



มาตรฐานอาชีพและคุณวุฒิวิชาชีพ
Occupational Standard and Professional Qualifications

สาขาวิชาชีพการบิน สาขางานเทคนิคและฝึกอบรม

จัดทำโดย สถาบันคุณวุฒิวิชาชีพ (องค์การมหาชน)
ร่วมกับ มหาวิทยาลัยเทคโนโลยีพระจอมเกล้าพระนครเหนือ

1. ชื่อมาตรฐานอาชีพ

สาขาวิชาซีพการบิน สาขางานเทคนิคและฝึกอบรม

2. ประวัติการปรับปรุงมาตรฐาน

N/A

3. ทะเบียนอ้างอิง (Imprint)

N/A

4. ข้อมูลเบื้องต้น

Basics need for establishing a professional qualification standard for an occupation of an aircraft mechanics arises from the highly demands and supplys of social, industial economic, and personal needs.

5. ประวัติการปรับปรุงมาตรฐานในแต่ละครั้ง

N/A

6. ครั้งที่

1

(รายละเอียดของชุดฝึกอบรมที่ได้รับการรับรองตามการปรับปรุงในแต่ละครั้ง แสดงในตารางข้างล่าง ข้อมูลครั้งล่าสุดจะแสดงอยู่ในบรรทัดบนสุด)

ครั้งที่ (อื่น ๆ) :

ครั้งที่ประกาศก่อนหน้านี้ วันที่ประกาศ

ข้อสังเกต :

การเปลี่ยนแปลงที่สำคัญ :

7. คุณวุฒิวิชาชีพที่ครอบคลุม (Professional Qualifications included)

สาขาวิชาซีพการบิน

สาขางานเทคนิคและฝึกอบรม

อาชีพช่างซ่อมเฮลิคอปเตอร์ (Aircraft Mechanic :Helicopters) ชั้น 3

8. คุณวุฒิวิชาชีพที่เกี่ยวข้อง (Related Professional Qualifications)

N/A

9. หน่วยสมรรถนะทั้งหมดในมาตรฐานอาชีพ (List of All Units of Competence within this Occupational Standards)

รหัสหน่วยสมรรถนะ	เนื้อหา
101301	Interpret work health and safety practices in aviation maintenance.
101302	Apply quality standards applicable to aviation maintenance.
101303	Interpret and use aviation maintenance industry manuals and specifications.
101304	Complete aviation maintenance industry documentation.
101305	Perform basic hand skills, standard trade practices and fundamentals in aviation.
101306	Conduct self in the aviation maintenance environment.
101307	Communicate aviation technical and maintenance management knowledge.
101308	Apply mathematics and physics in aviation maintenance.

101309	Remove and install miscellaneous aircraft electrical hardware/components
101311	Use electrical test equipment.
101312	Perform aircraft flight servicing.
101313	Remove and install aircraft hydro-mechanical and landing gear system.
101314	Remove and install aircraft pneumatic system components.
101317	Remove and install engines and engine system components.
101320	Inspect and maintain structures and related components of non-pressurized small aircraft.
101321	Participate in environmentally sustainable work practices.
102301	Remove and install rotary wing rotor and flight control system components.
102302	Remove and install avionic system components.
102303	Maintain basic rotary wing aircraft systems.

10. ระดับคุณวุฒิ

10.1 สาขาวิชาช่างการบิน สาขางานเทคนิคและฝึกอบรม อาชีพช่างซ่อมเฮลิคอปเตอร์ (Aircraft Mechanic :Helicopters) ชั้น 3

คุณลักษณะของผลการเรียนรู้ (Characteristics of Outcomes)

A person with specialize skill and technique who is capable working as an aircraft mechanic. The one can handle all routine tasks by applying theory, basic knowledge, and necessary tools under his/her supervisors.

Capable of removing and installing all minor component of the aircraft strictly following a technical manual. However, all conducted task has to be taken under supervision by supervisors.

การเลื่อนระดับคุณวุฒิวิชาชีพ (Qualification Pathways)

The qualify person has to demonstrate his/her ability through all designated unit of competences. The total unit of competence for this level is **19** units.

หลักเกณฑ์การต่ออายุหนังสือรับรองมาตรฐานอาชีพ

N/A

กลุ่มบุคคลในอาชีพ (Target Group)

1. The minimum age for person who wants to qualify this level is **18** years old.
2. Legitimizes one of the following:
 - 2.1 Holds a Vocational Certificate or equivalence.
 - 2.2 At least **one** year experience in aviation industry with an official verification letter.

หน่วยสมรรถนะ (หน่วยสมรรถนะทั้งหมดของคุณวุฒิวิชาชีพนี้)

- 101301 Interpret work health and safety practices in aviation maintenance.
101302 Apply quality standards applicable to aviation maintenance.

- 101303 Interpret and use aviation maintenance industry manuals and specifications.
- 101304 Complete aviation maintenance industry documentation.
- 101305 Perform basic hand skills, standard trade practices and fundamentals in aviation.
- 101306 Conduct self in the aviation maintenance environment.
- 101307 Communicate aviation technical and maintenance management knowledge.
- 101308 Apply mathematics and physics in aviation maintenance.
- 101309 Remove and install miscellaneous aircraft electrical hardware/components
- 101311 Use electrical test equipment.
- 101312 Perform aircraft flight servicing.
- 101313 Remove and install aircraft hydro-mechanical and landing gear system.
- 101314 Remove and install aircraft pneumatic system components.
- 101317 Remove and install engines and engine system components.
- 101320 Inspect and maintain structures and related components of non-pressurized small aircraft.
- 101321 Participate in environmentally sustainable work practices.
- 102301 Remove and install rotary wing rotor and flight control system components.
- 102302 Remove and install avionic system components.
- 102303 Maintain basic rotary wing aircraft systems.

