



Australian Government

MEA340 Lay out and set up aircraft systems

Release: 1

MEA340 Lay out and set up aircraft systems

Modification History

Release 1 - New unit of competency

Application

This unit of competency requires application of basic knowledge of aircraft system design and schematic layout, including the relative advantages of the different types of system.

The unit is part of Diploma and Advanced Diploma training pathways. It is used in workplaces that operate under the airworthiness regulatory systems of the Australian Defence Force (ADF) and the Civil Aviation Safety Authority (CASA).

Pre-requisite Unit

MEA101	Interpret work health and safety practices in aviation maintenance
MEA107	Interpret and use aviation maintenance industry manuals and specifications
MEA109	Perform basic hand skills, standard trade practices and fundamentals in aviation maintenance

Competency Field

Aeronautical engineering

Unit Sector

Elements and Performance Criteria

Elements describe the essential outcomes.	Performance criteria describe the performance needed to demonstrate achievement of the element.
1. Select and lay out schematically aircraft mechanical systems	1.1 Mechanical system applications in aircraft design and their relative advantages and disadvantages compared to other system types are identified
	1.2 Components of mechanical systems are identified
	1.3 A mechanical system is selected for an application, the schematic layout is sketched and all components are

		labelled
	1.4	Mechanical system maintenance requirements are identified
2. Select and lay out schematically aircraft hydraulic systems	2.1	Hydraulic system applications in aircraft design, their operation and their relative advantages and disadvantages compared to other system types are identified
	2.2	Aircraft hydraulic fluids, their characteristics and handling precautions are identified
	2.3	Components of hydraulic systems are identified and their operation is described in general terms
	2.4	A hydraulic system is selected for an application, the schematic layout is sketched and all components are labelled
	2.5	Hydraulic system maintenance requirements are identified
3. Select and lay out schematically aircraft pneumatic systems	3.1	Pneumatic system applications in aircraft design, their operation and their relative advantages and disadvantages compared to other system types are identified
	3.2	Components of pneumatic systems are identified and their operation is described in general terms
	3.3	A pneumatic system is selected for an application, the schematic layout is sketched and all components are labelled
	3.4	Pneumatic system maintenance requirements are identified
4. Select and lay out schematically aircraft fuel storage and distribution systems	4.1	Typical fuel storage and distribution systems used in aircraft design are identified
	4.2	Components of fuel storage and distribution systems are identified and their operation is described
	4.3	A fuel storage and distribution system is selected for an application, the schematic layout is sketched and all components are labelled
	4.4	Types of aircraft fuel, their characteristics and handling precautions are identified

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| | 4.5 | Fuel storage and distribution system maintenance requirements are identified |
| 5. Set up and operate a simple hydraulic system | 5.1 | The hydraulic system is sketched and all components are labelled |
| | 5.2 | Required components are obtained |
| | 5.3 | The system is assembled and operated 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) |

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.

Mechanical system applications include:

- Flight controls
- Flap operation
- Nose wheel steering
- Landing gear door operation
- Entrance door mechanisms

Components of mechanical systems include:

- Cables
- Chains
- Sprockets
- Pulleys
- Fairleads
- Cable tensioners
- Gearboxes
- Screwjacks
- Rods
- Universal joints
- Constant velocity joints

Hydraulic system applications include:

- Clutches
- Bearings and bushes
- Flight controls
- Flap and spoiler operation
- Landing gear retraction and extension
- Brakes (including anti-skid)
- Nose wheel steering
- Shimmy damping
- Door operation

Components of hydraulic systems include:

- Pumps
- Plumbing
- Valves (manual and electrically operated)
- Actuators
- Motors
- Check valves
- Pressure gauges (direct reading and electrical)
- Electrical control circuit micro switches
- Reservoirs
- Accumulators
- Filters

Pneumatic system applications include:

- Landing gear retraction and extension
- Pneudraulic emergency systems for landing gear extension and brakes
- Engine bleed air
- Engine starting
- Anti-icing
- De-icing
- Pressurisation
- Air cycle air conditioning

Components of pneumatic systems include:

- Precoolers
- Pressure regulator and shutoff valves
- Temperature modulating valve
- Check valves
- Over-pressure valves
- Temperature regulating valves
- Underloading valves
- Shuttle valves
- Back pressure valves
- Outflow valves
- Heat exchangers
- Moisture separators
- Chemical driers

Components of fuel storage and distribution systems include:

- Filters
- Mechanical compressors
- Compressed air bottles
- De-icing boots
- Ducting
- Integral fuel cells
- Rigid and flexible fuel cells
- External fuel tanks
- Rigid and flexible plumbing and couplings
- Manifolds
- Selector valves
- Anti-surge valves
- Anti-gravity valves
- Fuel quantity indication
- Fuel flow indication
- Boost pumps
- Transfer pumps
- Filters
- Strainers
- Fuel heaters

Unit Mapping Information

Release 1 – equivalent to MEA340A Lay out and set up aircraft systems

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 MEA340 Lay out and set up aircraft systems

Modification History

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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:

- laying out a typical aircraft mechanical system
- laying out a typical aircraft hydraulic system
- laying out a typical aircraft pneumatic system
- laying out a typical fuel storage and distribution system
- setting up and operating a basic hydraulic system that includes:
 - hydraulic rig
 - manual selector valve
 - filter
 - accumulator
 - check valve
 - linear actuators
 - rigid and flexible plumbing
- applying relevant WHS precautions, including the use of PPE and MSDS.
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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:

- fluid power principles
- plumbing identification marking
- mechanical, hydraulic and pneumatic aircraft systems, their components and maintenance requirements
- the relative advantages and disadvantages of mechanical, hydraulic and pneumatic systems
- hydraulic fluid types, characteristics and handling precautions
- aircraft fuel storage and distribution systems and components thereof
- aircraft fuels, their characteristics and handling precautions
- WHS precautions relating to aircraft systems and their operation.

Assessment Conditions

- This unit may be assessed off the job in a training environment equipped to provide exposure to the range of system types and provide for the layout, set-up and operation of basic hydraulic systems. The candidate must have access to all tools, equipment, materials and documentation required and must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials. The assessment environment should not disadvantage the candidate.
- Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
- Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, teacher's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency.
- Assessors must satisfy the requirements of the National Vocational Education and Training Regulator (Australian Skills Quality Authority, or its successors).

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