



Advisory Circular (AC)

Lift And Drag Devices, Controls And Indicators

File No.	5009-6-525	AC No.	525-016
RDIMS No.	528492-V3	Issue No.	01
Issuing Branch	Aircraft Certification	Effective Date	2004-12-01

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1.0 INTRODUCTION

1.1 Purpose

The purpose of this Advisory Circular (AC) is to provide interpretation and guidance material for acceptable means, but not the only means, of demonstrate compliance with the requirements of Chapter 525 of the Airworthiness Manual (AWM) dealing with preventing hazard to aircraft due to deployment of lift and drag devices in flight

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. 525.697, 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. 525.697 date 1 May 1986 is cancelled.

3.0 BACKGROUND

This advisory material, together with the Canadian regulatory variation introduced in subsections 525.697 (b) and 525.699 (d) replaces Transport Canada's Additional Airworthiness Requirement No. 1 "Spoiler Systems" dealing with the inadvertent and inopportune deployment of spoilers in flight.

4.0 INTERPRETATION

For the purpose of this AC, lift and drag devices are considered to be aerodynamic panels that when deployed result in a reduction in aircraft lift, an increase in the aircraft drag, or a combination of both. Flaps and leading edge devices are specifically excluded under 525.699(d); thrust reversing systems and propeller systems are not a consideration under this AC. Examples of terminology used on current generation aircraft are "*flight spoilers*", "*ground spoilers*", "*airbrakes*" or "*speed brakes*" and "*lift dump*" systems.

Lift and drag devices are considered to fall into five functional configurations:

- I: Devices intended to be used in flight, which cannot be deployed on the ground;
- II: Devices intended to be used in flight, which can be deployed on the ground;
- III: Devices intended to be used on the ground, which cannot be deployed in flight;
- IV: Devices intended to be used on the ground, which can be deployed in flight; or
- V: Devices intended to be used both in flight and on the ground.

In accordance with 525.697(b) and 525.699(d) consideration must be given to the effect on the aircraft if the device is operated during any regime of flight. Unless it is shown by actual test

demonstration that deployment is not hazardous, means must be provided to prevent activation of devices intended for ground operation only. For devices intended for in flight use there must be means to warn the pilot that the control is operated in the flight regime where deployment is hazardous. If an independent control is used for each set of lift or drag devices and the deployment is hazardous, the above configurations will result as follows:

- I: A warning is required;
- II: A warning is required;
- III: The requirements are met;
- IV: Means to prevent operation are required; or
- V: A warning is required.

5.0 CONFIGURATIONS REQUIRING SPECIAL CONSIDERATION

In some cases the pilot's control will serve to operate more than one set of lift/drag devices (e.g. one set of panels in the air and an additional or different set of panels on the ground), or will operate the same set of devices in a different manner (e.g. panels operate to 25 degrees in the air and the same panels operate to 65 degrees on the ground). In these cases all functions of the panel must be considered separately under 525.697(b) and 525.699(d). If operation of the configuration intended for use on the ground is considered to be hazardous when used in the air, a means to prevent operation of the control into the ground configuration must be provided.

6.0 PREVENTION OF CONTROL OPERATION

In demonstrating compliance with the requirements of 525.697(b):

- (a) The following design criteria have been shown to provide a means of preventing operation of the lift/drag control in certain flight configurations:
 - (i) Controls cannot be operated if the flap is extended; or
 - (ii) Controls cannot be operated below a specific altitude; and
- (b) Subsequent operation on the ground has been shown to be acceptable with:
 - (i) Weight on wheels;
 - (ii) Wheel spin-up;
 - (iii) Nose gear oleo-strut compression;
 - (iv) Power levers at idle; or
 - (v) Combination of above.

7.0 WARNING DEVICE

The warning device specified under 525.699 should be either an effective aural or visual signal, which will alert the pilot to the unsafe condition under all appropriate flight conditions.

8.0 FLIGHT MANUAL

Flight manual limitations and procedures describing use of spoiler devices in flight are required, subject to the scope of the flight test demonstration and compliance with applicable regulations.

9.0 HEADQUARTERS CONTACT

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