ตารางแผนผังแสดงหน้าที่

1. ตารางแสดงหน้าที่ 1

(ทบทวนครั้งที่ (ไม่มี) ประกาศใช้ ณ วัน/เดือน/ปี)

ตาราง 1 : FUNCTIONAL MAP แสดง KEY PURPOSE , KEY ROLES , KEY FUNCTION

ความมุ่งหมายหลัก Key Purpose	บทบาทหลัก Key Roles		หน้าที่หลัก Key Function	
	รหัส	คำอธิบาย	รหัส	คำอธิบาย
To promote and support aircraft maintenance of a aircraft mechanics group	10	Aircraft Mechanics	101	Aircraft Mechanics: Airplane
			102	Aircraft Mechanics Helicopter

คำอธิบาย ตารางแผนผังแสดงหน้าที่เป็นแผนผังที่ใช้วิเคราะห์หน้าที่งานเพื่อให้ได้หน้าที่หลัก (Key Function)

2. ตารางแสดงหน้าที่ 1 (ต่อ)

(ทบทวนครั้งที่ (ไม่มี) ประกาศใช้ ณ วัน/เดือน/ปี)

ตาราง 2 : FUNCTIONAL MAP แสดง KEY FUNCTION , UNIT OF COMPETENCE , ELEMENT OF COMPETENCE

หน้าที่หลัก Key Function		หน่วยสมรรถนะ Unit of Competence		หน่วยสมรรถนะย่อย Element of Competence	
รหัส	คำอธิบาย	รหัส	คำอธิบาย	รหัส	คำอธิบาย
101	Aircraft Mechanics: Airplane	101301	Interpret work health and safety practices in aviation maintenance.	10130	Interpret safe work practices, reporting procedures for workplace hazards.
				1.01	
		101302	Apply quality standards applicable to aviation maintenance.	101301	Interpret emergency procedures.
				.02	
		101303	Interpret and use aviation maintenance industry manuals and specifications.	10130	Interpret and apply quality standards.
				2.01	
		101304	Complete aviation maintenance industry documentation.	101302	Interpret quality improvement.
				.02	
		101305	Perform basic hand skills, standard trade practices and fundamentals in aviation.	101303	Identify, interpret and apply industry manuals, specifications and drawings.
				3.01	
		101306	Conduct self in the aviation maintenance environment.	101303	Amend and store manuals, specifications or drawings.
				.02	
		101307	Communicate aviation technical and maintenance management knowledge.	10130	Interpret documentation.
				4.01	
		101308	Apply mathematics and physics in aviation maintenance.	101304	Complete, store and distribute documentation.
				.02	
		101309	Remove and install miscellaneous aircraft electrical hardware/components	10130	Select, use and store tools and/or equipment
				5.01	
		101301	Interpret work health and safety practices in aviation maintenance.	101305	Apply standard trade practices.
				.02	
101302	Apply quality standards applicable to aviation maintenance.	10130	Manage self and work effectively with others.		
		6.01			
101303	Interpret and use aviation maintenance industry manuals and specifications.	101306	Participate in the process of change and innovation.		
		.02			
101304	Complete aviation maintenance industry documentation.	10130	Evaluate written technical communication.		
		7.01			
101305	Perform basic hand skills, standard trade practices and fundamentals in aviation.	101307	Present technical and non-technical briefings.		
		.02			
101306	Conduct self in the aviation maintenance environment.	10130	Apply mathematical techniques in aviation maintenance.		
		8.01			
101307	Communicate aviation technical and maintenance management knowledge.	101308	Apply physics laws and principles in aviation maintenance.		
		.02			
101308	Apply mathematics and physics in aviation maintenance.	10130	Remove aircraft electrical hardware.		
		9.01			
101309	Remove and install miscellaneous aircraft electrical hardware/components	101309	Install aircraft electrical hardware.		
		.02			

หน้าที่หลัก Key Function		หน่วยสมรรถนะ Unit of Competence		หน่วยสมรรถนะย่อย Element of Competence	
รหัส	คำอธิบาย	รหัส	คำอธิบาย	รหัส	คำอธิบาย
101	Aircraft Mechanics: Airplane	101311	Use electrical test equipment.	10131	Select and prepare test equipment.
				1.01	
		101312	Perform aircraft flight servicing.	101311	Test system or component.
				.02	
		101313	Remove and install aircraft hydro-mechanical and landing gear system.	10131	Inspect aircraft and systems, and prepare for flight.
				2.01	
		101312		101312	Replenish aircraft systems.
				.02	
		101313	Remove and install aircraft hydro-mechanical and landing gear system.	10131	Remove hydro-mechanical system and landing gear components.
				3.01	
		101313		101313	Install hydro-mechanical system and landing gear components.
				.02	
		101314	Remove and install aircraft pneumatic system components.	10131	Remove pneumatic system components.
				4.01	
		101314		101314	Install pneumatic system components.
.02					
101317	Remove and install engines and engine system components.	10131	Remove engine.		
		7.01			
		101317	Remove engine system components.		
.02					
101317	Install engine, engine system components.				
.03					
101320	Inspect and maintain structures and related components of non-pressurized small aircraft.	10132	Inspect and maintain aircraft structure.		
		0.01			
101320	Prepare and Install components.				
.02					
101321	Participate in environmentally sustainable work practices.	10132	Identify current resource use and environmental issues.		
		1.01			
		101321	Comply with environmental regulations and seek opportunities to improve environmental practices and resource efficiency.		
.02					
102	Aircraft Mechanics Helicopter	102301	Remove and install rotary wing rotor and flight control system components.	10230	Remove and install rotary wing rotor.
				1.01	
		102302	Remove and install avionic system components.	102301	Remove and install rotary wing flight control system components.
				.02	
102302		10230	Remove avionic system components.		
		2.01			
102302	Install avionic system components and verify system serviceability.				
.02					

