

Revision 3

09 May 2007

## Pilot Licences and Ratings - Aerobatic Flight Rating

### General

Civil Aviation Authority Advisory Circulars contain information about standards, practices, and procedures that the Director has found to be an **Acceptable Means of Compliance (AMC)** with the associated rule.

An AMC is not intended to be the only means of compliance with a rule, and consideration will be given to other methods of compliance that may be presented to the Director. When new standards, practices, or procedures are found to be acceptable they will be added to the appropriate Advisory Circular.

This Advisory Circular also includes **guidance material (GM)** to facilitate compliance with the rule requirements. Guidance material must not be regarded as an acceptable means of compliance.

### Purpose

The Advisory Circular provides information on the ground syllabus and flight syllabus content that is acceptable to the Director for meeting the Civil Aviation Rule requirements for the issue of an Aerobatic Flight Rating.

### Related Rules

This Advisory Circular relates specifically to Civil Aviation Rule Part 61 Subpart L – Aerobatic Flight Rating

### Change Notice

Revision 3 re-numbers this advisory circular from AC 61-1.12 to AC 61-12 as part of a project to standardise the numbering of all ACs.

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## Rule 61.551 Eligibility requirements

### Ground course

**Rule 61.551(a)(1)** requires an applicant for an aerobatic flight rating to have satisfactorily completed an aerobatics ground course. The content of the ground course generally includes the material detailed in Appendix I of this Advisory Circular.

### Flight training course

**Rule 61.551(a)(2)** requires an applicant for an aerobatic flight rating to have satisfactorily completed an aerobatics flight training course. The content of this course will generally include the material detailed in Appendix II of this Advisory Circular.

## Rule 61.553 Issue

### Logbook endorsement

**Rule 61.553** states the requirements for the issue of an aerobatic flight rating. The flight instructor operating under the authority of the Part 141 certificate, or the authorised person operating under the authority of the Part 149 organisation, must be satisfied that the eligibility requirements of rule 61.551 have been met before issuing the aerobatic flight rating.

All relevant details must have been instructed, completed, and checked, either orally, in writing, or in practice, to the satisfaction of the certifying person. This process should include a thorough understanding by the candidate of the limitations of the conditions and the responsibilities of the approval. The certifying person must be satisfied that the candidate is both competent and safe. The essential element of aerobatics training is safety and that includes the attitude of the pilot.

The entry in the logbook must be made in accordance with rule 61.29(a)(3) including—

- (ii) the purpose of the flight; and
- (ii) the date of the flight; and
- (ii) the expiry date of the flight test, flight review, competency demonstration or check; and
- (ii) the name, client number, and signature of the person conducting the flight test, flight review, competency demonstration, or check.

### Additional reading material on aerobatics:

*Aerobatics* - Neil Williams

*Flight Unlimited* - Muller and Carson

*Basic Aerobatics* - Campbell and Tempest

*Basic Aerobatics* - Mike Goulian

*Fly for Fun* - Bill Thomas

*All about Aerobatics* – Ross Ewing 2005

*Aviation Medicine and Other Human Factors for Pilots* - Ewing

*Aerobatics, Principles and Practise* – David Robson 1999

## Appendix I - Aerobatic Flight Rating Ground Syllabus

It is recommended that the ground course is integrated with the flight training.

### **Legislation:**

Civil Aviation Rules: 91.701 and 91.703.

### **Airframe and aerodynamics:**

Weight: fuel, passengers, and parachute (As applicable).

Centre of Gravity.

The accelerometer (G-meter).

Operational envelope: effect of speed and weight, gravitational limitations, anticipated height loss/gain, rolling and pitching under load, overstress, and effect of turbulence.

Angle of Attack and drag.

Dynamic stall.

Airspeed: dive and recovery, escape manoeuvres, limitations, recommended entry speeds, relationship of IAS and control.

High and low speed flight.

Energy management.

### **Engine and mechanical limitations:**

Limits of engine RPM and redline: temperatures and pressures.

Propellers: forces, effect at high and slow speed, fixed pitch and constant speed.

Fuel and oil system: controls and limitations.

### **Flight controls limitations and effects:**

Ailerons and elevator.

Rudder.

