

# PŘÍKAZ K ZACHOVÁNÍ LETOVÉ ZPŮSOBILOSTI

CAA-AD-107/2000R1

Datum vydání: 18. ledna 2001

## LETOUN - LETOVÁ PŘÍRUČKA - DOPLNĚNÍ

**Týká se:** všech letadel ATR 42-200, -300, -320, -400, -500.

**Datum účinnosti:** zůstává 28. prosince 2000

**Provést v termínech:** Jak je popsáno v DGAC AD 2000-449-082(B) R1 od data účinnosti tohoto PZZ.

**Postup provedení prací:** Dle DGAC AD 2000-449-082(B) R1 (příloha tohoto PZZ).

Poznámky: Provedení tohoto PZZ musí být zapsáno do letadlové knihy. Případné dotazy týkající se tohoto PZZ adresujte na ÚCL technický inspektorát - Ing. Stibůrek. Pokud to vyžaduje povaha tohoto PZZ, musí být zapracován do příslušné části dokumentace pro obsluhu, údržbu a opravy letadla. Tento PZZ byl vypracován na základě DGAC AD 2000-449-082(B) R1, který nahrazuje DGAC AD 2000-449-082.

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**DGAC AD No.: 2000-449-082(B) R1**  
**EADS ATR**  
**ATR 42 aircraft**

Take-off after use of type II or IV fluids - Appendix to the Flight Manual (ATA 04)

### 1. APPLICABILITY:

ATR 42 aircraft models -200, -300, -320, -400, -500.

### 2. REASONS:

The aim of this revision is to clarify the reasons which prompted the issuance of the original AD.

### INTRODUCTION:

The experience of ground de-icing/anti-icing fluids use, accumulated by the world wide transport aircraft fleet, has led to the issuance by the Joint Aviation Authorities of the "JAR OPS temporary guidance leaflet No. 4". This document highlights the characteristics of de-icing/anti-icing fluids, and precautions to be taken to make use of these fluids. This document indicates that specific precautions or procedures may be needed on some aircraft types and then be part of training and briefing.

Increased pitch control forces have been experienced during rotation on ATR aircraft, after using type II or type IV fluids. The magnitude of these control force increase was such, in some cases, that the crew made a late decision to abort the take-off.

The ATR manufacturer has published an appendix to the flight manual which prescribes an increase in required runway lengths, in case of use of type II or IV fluids.

DGAC, after review of Me in-service experience and of the tests and analyses performed by the manufacturer, considered that under some specific conditions, use of type II or type IV fluids could lead to excessive control forces during rotation, which could increase the take-off distance, or lead the crew to decide to abort take-off after V1.

DGAC determined that the proposed appendix to the flight manual did provide an additional margin against the risk of

increased take-off distance, or late abort take-off decision, and decided to render mandatory the application of this increase in required runway lengths, in order to prevent an unsafe condition from developing when using type II or IV on ATR aircraft.

Tests performed by ATR, with use of type II or IV fluids, have shown that, in the worst cases (most severe fluid application combined with forward CG), pitch control forces up to 60 daN could be encountered during rotation. This level of control forces exceeds significantly the value of 75 lbs provided in JAR 25.143 as the maximum control forces for short term application in pitch. However, it has been demonstrated that an "average" pilot, if specially trained to face such situation, could cope with such force levels and continue take-off, with possibly a lower than nominal rotation rate.

ATR simulators were modified, to simulate the effect of type II/IV fluids on pitch control forces during rotation, and operators should introduce the demonstration of this effect in their crew training programs.

Procedure for application of type II/IV fluids on ATR should follow accurately the recommendations of the aircraft and of the fluid manufacturers, in order to get efficient de/anti-icing, and to limit the increased control forces during rotation at an acceptable level. In case the recommendations of the manufacturers are not properly followed, significant increase in pitch control forces could be encountered.

5 cases of aborted take-off after V1, after use of type II or IV fluids have been reported to the manufacturer between 1991 and 1998.

Analysis of in-service experience has shown that the application of inadequate procedures for use and application of type II/IV fluid could lead to high control forces during rotation. Combined with lack of crew awareness or insufficient crew training, and possibly marginal pilot physical strength these increased control forces could lead to delayed rotation and significantly lower rotation rates, and in some cases, decision of the crew to abort the take-off after V1.

DGAC considered that it could not assume that all operators would be able to always maintain the highest standards for use of type II/IV fluids, and for crew training when using such fluids, and concluded that the combination of factors mentioned above which led to aborted take-off after V1 or can lead to delayed rotation is not extremely improbable.

DGAC considers that an aborted take-off after V1 can lead to an hazardous or catastrophic situation on limited runways.

Therefore DGAC decided, that, in order to prevent an unsafe condition, it was necessary to mandate an increase in required runway length, in order to provide the necessary margins in case of late rotation, or aborted take-off after V1.

This AD should not be interpreted as a reconsideration of the concept of V1 as a decision speed, or as an incentive to abort take-off after V1. DGAC still believes that crews should be trained to continue take-off after V1, even in case of increased pitch control forces.

However, despite the published procedures and training, the possibility that a crew would consider that the pitch control forces are so high that take-off is impossible, and decide to abort take-off after V1, cannot be totally excluded. In such a case, the proposed AFM appendix would provide an additional margin for accelerate-stop distance.

Aeronautical Authorities may consider Alternative Means Of Compliance depending to the operational context specific to each operator. It is expected that the above mentioned background information and discussion can be useful when deciding on the most appropriate means to implement this AD with each operator.

### **3. ACTIONS:**

In order to take into account the effect of use of type II/IV de-icing/anti-icing fluids on ATR pitch control forces during rotation and subsequent impact on take-off performance, the following measures are rendered mandatory from the effective date of this AD:

Within 15 days after the effective date of this AD, accomplish the following:

Revise the approved Flight Manual by incorporating the following appendix. This may be accomplished by inserting a copy of this Airworthiness Directive in the Aircraft Flight Manual.

In the Appendices and Supplements chapter:

"Take-off after use of fluids type II or IV

This appendix applies only to aircraft de/anti iced before take-off, using fluids type II or IV.

These type of fluids may lead to an increase in control forces necessary to rotate, and then to a modification of take off performances.

Therefore this flight manual must be modified as follows:

#### 1. GENERAL

The general information in Section 1 are applicable.

#### 2. LIMITATIONS

The limitations in Section 2 are applicable.

#### 3. NORMAL PROCEDURES

The normal procedures in Section 3 are applicable

#### 4. EMERGENCY PROCEDURES

The emergency procedures in Section 4 are applicable.

#### 5. PROCEDURES FOLLOWING FAILURES

The procedures following failures in Section 5 are applicable.

#### 6. PERFORMANCES

The performances in Section 6 for dry runways and in Section 7.03 for non dry runways (advisory materials) are applicable with the addition of the following for take-off computations:

Determine VR for the lowest available V2,

Assume  $V1=VR$ ,

Increase TOR, TOD, ASD by 20 %.

#### 7. APPENDICES AND SUPPLEMENTS

Data of Section 7 are applicable by adding what follows:

For the dispatch cases:

- Apply take off penalties due to the system failure,
- Then apply take-off penalties due to the use of fluids type II or IV.

Dispatch is not authorized in the following cases:

Ferry flight with pitch elevators disconnected,

Take-off with flaps retracted. "

**REF.:** Approved Flight Manual.

This Revision 1 replaces original AD 2000-449-082(B) dated October 31, 2000.

#### **EFFECTIVE DATE:**

Upon receipt of original issue from OCTOBER 31, 2000