



# Advisory Circular (AC)

## Downwind Take-Off And Landing

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## 1.0 INTRODUCTION

### 1.1 Purpose

The purpose of this Advisory Circular (AC) is to provide guidance material for an acceptable means, but not the only means, of demonstrating compliance with the flight requirements of Chapter 525 of the Airworthiness Manual (AWM), dealing with take-off and landing with tailwinds in excess of 10 knots.

This advisory material is presently the subject of international harmonisation, and this AC is issued for use during type approval programs. When harmonisation is completed, this AC will be amended, or revoked and the corresponding harmonised advisory material adopted.

### 1.2 Guidance Applicability

This document is applicable to all Transport Canada personnel, delegates and industry.

### 1.3 Description of Changes

This document, formerly AMA No. 525/6A is reissued as an AC. With the exception of minor editorial changes, the content is unaltered.

### 1.4 Termination

This document does not have a terminating action. It will however, be reviewed periodically for suitability of content.

## 2.0 REFERENCES

### 2.1 Reference Document

It is intended that the following reference material be used in conjunction with this document:

Chapter 525 of the Airworthiness Manual (AWM) — *Transport Category Aeroplanes*.

### 2.2 Cancelled Document

As of the effective date of this document, AMA No. 525/6A dated 15 November 1999 is cancelled.

## 3.0 BACKGROUND

No special testing is required for approval of tailwind components of up to 10 knots. However, for approval of tailwind components greater than this value, specific testing in tailwind test conditions is required to show that an adequate level of safety is maintained.

## 4.0 ACCEPTABLE MEANS OF COMPLIANCE

The following are acceptable means of compliance:

- (a) **Tailwind Test Condition** — For approval of a tailwind component of  $V_{TW}$  knots, the tailwind test conditions are:
- (i) The mean tailwind component recorded must be greater than  $V_{TW}$ ; and
  - (ii) The maximum tailwind component recorded in unsteady conditions must be at least  $1.5 V_{TW}$ .

The wind conditions should be recorded continuously throughout the take-off and landing phases at a location close to the take-off and landing points. The wind recorded at a height ( $h$ ) above the surface (minimum 2 m) should be corrected to a height of 10 m (32.8 ft) by:

$$V_{TW}(10m) = V_{TW}(h) * (10 / h)^{1/7}$$

- (b) **Take-off and Landing Handling Tests** — The following tests should be carried out in the tailwind condition indicated in 4 (a):
- (i) Normal All-Engine-Operative (AEO) Take-off;
  - (ii) Take-off with One-Engine-Inoperative (OEI) at  $V_{EF}$  under simulated Weight Altitude Temperature (WAT) limiting conditions;
  - (iii) Normal AEO landing;
  - (iv) OEI Approach and Go around; and
  - (v) OEI Landing.

The landing approaches should be done at a normal 3 degree glidepath angle.

The take-off and landing tests must show that the existing speed schedules are adequate for aircraft operation. If new speed schedules are required, then appropriate performance data must be generated. The aircraft must demonstrate adequate controllability, performance and freedom from hazardous characteristics during the tests. The take-off and landing speeds must be such that stall warning onset in representative turbulent conditions is infrequent.

- (c) **Climb Gradients for Obstacle Clearance** — There is no need to adjust the takeoff and landing weight limits based on free air climb gradient requirements to account for the actual climb profile in tailwind conditions. For obstacle clearance purposes, the takeoff path already includes an operational correction factor of not less than 150% of the tailwind component. However for the landing climb: all engines operating of 525.119, and the approach climb of 525.121(d), the effects of 150% of the tailwind component on the free air climb gradient should be presented in the AFM for guidance in determining obstacle clearance during a missed approach.
- (d) **Engine Handling** — The operation of the powerplant should be assessed in the required tailwind test conditions (Section 525.939). In particular, if special procedures are required, their effect on performance must be considered.
- (e) **Flight Guidance** — ILS guided approaches (Flight Director and/or Autopilot) should be assessed in the required tailwind test condition unless operation in tailwinds above 10 knots is prohibited in the appropriate "Systems Limitations" section of the Flight Manual.
- (f) **Maximum Wind Speed** — As a result of the above testing, a maximum wind speed limitation, in combination with the maximum tailwind component, may be required.

## 5.0 AIRCRAFT FLIGHT MANUAL

**Limitations** — The applicable limitations including take-off and landing configurations and the maximum tailwind component must be provided. In addition any applicable systems limitations must be provided. If applicable, a maximum wind speed should be provided.

**Normal and Abnormal Procedures** — The procedures should include any special instructions associated with operation in tailwinds, e.g. power setting, operation of flight control locks.

**Performance** — Data must be established using 150% of the reported tailwind component and be presented up to the maximum component approved. The effect of tailwind on the landing climb and approach climb free air gradients should be provided for guidance in accordance with paragraph 4.(c). In addition, any performance decrements associated with changes in procedures must be provided.

**6.0 HEADQUARTERS CONTACT**

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