti" airplane, proposes to use an airspeed indicator with a 140 knot single engine best rate of climb airspeed (V_{yse}) marked as a radial blue line (See Attachment). The width of this line covers a speed range from 139 to 141 knots on the indicator dial face. Corresponding altitude labels at the blue line edges will not be incorporated.

Applicable Regulation:

The applicable Federal Aviation Regulation (FAR) paragraph states:

"23.1545 * * * * *

(b) * * *

(5) For the one-engine-inoperative best rate of climb speed, V_y , a blue sector extending from the V_y speed at sea level of the V_y speed at-

(i) An altitude of 5,000 feet, if the one-engine-inoperative best rate of climb at that altitude is less than 100 feet per minute, or

(ii) The highest 1,000-foot altitude (at or 5,000 feet) at which the one-engine-inoperative best rate of climb is 100 feet per minute or more.

Each side of the sector must be labeled to show the altitude for the corresponding V_y ."

Applicant's Position:

Based upon P-180 flight test data, the single engine best rate of climb is attained at an airspeed of 141 knots at sea level, which decreases with altitude to 137 knots at 25,000 feet: a 4 knot differential.

Since the variation of airspeed for attaining single engine best rate of climb with change in altitude is so small, Piaggio has selected 140 knots as the optimal value.

Using the Piaggio proposed blue line marked $V_{y_{se}}$ airspeed, a pilot will be "off schedule" by no more than 2 knots at the maximum altitude of 25,000 feet.

The Piaggio proposed blue radial line is approximately 1/16 inch wide, or the equivalent to a 2 knot width on the airspeed indicator dial face. It is centered on the 140 knot mark and thus demarcates a blue "sector" from 139 to 141 knots.

As a backup, Piaggio will provide complete charting of rate of climb for variations in airplane weight, altitude and outside air temperature, should the pilot desire more precise information in the P-180 airplane flight manual.

The Piaggio P-180 Airplane Flight Manual will include single engine procedures based upon the selected 140 knot airspeed.

The FAA Practical Test Standards for Airline Transport Pilot (ATP) and ATP pilot recurrency flight check requires that the pilot candidate only maintain the airplane airspeed to within plus or minus 5 knots of the target value.

FAA's Position:

The selection of a single speed has the beneficial effect in reducing pilot work load.

At high altitudes the difference in the P-180 best rate of climb between the selected target value of 140 knots and 137 knots is negligible.

The P-180 best $V_{y_{se}}$ airspeed variation over the altitude range is less than the allowable practical airspeed variation granted to an average ATP pilot candidate. Therefore, attempting to provide for visual subdivision of the 137 to 141 knot range for target airspeed values, by labeling each side of such a sector with altitude values, is impractical.

Deletion of the altitude markings eliminates both unnecessary clutter and extraneous information.

Compensating Features:

Base upon:

a. Reduction in pilot workload by Piaggio's selection of a specific single engine best rate of climb airspeed, which permits the airplane to meet all applicable requirements; and

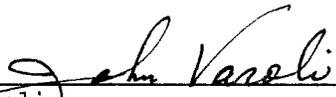
b. The supporting data contained in the AFM; and

c. The reduction is clutter on the face of the airspeed indicator, while still providing the essential pilot required information.

Recommendation:

We concur that the Piaggio proposed airspeed indicator with a blue line marking the Vy_{se} airspeed with no associated altitude markings is considered as providing an equivalent level of safety as envisioned in the regulations and thus meets the requirements of paragraph 23.1545(b)(5) of the FAR.

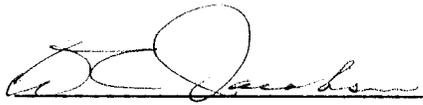
Concurred by:



John Varoli Manager
Brussels Aircraft Certification Office, AEU-100

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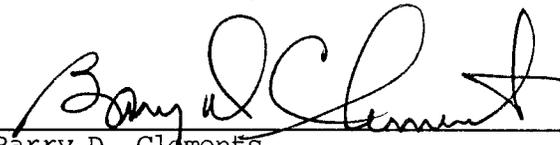
Date



Manager
Standards Office, ACE-110

2/12/90

Date



Barry D. Clements Manager
Small Airplane Directorate, Aircraft Certification Service, ACE-100

2/12/90

Date

Attachment