



Australian Government

MEA353 Maintain basic light aircraft engines and propellers

Release: 2

MEA353 Maintain basic light aircraft engines and propellers

Modification History

Release 2. Equivalent to MEA353 Maintain basic light aircraft engines and propellers with amended prerequisite codes.

Application

This unit of competency requires application of hand skills, the use of maintenance publications, and knowledge of piston engine and system theory to inspect, test and troubleshoot, remove and install normally aspirated piston engines and engine system components during the performance of scheduled or unscheduled maintenance. Maintenance may be performed individually or as part of a team.

Applications include normally aspirated piston engines of basic light fixed wing aircraft and basic rotary wing aircraft, and fixed pitch propellers.

The unit is part of the Mechanical Certificate IV (Aircraft Maintenance Stream) training pathway.

Where a Civil Aviation Safety Authority (CASA) licensing outcome is sought this unit forms part of the CASA requirement for the granting of the chosen maintenance certification licence under Civil Aviation Safety Regulation (CASR) Part 66, in accordance with the licensing provisions in the Companion Volume Implementation Guide.

Pre-requisite Unit

MEA107	Interpret and use aviation maintenance industry manuals and specifications
MEA154	Apply work health and safety practices in aviation maintenance
MEA155	Plan and organise aviation maintenance work activities
MEA156	Apply quality standards during aviation maintenance activities
MEA157	Complete aviation maintenance industry documentation
MEA158	Perform basic hand skills, standard trade practices and fundamentals in aviation maintenance

Competency Field

Aviation maintenance

Unit Sector

Elements and Performance Criteria

Elements describe the essential outcomes.	Performance criteria describe the performance needed to demonstrate achievement of the element.
1. Inspect piston engine system and components	1.1 Isolation tags already attached to the system or related systems are checked and aircraft/engine configured for safe system inspection and operation in accordance with applicable maintenance manual 1.2 Piston engine and components/systems are visually or physically checked for external and internal signs of defects in accordance with applicable maintenance manual while observing all relevant work health and safety (WHS) requirements, including the use of material safety data sheets (MSDS) and items of personal protective equipment (PPE)
2. Test piston engine	2.1 Aircraft and engine are correctly prepared in accordance with applicable maintenance manual 2.2 Assistance is provided with engine and/or system operation during prescribed test procedures to establish serviceability and correct function in accordance with applicable maintenance manual
3. Troubleshoot piston engine	3.1 Available information from maintenance documentation and inspection and test results is used, where necessary, to assist in fault determination 3.2 Maintenance manual fault diagnosis guide and logical processes are used to ensure efficient and accurate troubleshooting to line replacement level 3.3 Specialist advice is obtained, where required, to assist with the troubleshooting process 3.4 Piston engine faults are located and the causes of the faults are clearly identified and correctly recorded in maintenance documentation, where required 3.5 Fault rectification requirements are determined to assist in planning the repair
4. Remove piston engine and engine system	4.1 Aircraft is prepared and supported and rendered safe in accordance with the applicable maintenance manual and isolation tags are fitted, where necessary, to ensure the

components		safety of personnel and freedom from damage during engine removal	
		4.2	Removal is carried out in accordance with the applicable maintenance manual while observing all relevant WHS requirements, including the use of MSDS and items of PPE
		4.3	Engine is tagged and prepared for transport or storage in accordance with the specified procedures
		4.4	Required maintenance documentation is completed and processed in accordance with standard enterprise procedures
5.	Install piston engine and engine system components	5.1	Engine to be installed is checked to confirm correct part or model numbers, modification status and serviceability
		5.2	Installation is carried out in accordance with the applicable maintenance manual
		5.3	Support/safety equipment is removed at the appropriate time to ensure personnel safety and freedom from structural damage
		5.4	Required maintenance documentation is completed and processed in accordance with standard enterprise procedures
6.	Inspect and maintain fixed pitch propeller	6.1	Engine is rendered safe for propeller inspection in accordance with maintenance manual or enterprise procedures
		6.2	Fixed pitch propeller is inspected for security, damage and deterioration in accordance with the applicable maintenance manual while observing all relevant WHS requirements, including the use of MSDS and items of PPE
		6.3	Metal propeller nicks and dents within damage limits are blended out in accordance with maintenance manual procedures
7.	Remove fixed pitch propeller	7.1	Engine is rendered safe and the aircraft is prepared for propeller removal in accordance with maintenance manual or enterprise procedures
		7.2	Propeller is removed in accordance with maintenance manual procedures while observing all relevant WHS

		requirements, including the use of MSDS and items of PPE
	7.3	Removed propeller is tagged and prepared for transport or storage in accordance with specified procedures
	7.4	Required maintenance documentation is completed and processed in accordance with standard enterprise procedures
8. Install fixed pitch propeller	8.1	Engine is rendered safe and the aircraft is prepared for propeller installation in accordance with maintenance manual or enterprise procedures
	8.2	Propeller to be installed is checked to confirm correct part or number, modification status and serviceability
	8.3	Installation is carried out in accordance with the applicable maintenance manual
	8.4	Required maintenance documentation is completed and processed in accordance with standard enterprise procedures

Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

Range of Conditions

This field allows for different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Piston engines and components/systems include:

- Normally aspirated engine (all types), main components and accessories/drives
- Control system
- Starter system
- Fuel and air systems
- Exhaust system
- Oil system (if dry sump) (where applicable to the enterprise)

