



# Advisory Circular

AC 66-3(1)

MAY 2013

## ENGINE GROUND RUN TRAINING AND ASSESSMENT

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### 1. REFERENCES

Part 66 of the *Civil Aviation Safety Regulations 1998* (CASR) and its Manual of Standards (MOS).

### 2. PURPOSE

This Advisory Circular (AC) provides guidance and information to personnel preparing and conducting engine ground run training and assessment of trainee competence.

### 3. STATUS OF THIS ADVISORY CIRCULAR

This is the second AC to be issued on this subject. The following changes have been made to the document:

- Removal of reference to 145.A.30 (f) of the Part 145 MOS at paragraph 8.3.

This omission is not marked with shading.

- Inclusion of additional acronyms and reorganisation of the acronym list into alphabetical order at section 4 of the AC, marked by shading.
- Corrections to the referencing protocols, where appropriate, to the CAR 1988 and the CASR 1998 throughout the document, marked by shading.

*Advisory Circulars (ACs) are intended to provide advice and guidance to illustrate a means, but not necessarily the only means, of complying with the Regulations, or to explain certain regulatory requirements by providing informative, interpretative and explanatory material.*

*Where an AC is referred to in a 'Note' below the regulation, the AC remains as guidance material.*

*ACs should always be read in conjunction with the referenced regulations.*

*This AC has been approved for release by the Executive Manager, Standards Division.*

#### 4. ACRONYMS

<b>AC</b>	Advisory Circular
<b>ADF</b>	Australian Defence Force
<b>AMC</b>	Acceptable Means of Compliance
<b>AME</b>	Aircraft Maintenance Engineer
<b>AMO</b>	Approved Maintenance Organisation
<b>APU</b>	Auxiliary Power Unit
<b>CAR</b>	Civil Aviation Regulations 1988
<b>CASA</b>	Civil Aviation Safety Authority
<b>CASR</b>	Civil Aviation Safety Regulations 1998
<b>CTC</b>	Competency Technical Category
<b>DEEWR</b>	Department of Education, Employment and Workplace Relations
<b>EASA</b>	European Aviation Safety Agency
<b>GM</b>	Guidance Material
<b>LAME</b>	Licensed Aircraft Maintenance Engineer
<b>LTA</b>	Licensing Technical Assessment
<b>MSA</b>	Manufacturing Skills Australia
<b>MOS</b>	Manual of Standards
<b>MTO</b>	Maintenance Training Organisation
<b>NAA</b>	National Aviation Authority
<b>RPL</b>	Recognition of Prior Learning
<b>RTO</b>	Registered Training Organisation

#### 5. ENGINE GROUND RUN TRAINING

**5.1** This guidance information supports section 66.A.20 – Privileges of the Part 66 Manual of Standards (MOS).

#### 6. OBJECTIVE

**6.1** The objective of this document is to:

- assist trainers to achieve a consistent standard of engine ground run training;
- assist trainers to achieve a consistent standard of assessment; and
- assist trainers to ensure persons trained and assessed are competent to perform engine ground running.

#### 7. TERMS USED

**7.1** The terms used in this document are not all inclusive and should be used as a guide. Where the engine or aircraft includes similar systems and functions not included in this document, or included under other terms, these should be included in the training as though this document included those systems and functions.

## 8. REGULATORY BACKGROUND

**8.1** Paragraph 230 (3) (a) of the Civil Aviation Regulations 1988 (CAR) authorises an appropriately rated Licensed Aircraft Maintenance Engineer (LAME) to ground run the engine(s), of an aeroplane that is having maintenance carried out on it or is being used for the provision of maintenance training provided he or she has ‘sufficient knowledge of the aircraft’s controls and systems to ensure the starting or running does not endanger any person or damage the aircraft.’

**8.2** Paragraph 30 (2C) (d) of CAR 1988 includes a condition that the holder of a Certificate of Approval must ensure that each person employed by or working under an arrangement with the holder receives adequate training in the work performed by that person and any equipment used in connection with the work.

**8.3** The Civil Aviation Safety Regulation (CASR) Part 145 Approved Maintenance Organisation (AMO) must include procedures for the conduct of engine ground running – if LAMEs are to provide engine ground running services for the AMO.

**8.4** Regulation 214 of CAR 1988 places responsibility on the holder of a Certificate of Registration of an aircraft used in commercial operations (Registered Operator) to ensure persons performing maintenance are adequately trained.

## 9. ACCEPTABLE MEANS OF COMPLIANCE

**9.1** An Acceptable Means of Compliance (AMC) to demonstrate that a LAME has sufficient knowledge pertaining to starting and running an engine (on fixed and rotary wing aircraft) would be provided by completion of a course of training or experience such that the CAR 30 or CASR Part 145 AMO becomes satisfied the holder now has the requisite qualifications and experience.

## 10. BASIC LICENCE AND AIRCRAFT TYPE TRAINING REQUIREMENTS DO NOT NECESSARILY INCLUDE TRAINING FOR ENGINE RUNNING

**10.1** Aircraft Maintenance Engineer (AME) licences and licence ratings are granted by CASA on the understanding that CAR 30, CASR Part 145, CAR 214 and CAR 230 will be complied with. It cannot be assumed that the holder of an appropriate CASR Part 66 licence rating is adequately trained and qualified to ground run the engines of a particular aircraft, aircraft type or model. The CASR Part 66 basic licence and aircraft type training requirements do not include training for engine running.