หน้าที่หลัก Key Function		หน่วยสมรรถนะ Unit of Competence		หน่วยสมรรถนะย่อย Element of Competence	
รหัส	คำอธิบาย	รหัส	คำอธิบาย	รหัส	คำอธิบาย
102	Aircraft Mechanics Helicopter	102303	Maintain basic rotary wing aircraft systems.	102303.01	Inspect and test/adjust basic rotary wing airframe systems and components.
				102303.02	Troubleshoot basic rotary wing airframe systems and components.
				102303.03	Troubleshoot rotor and rotor control systems
				102303.04	Troubleshoot basic rotary wing airframe systems
				102303.05	Remove and install rotary wing rotor and rotor system components
				102303.06	Remove and install rotor control system components
				102303.07	Remove and install basic rotary wing airframe system components

คำอธิบาย

ตารางแผนผังแสดงหน้าที่ (ต่อ) เป็นแผนผังที่ใช้วิเคราะห์หน้าที่งานหลังจากได้หน้าที่หลัก (Key Function) เพื่อให้ได้ หน่วยสมรรถนะ (Unit of Competence) และหน่วยสมรรถนะย่อย (Element of Competence)

1. รหัสหน่วยสมรรถนะ 101301
2. ชื่อหน่วยสมรรถนะ Interpret work health and safety practices in aviation maintenance.
3. ทบทวนครั้งที่ - / -
4. สร้างใหม่ ปรับปรุง

5. สำหรับชื่ออาชีพและรหัสอาชีพ (Occupational Classification)

- 101 Aircraft Mechanics: Airplane
 102 Aircraft Mechanics: Helicopter
 103 Aircraft Mechanics: Avionics

6. คำอธิบายหน่วยสมรรถนะ (Description of Unit of Competency)

This skill unit covers the skills and knowledge necessary to comply with work health and safety (WHS) regulation and work safely in aircraft maintenance areas. It requires the application of relevant WHS practices to aviation maintenance workplaces to ensure his own safety and that of others in the workplace.

Workplaces include flight line or tarmac, hangars and workshops. Maintenance activities include all planned and unplanned maintenance on fixed planes or rotary wing and components thereof. The work can be done individually or as part of a team.

7. สำหรับระดับคุณวุฒิ

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8. กลุ่มอาชีพ (Sector)

7232 AircraftMechanics

9. ชื่ออาชีพและรหัสอาชีพอื่นที่หน่วยสมรรถนะนี้สามารถใช้ได้ (ถ้ามี)

N/A

10. ข้อกำหนดหรือกฎระเบียบที่เกี่ยวข้อง (Licensing or Regulation Related) (ถ้ามี)

ICAO Doc 7192 / EASA Part 66

11. สมรรถนะย่อยและเกณฑ์การปฏิบัติงาน (Elements and Performance Criteria)

สมรรถนะย่อย (Element)	เกณฑ์ในการปฏิบัติงาน (Performance Criteria)	วิธีการประเมิน (Assessment)
101301.01 Interpret safe work practices, reporting procedures for workplace hazards.	101301.01.01 Able to interpret and understand Relevant regulatory and enterprise policies and procedures that identify therequirements for conduct of safe work, to identify Workplace housekeepingmeasures in accordance with standard enterprise procedures, to identify andunderstand the use of personal protective equipment (PPE) and maintenance measures are interpreted and understoodaccording to regulatory and enterprise procedures. 101301.01.02 Able to identify andunderstand safety signs and symbols, and their directions observed inaccordance with enterprise and safety requirements, to identify workplacehazards correctly and able to interpret and understand reporting proceduresaccording to standard enterprise procedures.	

สมรรถนะย่อย (Element)	เกณฑ์ในการปฏิบัติงาน (Performance Criteria)	วิธีการประเมิน (Assessment)
101301.02 Interpret emergency procedures.	101301.02.01 Able to contact the appropriate personnel and emergency services in the event of an accident using appropriate method according to enterprise requirements. 101301.02.02 Able to interpret and understand emergency and evacuation procedures to ensure safe conduct of personnel according to enterprise procedures, correctly identify the use of emergency equipment according to regulatory or enterprise procedures.	

12. ความรู้และทักษะก่อนหน้าที่จำเป็น (Pre-requisite Skill & Knowledge)

N/A

13. ทักษะและความรู้ที่ต้องการ (Required Skills and Knowledge)

(ก) ความต้องการด้านทักษะ

See Appendix A

(ข) ความต้องการด้านความรู้

See Appendix A

14. หลักฐานที่ต้องการ (Evidence Guide)

(a) Performance Evidence

The evidence required to demonstrate competency in this unit must be relevant and meets all the requirements of the elements and performance criteria as specified in the evaluation, and must include:

- correctly interpreting WHS regulations, instructions and procedures relevant to the requirements for conduct of safe work listed in the Range of Conditions
- recognizing and adhering to aerospace industry signage, including aircraft systems plumbing markings
- recognizing and reporting to designated personnel hazardous situations in the workplace
- risk assessment and control
- selecting appropriate PPE for the maintenance activity being undertaken
- correct interpretation of enterprise and regulatory emergency procedures
- correct identification and operation of enterprise/industry-specific workplace emergency equipment.