Engine and/or system

- Testing of engines fitted to helicopters (where auxiliary drive is not available) shall be carried out through the

operation includes:	applicant directing a pilot qualified on type
Fixed pitch propellers:	Fixed pitch propeller may include a spinner and the propeller will be made from: • metal • composite • wood
Procedures and requirements include:	• Industry standard procedures specified by manufacturers, regulatory authorities or the enterprise

Unit Mapping Information

Release 2. Equivalent to MEA353 Maintain basic light aircraft engines and propellers

Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=ce216c9c-04d5-4b3b-9bcf-4e81d0950371>

Assessment Requirements for MEA353 Maintain basic light aircraft engines and propellers

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Performance Evidence

Evidence required to demonstrate competency in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria under the specified conditions of assessment, and must include:

- applying relevant WHS procedures, including the use of MSDS and PPE
- using relevant maintenance documentation and aircraft manuals
- recognising external and internal signs of defects in piston engines, components and system components visual/physical inspection
- assisting with testing of piston engine and engine system operation, be able to operate systems, monitor indications, record parameters and recognise correct function
- compiling engine condition monitoring records
- rigging and adjusting engine controls and systems
- using fault diagnosis guides and equivalent data to accurately and efficiently troubleshoot the causes of unserviceabilities in piston engines and engine systems, clearly record details and identify the required rectification actions
- correctly removing and installing piston engine, engine components and fixed pitch propellers, including spinners
- inspecting propellers for security, damage and deterioration
- blending out metal propeller nicks and dents that are within maintenance manual limits.

The underlying skills inherent in this unit should be transferable across a range of inspection, testing, troubleshooting and removal and installation tasks (including the timely involvement of supervisor or other trades) associated with engines, engine systems and fixed pitch propellers. It is essential that system testing procedures take into account all safety precautions associated with piston engine system operation, and that awareness be demonstrated of dual inspection requirements associated with work on engine controls.

This shall be demonstrated through application across a number of engine systems or types and propellers made from different materials. Ability to interpret inspection procedures and specifications (allowable limits) and apply them in practice is critical. The application of testing procedures and functional rigging checks should also indicate knowledge of system operation.

Knowledge Evidence

Evidence required to demonstrate competency in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- WHS procedures associated with engine and propeller maintenance, including lifting and handling of heavy objects
- how to obtain MSDS
- use of PPE
- relevant maintenance manuals
- relevant regulatory requirements and standard procedures
- fault diagnosis techniques
- piston engine and engine system layout and operation:
 - four stroke engine theory of operation and performance
 - cylinder configurations
 - construction (components and materials)
 - carburettors and air induction systems
 - fuel injection systems
 - fuels and their characteristics
 - ignition systems
 - lubricating systems and lubricants
 - cooling systems
 - exhaust systems
 - accessory drives and mounts
 - normally aspirated piston engine maintenance requirements and troubleshooting procedures
- system component operation. including electrical and instrument system interfaces:
 - magnetos and ignition harnesses
 - spark plugs
 - fuel pumps
 - fuel filters
 - oil pumps
 - oil filters
 - oil tanks
 - vacuum pumps
 - generators
 - starter motors
 - oil pressure gauges (direct reading)
 - temperature gauges (direct reading)
 - tachometers
 - manifold pressure gauges
 - maintenance requirements and troubleshooting procedures
- removal and installation procedures for piston engines and engine components:
 - removal procedures and handling
 - control linkages

- electrical wiring
- engine instrument connections
- installation and rigging
- ground running
- system component removal, installation and system testing
- propellers, materials and damage and deterioration criteria:
 - fixed pitch propeller types, terminology and theory:
 - tractor/pusher
 - matching to engine and aircraft
 - leading edge/trailing edge
 - blade stations
 - forces acting on a propeller
 - propeller balance
 - materials and construction methods:
 - metal propeller metals, construction and surface protection
 - wooden propeller materials, construction and surface protection
 - composite propeller materials, construction and surface protection
 - damage and deterioration
 - methods of blending out of minor damage to metal propellers
- propeller removal and installation procedures.

Assessment Conditions

- Competency should be assessed in the work environment or simulated work environment using tools and equipment specified in maintenance documentation. It is also expected that general-purpose tools and test equipment found in most routine situations would be used where appropriate.
- Engine system operation knowledge, the relationship of individual components and the links with other systems will be necessary to supplement evidence of ability to carry out rigging checks and troubleshoot the system within the limits of the aircraft/system fault-finding guide before undertaking any action. The work plan should take account of applicable safety and quality requirements in accordance with the industry and regulatory standards.
- The following conditions of assessment represent the requirements of the Regulators (ADF and CASA) and maintenance stakeholders and must be rigorously observed.
- A person cannot be assessed as competent until it can be demonstrated to the satisfaction of the workplace assessor that the relevant elements and performance criteria of the unit of competency are being achieved under routine supervision on at least one (1) item from each of:
 - normally aspirated engine (all types), main components and accessories/drives
 - control system
 - starter system
 - fuel and air systems

- exhaust system
- oil system (if dry sump) (may be omitted where not applicable to the enterprise)
- and on at least one (1) type of fixed pitch propeller.
- This shall be established via the records in the Log of Industrial Experience and Achievement or, where appropriate, an equivalent Industry Evidence Guide (for details refer to the Companion Volume Assessment Guidelines).
- Assessors must satisfy the requirements of the National Vocational Education and Training Regulator (Australian Skills Quality Authority, or its successors).
- Where the unit is to be used for CASA licensing purposes the Assessor must also meet the criteria specified in the CASR Part 147 Manual of Standards.

Links

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