## 11. CONTENT OF TRAINING

**11.1** The following subjects, as applicable to the engine/aircraft combination, should be included:

- Aircraft system operation as required for engine operation and/or aircraft and personnel safety;
- Aircraft preparation for engine running;
- Emergency procedures;
- APU operation;
- Engine ground safety precautions, including:
  - prop/jet/rotor blast area;
  - inlet suction area;

- reverse blast area;
- fire protection/access;
- securing aircraft, chocks and other restraint; and
- safe areas and safety precautions for maintenance personnel during engine operation;
- Engine operational limits;
- Engine performance parameters and corrections for ambient conditions;
- Pre-start briefing of persons on the aircraft, including operating crew;
- Preparation for engine start, internal and external pre-start checks;
- Wet and dry motoring procedures;
- Preparing aircraft and engine for test as required;
- Normal and abnormal start procedures, including monitoring operation;
- Post start checks;
- Engine tests, including use of reference tables and record sheets;
- Normal shutdown procedures;
- Emergency shutdown procedures;
- Post engine run checks;
- Use of built in test and monitoring equipment before, during and after engine running;
- Restoring aircraft to normal shut down configuration, including recording and resetting of exceedance (s); and
- Completion of engine run and aircraft records.

**11.2** Pre-start briefing should include functions of each crew member in normal operations and emergencies, including evacuation procedures and assembly point. Procedures should include any of the following which are applicable to the engine/airframe combination:

- Start with external power/air;
- Start with APU;
- Cross bleed start;
- Battery power start;
- Start without N1, N2, Ng, Np, Fuel Flow or EGT indication;
- Start without automatic control and monitoring;
- Start without oil pressure;
- Start with tailpipe fire;
- Hung start;
- Surge/stall;
- Auto thrust recovery;
- Thrust reverser tests;
- Propeller tests, including beta operation, governing operation, auto feather, manual feather, NTS, pitch lock, reverse operation, auto power recovery; and
- Emergency shut down procedure, including extended motoring, if applicable.

**11.3** Where a simulator is used all normal pre-start, start, shutdown post run and emergency procedures which are simulated should be performed under the control of each student. Functional checks may be performed in teams of two (or three if flight engineer station is fitted) provided each student is a participant.

**11.4** Where an aircraft is used all normal pre-start, start, shutdown and post run procedures should be performed under the control of each student. Functional checks may be performed in teams of two (or three if flight engineer station is fitted) provided each student is a participant. Emergency procedures should be covered by a thorough briefing in the aircraft cockpit, with questions to confirm each student understands the procedures.

**11.5** Post run debriefs should include completion of all records related to the operation of the simulator/aircraft and completion of all documentation related to each task performed during the training session. If a vibration analysis was conducted during the training session all documentation related to a vibration analysis should be completed as though they were to be incorporated into the actual aircraft records. Where appropriate, the trainees should complete and sign duplicate documentation as a demonstration of competence in satisfactorily completing the documentation and making the certifications related to the tasks undertaken during the training/assessment session.

## **12. CONDUCT OF ENGINE GROUND RUNNING TRAINING**

**12.1** Engine ground run training is intended to meet these requirements in relation to engine ground running. Engine ground run training may be conducted in an aircraft, in an aircraft simulator or a combination of both. Engine ground run training will usually involve a period of classroom training, briefing and debriefing. Training should be conducted by a person with instructional and assessment training, such as Certificate IV in Workplace Training and Assessment, who is competent and authorised to carry out engine ground running for the engine/airframe combination.

**12.2** This authorisation may be limited to simulator training in which case the trainer need not hold a CASR Part 66 licence rating for the engine. If the training is conducted in an aircraft the trainer will need to hold an appropriately rated CASR Part 66 licence or other authorisation (e.g. pilot endorsed on aircraft) to run the engines. All engine ground run training should be conducted using the appropriate procedures used in the course of normal maintenance. Additional documents may be used to assist student learning and to provide consistency of training and assessment. Since this training usually involves both training and assessment, it is important that the trainer clearly differentiates between training and assessment. It would be unreasonable to subject a student to assessment of his/her handling of an emergency procedure without first being trained in the procedure.

## **13. ASSESSMENT**

**13.1** Satisfactory completion of engine ground run training would be demonstrated by each student satisfactorily completing each procedure assigned to him/her and satisfactorily answering questions related to the procedures and operation of the engine in the particular airframe.

**13.2** The questions may be asked at any appropriate times during the pre-run briefing, the run session or the post run debriefing. Questions asked during the engine run session should be in context with the current operations to avoid distraction and confusion of the student(s) operating the aircraft/simulator.

## **14. RECORD**

**14.1** An acceptable means of recording satisfactory completion of engine ground run training and assessment is via the use of a permanent recorded within the training records or personal file of the student. This entry must be verified by the Trainer/Assessor and show the date(s) the training/assessment was conducted.

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Executive Manager  
Standards Division

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