This unit must be linked to its assessment and application to all other units. The relationship between general workplace WHS requirements, as included in enterprise procedures, and the relevant federal and/or state and territory legislation must be clearly linked.

Evidence of knowledge and skills associated with the application of WHS standards is required to supplement evidence of ability to interpret and apply specific safe practices in the workplace.

(b) 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:

- the applicable sources of WHS requirements and procedures and their application in requirements for conduct of safe work as listed in the Range of Conditions
- how to recognize and report hazardous situations in the workplace
- methods of risk assessment and control
- the preferred order of ways to control risks (known as the hierarchy of control)
- work operations to control risks, e.g. permit to work systems, such as confined space entry and isolation procedures
- how to determine requirements for PPE associated with maintenance activities
- the correct selection and use of workplace emergency equipment
- action to be taken in emergency situations.

15. ขอบเขต (Range Statement)

Requirements for conduct of safe work include:

- Applying general duty of care under WHS legislation and common law
- Fluid and gas high and low pressure systems, including fluid handling (for example, hydraulic fluids, lubricants, compressed air, nitrogen and oxygen)
- Fuelling/defueling and working on fuel systems
- Using and handling chemicals, including solvents and battery acids
- Electrical systems, outlets and leads
- Noise hazard areas and aircraft safety zones
- Aircraft handling, towing, jacking, ground equipment operation and signage
- Personal protection
- Housekeeping and cleaning, waste disposal and foreign object damage (FOD) prevention practices and procedures

- Confined space entry (where applicable to the enterprise)
- Aircraft strobe lighting (where applicable to the enterprise)
- Ionizing and non-ionizing radiation equipment (where applicable to the enterprise)

Relevant regulatory and enterprise policies and procedures are found in:

- WHS Acts, regulations and codes of practice, including regulations and codes of practice relating to hazards present in the workplace or industry
- Organizational safety manuals that specify provisions relating to roles and responsibilities of health and safety representatives and/or WHS committees and provisions relating to WHS issue resolution
- Maintenance organization manuals
- Procedures manuals
- Work instructions

Personal protective equipment (PPE) requirements are found in:

- Procedures manuals
- Maintenance manuals
- Work instructions

Workplace hazard identification includes:

- Checking equipment or the work area before work commences and during work
- Workplace inspections
- Housekeeping

16. หน่วยสมรรถนะร่วม (ถ้ามี)

N/A

17. อุตสาหกรรมร่วม/กลุ่มอาชีพร่วม (ถ้ามี)

N/A

18. รายละเอียดกระบวนการและวิธีการประเมิน (Assessment Description and Procedure)

The assessment are compose of paper exams , interviews, and practical demonstrations, which the paper exam is the main testing. The selection of interviews and practical demonstrations are depending on the assessors' judgment. This unit may be assessed on the job, off the job or a combination of both on and off the job. When evaluation occurs outside the workplace, that is, the candidate is not in productive work, an appropriate simulation should be used when the range of conditions reflects realistic situations in the workplace. If a demonstration of the application of skills, the candidate must have access to all the necessary tools, equipment, materials and relevant documentation. The candidate should be allowed to refer to all relevant procedures in the workplace, product specifications and manufacturing, codes, standards, manuals and reference materials.

The 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 under routine supervision on at least one item from each of:

- applying general duty of care under WHS legislation and common law
 - fluid and gas high and low pressure systems, including fluid handling (for example, hydraulic fluids, lubricants, compressed air, nitrogen and oxygen)
 - fuelling/defueling and working on fuel systems using and handling chemicals, including solvents and battery acids electrical systems, outlets and leads noise hazard areas and aircraft safety zones aircraft handling, towing, jacking, ground equipment operation and signage personal protection housekeeping and cleaning, waste disposal and FOD prevention practices and procedures.
- Also, where applicable to the enterprise, the following:
- confined space entry
 - aircraft strobe lighting
 - ionizing, non-ionizing radiation equipment

This shall be established via the records in the Log of Industrial Experience and Achievement or, where appropriate, an equivalent Industry Evidence Guide. The relationship between general workplace WHS requirements, as included in enterprise procedures, and the relevant federal and/or state and territory legislation must be clearly linked.

1. รหัสหน่วยสมรรถนะ 101302
2. ชื่อหน่วยสมรรถนะ Apply quality standards applicable to aviation maintenance.
3. ทบทวนครั้งที่ - / -
4. สร้างใหม่ ปรับปรุง

5. สำหรับชื่ออาชีพและรหัสอาชีพ (Occupational Classification)

- 101 Aircraft Mechanics: Airplane
 102 Aircraft Mechanics: Helicopter
 103 Aircraft Mechanics: Avionics

6. คำอธิบายหน่วยสมรรถนะ (Description of Unit of Competency)

This skill unit requires the application of quality standards in the implementation of aviation maintenance activities, including tasks scheduled flight / asphalt, hangar and maintenance workshop, either individually or as a member of a team during the scheduled or unscheduled maintenance.