Throttle.

Slipstream.

Torque.

### **Human factors:**

Physiological limitations: "G" Force - physiological effects (grey-out, black-out, G induced loss of consciousness, red out), how it is sensed, emphasis on early recognition and prevention of its effects, recovery, becoming adjusted through currency.

Causes of nausea: pilot and passenger monitoring techniques.

Visual illusion: at low level, in poor light, over water; depth of vision.

Disorientation and loss of horizon.

### **Airmanship:**

#### Prior to Flight:

Pilot: I'M SAFE procedure. Physical fitness, currency, free of performance inhibitors (medication, alcohol, sleep deprivation, occupational and social stress), adrenaline and peer pressure effects.

Aircraft: Pockets empty, aircraft free of loose articles or articles that could come loose, mechanical inspection (aerobatics is most intolerant of airworthiness fault).

Parachutes: fitting and use (as applicable).

In Flight:

Environmental and neighbourly considerations.

HASEL checks.

Safety manoeuvres.

Altitude awareness.

Situational awareness.

Emergency procedures:

Engine failure, control failure, fire, loss of control of passenger, escape manoeuvres and recovery from unusual attitudes, height preservation.

Vacating the aircraft in flight (as applicable).

Energy management.

Recognition of when to stop.

**Post flight evaluation:**

Any activity outside limits of legislation, airframe, engine and pilot.

Medium term post flight effects of aerobatics, disorientation and G force.

**Pilot maintenance:**

Abilities and restrictions in accordance with Part 43.

## Appendix II - Aerobatic Flight Rating Flight Syllabus

### *General*

The flight training course should provide an introduction to the basic aerobatic manoeuvres with an emphasis on their safe and accurate execution.

The flight training course should consist of dual instruction, solo practice and consolidation.

The flight training course should cover in practice all the elements of the ground course. Particular attention should be given to engine management, the aerodynamic and loading affects of aerobatic flight on the aircraft, disorientation effects on the pilot, and the elemental need for safety, particularly recovery from unusual attitudes, the management of energy, height above the ground and situational awareness.

The course ought to be flexible enough to cater for aircraft of different performance and capabilities.

Advanced turns (more than 60-degrees of bank angle)

Spinning

Loops

Rolls

Stall turns

Combinations - eg Half cubans, half reverse cubans, and rolls off the top.

Emergencies and recovery from unusual attitudes.

It may include:

Snap rolls or other manoeuvres at the discretion of the instructor, and dependent on pilot aptitude and aircraft integrity.

### ***Minimum Flight Instructor Requirements:***

#### **Greater than 3000ft above the surface:**

A current Category A Flight Instructor may carry out aerobatic flight instruction training for an Aerobatic Flight Rating provided the flight instructor–

- (a) is rated on the aircraft being used for flight instruction, and
- (b) is operating under a Part 141 organisation authorised to conduct and issue an Aerobatic Flight Rating.

A current Category B or Category C Flight Instructor may carry out aerobatic flight instruction training for an Aerobatic Flight Rating provided the flight instructor–

- (a) is rated on the aircraft being used for flight instruction, and
- (b) holds flight instructor aerobatic privilege, and
- (c) has a logbook certification by an appropriately authorised Flight Examiner to instruct in spinning and aerobatics, and

- (d) is operating under a Part 141 organisation authorised to conduct and issue the Aerobatic Flight Rating, or

A person authorised by and operating under the authority of a Part 149 organisation authorised to conduct and issue an Aerobatic Flight Rating,

**At or below 3000ft and greater than 1500ft above the surface:**

In addition to the requirements above, the Flight Instructor who is operating under a Part 141 organisation, or the person authorised by the Part 149 organisation, prior to carrying out aerobatic flight instruction at this altitude is to have 50 hours of aerobatic flight instructor experience.

**At or below 1500ft above the surface:**

In addition to the requirements above, the Flight Instructor who is operating under a Part 141 organisation, or the person authorised by the Part 149 organisation, prior to carrying out aerobatic flight instruction at this altitude is to have 100 hours of aerobatic flight instructor experience.

Persons wishing more information on the aerobatic rating should contact an aerobatic organisation certificated under Rule Part 141 or Rule Part 149.