7. สำหรับระดับคุณวุฒิ

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8. กลุ่มอาชีพ (Sector)

7232 Aircraft Mechanics

9. ชื่ออาชีพและรหัสอาชีพอื่นที่หน่วยสมรรถนะนี้สามารถใช้ได้ (ถ้ามี)

N/A

10. ข้อกำหนดหรือกฎระเบียบที่เกี่ยวข้อง (Licensing or Regulation Related) (ถ้ามี)

ICAO Doc 7192 / EASA Part 66

11. สมรรถนะย่อยและเกณฑ์การปฏิบัติงาน (Elements and Performance Criteria)

สมรรถนะย่อย (Element)	เกณฑ์ในการปฏิบัติงาน (Performance Criteria)	วิธีการประเมิน (Assessment)
101302.01 Interpret and apply quality standards.	101302.01.01 Standards or specifications set out in maintenance documents and process specifications are identified and interpreted. 10130.01.02 Standards are applied appropriately for individual and team-related activities, documentation is handled and completed accurately.	
101302.02 Interpret quality improvement.	101302.02.01 Performance monitoring measures are identified to ensure product or service standards are maintained or improved. 10130.02.02 Clearly enable information to be easily read or interpreted.	

12. ความรู้และทักษะก่อนหน้าที่จำเป็น (Pre-requisite Skill & Knowledge)

- 101301 Interpret work health and safety practices in aviation maintenance
 101303 Interpret and use aviation maintenance industry manuals and specifications

13. ทักษะและความรู้ที่ต้องการ (Required Skills and Knowledge)

(ก) ความต้องการด้านทักษะ

See Appendix A

(ข) ความต้องการด้านความรู้

See Appendix A

14. หลักฐานที่ต้องการ (Evidence Guide)

(a) Performance Evidence

The evidence required to demonstrate competency in this unit must be relevant and meets all the requirements of the elements and performance criteria as specified in the evaluation, and must include:

- the application of workplace hazard reporting and identification procedures
- interpretation and application of information from a range of industry manuals, in particular, amendment status block information, amendment procedures, specification/modification leaflet applicability and changes to drawings
- the correct identification of aircraft hardware, materials and components by marking, part number, size and shape
- being able to differentiate the elements which constitute the system and be able to identify processes, workplace regulations and ISO 9000 compliant documentation and specifications within the workplace environment. The relationship between broader quality standards requirements and service-specific procedures must be clearly linked. It is essential that actual and potential defects within the quality system are considered, together with ongoing abnormalities of equipment or systems as they affect the quality system.

(b) 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:

- typical quality systems and their operation in the workplace
- workplace quality documentation, such as quality manuals, procedures manuals, work instructions and worksheets
- the relationship between the quality system and work health and safety (WHS) requirements, such as workplace hazard reporting
- the relationship between the quality system and identification systems for aircraft hardware, materials and components
- the role of inspection in maintaining aircraft continuing airworthiness and reliability, including ageing aircraft inspection requirements
- how inspection programs are derived and developed
- individual and organizational responsibility associated with 'on condition' maintenance
- inspection terminology and standards of inspection with regard to the quality system
- identifying potential areas for inspection process improvement as a quality system activity.

15. ขอบเขต (Range Statement)

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.

16. หน่วยสมรรถนะร่วม (ถ้ามี)

N/A

17. อุตสาหกรรมร่วม/กลุ่มอาชีพร่วม (ถ้ามี)

N/A

18. รายละเอียดกระบวนการและวิธีการประเมิน (Assessment Description and Procedure)

- The assessment are composed of paper exams , interviews, and practical demonstrations, which the paper exam is the main testing. The selection of interviews and practical demonstrations are depending on the assessors' judgment.
- Competency should be assessed in the work environment or by use of simulated activities, covering the application of quality standards in situations within the aircraft maintenance environment.
- Evidence of underlying knowledge and skills associated with the general application of quality standards is required to supplement evidence of ability to integrate these processes in conjunction with other personnel in the workplace.
- This unit must be related in its assessment and application to all other units.
- The following conditions of assessment represent the requirements of the Regulators 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 in both single and multiple tasks involving more than one person. 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).

1. รหัสหน่วยสมรรถนะ 101303
2. ชื่อหน่วยสมรรถนะ Interpret and use aviation maintenance industry manuals and specifications.
3. ทบทวนครั้งที่ - / -
4. สร้างใหม่ ปรับปรุง

5. สำหรับชื่ออาชีพและรหัสอาชีพ (Occupational Classification)

- 101 Aircraft Mechanics: Airplane
 102 Aircraft Mechanics: Helicopter
 103 Aircraft Mechanics: Avionics

6. คำอธิบายหน่วยสมรรถนะ (Description of Unit of Competency)

This skill unit requires application of skills and knowledge needed to board the plane and the activities of the related workshop and is applicable to all aeroskills training routes. It covers the skills required to properly use and interpret industry manuals, specifications and drawings used for maintenance and manufacturing of aircraft and components during scheduled or unscheduled maintenance. The work can be done individually or as part of a team.

7. สำหรับระดับคุณวุฒิ

1	2	3	4	5	6	7	8
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

8. กลุ่มอาชีพ (Sector)

7232 Aircraft Mechanics

9. ชื่ออาชีพและรหัสอาชีพอื่นที่หน่วยสมรรถนะนี้สามารถใช้ได้ (ถ้ามี)

N/A

10. ข้อกำหนดหรือกฎระเบียบที่เกี่ยวข้อง (Licensing or Regulation Related) (ถ้ามี)

ICAO Doc 7192 / EASA Part 66

11. สมรรถนะย่อยและเกณฑ์การปฏิบัติงาน (Elements and Performance Criteria)

สมรรถนะย่อย (Element)	เกณฑ์ในการปฏิบัติงาน (Performance Criteria)	วิธีการประเมิน (Assessment)
101303.01 Identify, interpret and apply industry manuals, specifications and drawings.	101303.01.01 Appropriate manuals are identified and accessed for the type of aircraft or component to be maintained. 101303.01.02 Information and worksteps are interpreted and procedures to be followed are accurately determined.	
101303.02 Amend and store manuals, specifications or drawings.	101303.02.01 Manual, specification or drawing changes and/or amendments are incorporated and documented correctly in accordance with statutory regulations and/or enterprise procedures. 101303.02.01.02 Manuals, specifications or drawings are stored appropriately to ensure prevention of damage, ready access and updating of information, when required, in accordance with regulatory and/or enterprise procedures	

12. ความรู้และทักษะก่อนหน้าที่จำเป็น (Pre-requisite Skill & Knowledge)

101301 Interpret work health and safety practices in aviation maintenance

13. ทักษะและความรู้ที่ต้องการ (Required Skills and Knowledge)

(ก) ความต้องการด้านทักษะ

See Appendix A

(ข) ความต้องการด้านความรู้

See Appendix A

14. หลักฐานที่ต้องการ (Evidence Guide)

(a) Performance Evidence

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

- accessing and interpreting information from industry manuals, including paper-based, microfiche or computer-based media, relating to work activities, includes determination of manual amendment status, knowledge of manual structures and locating relevant information/instructions for work activity
- amending industry manuals to reflect current/approved amendment status
- identifying and interpreting information from drawings and diagrams in aircraft maintenance manuals, including component scaling, section, assembly, location, drawing applicability and amendment status from the title block
- correct handling and storage of drawings, manuals and industry media, i.e. microfiche and digital formats
- calculating allowable dimension variations on a component from information in drawing title blocks and drawings
- calculating dimensions from drawings for the purpose of manufacturing aircraft components and hardware. The transferability of general manual interpretation and use in accordance with relevant aircraft publications/maintenance regulations/orders and standards and practices must be clearly established. Evidence of underlying knowledge and skills associated with the interpretation and use of manuals is required to supplement understanding of the structure and regulatory requirements associated with the aircraft maintenance environment in this area.

(b) 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:

- the types of industry manuals used in aviation maintenance and types of media
- requirements for custody and upkeep of industry manuals
- techniques for obtaining and applying data contained in industry manuals.

15. ขอบเขต (Range Statement)

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.

Appropriate manuals include:

Aircraft publications, maintenance instruction manuals, process specifications, servicing or service bulletins or structural repair manuals.

Tooling or equipment manuals, manufacturer's manuals, standard practices, enterprise aviation regulations and publications .

Illustrated parts catalogues, aircraft wiring manuals or drawings .

Statutory regulations and/or enterprise procedures include:

Civil Aviation Regulations (CARs) or Civil Aviation Safety Regulations (CASRs) .

Applicable Defence Regulations and instructions.

Maintenance organisation manuals

Standing instructions.

16. หน่วยสมรรถนะร่วม (ถ้ามี)

N/A

17. อุตสาหกรรมร่วม/กลุ่มอาชีพร่วม (ถ้ามี)

N/A

18. รายละเอียดกระบวนการและวิธีการประเมิน (Assessment Description and Procedure)

- The assessment are compose of paper exams , interviews, and practical demonstrations, which the paper exam is the main testing. The selection of interviews and practical demonstrations are depending on the assessors' judgment.
- Competency should be assessed in the work environment, or by use of simulated activities, covering the interpretation and use of enterprise aviation manuals, aircraft publications, process sheets, specifications and drawings applicable to the aircraft maintenance environment.
- This unit must be linked in its assessment and application to those that apply to the actual maintenance of aircraft.
- 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 manual from each of the following groups of publications:
 - aircraft publications, maintenance instruction manuals, process specifications, servicing or service bulletins or structural repair manuals
 - tooling or equipment manuals, manufacturer's manuals, standard practices, enterprise aviation regulations and publications
 - illustrated parts catalogues, aircraft wiring manuals or drawings.
- 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 Implementation Guide).

1. รหัสหน่วยสมรรถนะ 101304
2. ชื่อหน่วยสมรรถนะ Complete aviation maintenance industry documentation.
3. ทบทวนครั้งที่ - / -
4. สร้างใหม่ ปรับปรุง

5. สำหรับชื่ออาชีพและรหัสอาชีพ (Occupational Classification)

- 101 Aircraft Mechanics: Airplane
 102 Aircraft Mechanics: Helicopter
 103 Aircraft Mechanics: Avionics

6. คำอธิบายหน่วยสมรรถนะ (Description of Unit of Competency)

This skill unit requires the use of the skills and the knowledge requirements for the completion and processing of documents during and at the end of aviation maintenance activities and is applicable to all educational paths aero skills during scheduled or unscheduled maintenance.

7. สำหรับระดับคุณวุฒิ

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8. กลุ่มอาชีพ (Sector)

7232 Aircraft Mechanics

9. ชื่ออาชีพและรหัสอาชีพอื่นที่หน่วยสมรรถนะนี้สามารถใช้ได้ (ถ้ามี)

N/A

10. ข้อกำหนดหรือกฎระเบียบที่เกี่ยวข้อง (Licensing or Regulation Related) (ถ้ามี)

ICAO Doc 7192 / EASA Part 66

11. สมรรถนะย่อยและเกณฑ์การปฏิบัติงาน (Elements and Performance Criteria)

สมรรถนะย่อย (Element)	เกณฑ์ในการปฏิบัติงาน (Performance Criteria)	วิธีการประเมิน (Assessment)
101304.01 Interpret documentation.	101304.01.01 Documentation requirements are determined and accessed, where necessary from relevant sources in accordance with regulatory and enterprise procedures. 101304.01.02 Information contained in existing documentation is interpreted correctly and, where necessary, requirements carried out in accordance with regulatory and enterprise procedures.	
101304.02 Complete, store and distribute documentation.	101304.02.01 Information requirements for new documentation or updating of existing documentation are determined to allow for accurate completion of records. 101304.02.02 All procedures for storing and distributing documentation are followed to ensure ready access when required in accordance with regulatory and enterprise procedures.	

12. ความรู้และทักษะก่อนหน้าที่จำเป็น (Pre-requisite Skill & Knowledge)

101302 Apply quality standards applicable to aviation maintenance processes.

13. ทักษะและความรู้ที่ต้องการ (Required Skills and Knowledge)

(ก) ความต้องการด้านทักษะ

See Appendix A

(ข) ความต้องการด้านความรู้

See Appendix A

14. หลักฐานที่ต้องการ (Evidence Guide)

(a) Performance Evidence

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

- identification and accurate completion of industry documentation associated with aircraft/aircraft component maintenance, repair, overhaul and modification activities and industry regulatory reports
- handling industry documentation appropriately to ensure that records are accurately processed, forwarded and/or stored as required by industry and enterprise regulations. It is essential that information generated in the process of completing paperwork is in a form which is acceptable to the workplace environment and regulatory requirements in accordance with the relevant aircraft publications/maintenance regulations/orders and standards and practices.

(b) 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:

- maintenance practice terminology and the associated relationship with industry documentation, i.e. scheduled and unscheduled servicing, aircraft/component lifting, i.e. on condition, life expired, throwaway, repair and overhaul.

15. ขอบเขต (Range Statement)

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.

Documentation includes:

Maintenance logs, overhaul test/check sheets, job history sheets, traveller cards, maintenance reports, irregularity reports, serviceable tags or removal tags

Material safety data sheets (MSDS) or material record sheets

Regulatory and enterprise procedures are found in:

Civil Aviation Regulations (CARs) or Civil Aviation Safety Regulations (CASRs)

Maintenance organisation manuals

Procedures manuals

Work instructions

Quality manuals

Safety manuals

Applicable Defence Regulations and instructions

Standing instructions

16. หน่วยสมรรถนะร่วม (ถ้ามี)

N/A

17. อุตสาหกรรมร่วม/กลุ่มอาชีพร่วม (ถ้ามี)

N/A

18. รายละเอียดกระบวนการและวิธีการประเมิน (Assessment Description and Procedure)

- The assessment are composed of paper exams , interviews, and practical demonstrations, which the paper exam is the main testing. The selection of interviews and practical demonstrations are depending on the assessors' judgment.
- Competency should be assessed in the work environment, or by use of simulated activities, covering the interpretation, use and completion of aircraft maintenance documentation in the maintenance environment in accordance with relevant aircraft publications/maintenance regulations/orders and standards and practices.
- This unit must be linked in its assessment and application to those that apply to the actual maintenance of aircraft.
- Evidence of underlying knowledge and skills associated with the interpretation and completion of paperwork is required to supplement evidence of appropriate levels of literacy and numeracy, associated with presenting clear and concise information.
- 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 type of documentation from each of the following groups:
 - maintenance logs, overhaul test/check sheets, job history sheets, traveller cards, maintenance reports, irregularity reports, serviceable tags or removal tags
 - MSDS or material record sheets.
 - 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 Implementation Guide).

1. รหัสหน่วยสมรรถนะ 101305
2. ชื่อหน่วยสมรรถนะ Perform basic hand skills, standard trade practices and fundamentals in aviation.
3. ทบทวนครั้งที่ - / -
4. สร้างใหม่ ปรับปรุง

5. สำหรับชื่ออาชีพและรหัสอาชีพ (Occupational Classification)

- 101 Aircraft Mechanics: Airplane
 102 Aircraft Mechanics: Helicopter
 103 Aircraft Mechanics: Avionics

6. คำอธิบายหน่วยสมรรถนะ (Description of Unit of Competency)

This unit of competency is applicable to all maintenance training pathways Aeroskills. It requires the application of basic hand skills and standard business practices in the maintenance of aircraft and components. The jurisdiction applies to the selection and use of tools and manual and electric equipment associated with planned and unplanned on airplanes or activities related to the workshop in the aircraft maintenance environment involves:

- laying out and fabricating simple items from common aircraft materials
- assembling items using a representative range of common types of aircraft attachment hardware for which relevant fits and clearances, appropriate safety locking devices and fasteners, including lock wire, are correctly selected and applied
- assembling/connecting a range of common aircraft connectors and plumbing, applying safety locking devices, where applicable
- assembling/connecting aircraft control cables and applying safety locking devices, where applicable
- the use of lubrication equipment and lubricants. Work may be performed individually or as part of a team and in accordance with industry standard procedures specified by manufacturers, regulatory authorities or the enterprise.

7. สำหรับระดับคุณวุฒิ

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<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

8. กลุ่มอาชีพ (Sector)

7232 Aircraft Mechanics

9. ชื่ออาชีพและรหัสอาชีพอื่นที่หน่วยสมรรถนะนี้สามารถใช้ได้ (ถ้ามี)

N/A

10. ข้อกำหนดหรือกฎระเบียบที่เกี่ยวข้อง (Licensing or Regulation Related) (ถ้ามี)

ICAO Doc 7192 / EASA Part 66

11. สมรรถนะย่อยและเกณฑ์การปฏิบัติงาน (Elements and Performance Criteria)

สมรรถนะย่อย (Element)	เกณฑ์ในการปฏิบัติงาน (Performance Criteria)	วิธีการประเมิน (Assessment)
101305.01 Select, use and store tools and/or equipment	101305.01.01 Hand and/or power tools or equipment, including lubrication equipment and lubricants, are selected for appropriate application to the required task. 101305.01.02 Tools and/or equipment are used according to standard practices to ensure the correct outcome is produced and are stored safely and securely in accordance with enterprise procedures.	

สมรรถนะย่อย (Element)	เกณฑ์ในการปฏิบัติงาน (Performance Criteria)	วิธีการประเมิน (Assessment)
101305.02 Apply standard trade practices.	101305.02.01 Common types of aircraft attachment hardware, types of safety locking devices and fasteners are correctly selected and used. 101305.02.02 Aircraft components, devices and hardware are lock wired in the correct manner, using the appropriate wire gauge, common types of aircraft connectors and plumbing are accurately assembled or connected.	

12. ความรู้และทักษะก่อนหน้าที่จำเป็น (Pre-requisite Skill & Knowledge)

101302 Apply quality standards applicable to aviation maintenance processes

101304 Complete aviation maintenance industry documentation

13. ทักษะและความรู้ที่ต้องการ (Required Skills and Knowledge)

(ก) ความต้องการด้านทักษะ

See Appendix A

(ข) ความต้องการด้านความรู้

See Appendix A

14. หลักฐานที่ต้องการ (Evidence Guide)

(a) Performance Evidence

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

- the correct identification, inspection of, application, use and storage of general and purpose specific hand tools (i.e. spanners, screwdrivers, pliers, hammers, cutting devices, files, punches, drills and marking out tools) that may be found in an aircraft engineering workshop or hangar
- the correct identification, inspection of (including calibration), application, use and storage of precision measuring tools (i.e. micrometers, vernier instruments, feeler gauges, go/no-go gauges) that may be found in an aircraft engineering workshop or hangar.

Reading instrument scales must be clearly demonstrated during application of instruments to ensure compliance with specifications

- the correct identification, inspection of, application, operation and storage/servicing of portable and fixed power and machine tools (i.e. drills, presses, grinders, shears, pan breaks) that may be found in an aircraft engineering workshop or hangar
- identification, inspection and use of lubrication equipment
- determination of correct lubricants for specified applications
- identification of common ferrous and non-ferrous aircraft materials
- identification of common aircraft composite and non-metallic materials (other than wood)
- identification of aircraft hardware by markings, part numbers, size, shape and material
- the installation of aircraft hardware using standard practices/techniques to ensure safe security and includes:
 - minimum thread engagement
 - split pinning
 - lock wiring
 - application of locking compounds
 - locking tabs, spring washers
 - lock nuts
- the installation of aircraft hardware using tightening, torqueing and tensioning techniques.

Calculating setting, reading scales and setting up of torque wrench and/or tensioning devices must be clearly demonstrated before application of wrench or device

- identification of various types of aircraft rigid and flexible plumbing and their connectors
- identification of aircraft control cables and related cable system hardware
- manufacture of simple items using basic hand skills.

(b) 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:

- types of standard aircraft hardware and methods of identification, including bolts, nuts, washers, pins (cotter, tapered) and fasteners (rivets and camlocs)
- materials from which hardware is manufactured and its applications, including plain, corrosion resistant and temperature/heat resistant
- types of safety locking devices and their application
- common ferrous and non-ferrous aircraft materials, heat treatment and testing
- characteristics and properties of common composite and non-metallic materials other than wood
- types of aircraft cable, turnbuckles, end fittings, tensiometers, and pulleys and cable system components, and aircraft flexible control systems
- types and characteristics of lubricants
- types and uses of lubrication equipment
- fits and clearances
- laying out of simple items for manufacture using basic hand skills
- hand and power tool storage and maintenance requirements
- tool calibration requirements
- WHS requirements relevant to the use of hand and power tools.

15. ขอบเขต (Range Statement)

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.

The use of tools and equipment includes:

- The related manipulative skills required to perform aircraft maintenance in areas where access is extremely limited

16. หน่วยสมรรถนะรวม (ถ้ามี)

N/A

17. ชุดสาทกรรมรวม/กลุ่มอาชีพรวม (ถ้ามี)

N/A

18. รายละเอียดกระบวนการและวิธีการประเมิน (Assessment Description and Procedure)

• The assessment are composed of paper exams , interviews, and practical demonstrations, which the paper exam is the main testing. The selection of interviews and practical demonstrations are depending on the assessors' judgment.

• Competency should be assessed in the work environment, or by use of simulated activities, using tools and equipment specified by aircraft manuals as well as general purpose tools and test equipment found in most routine situations.

• This unit must be linked in its assessment and application to those units that apply to actual maintenance of aircraft. It is essential that all WHS requirements are met and understood.

• Evidence of knowledge about how tools and equipment are selected, used and maintained is essential. The ability to manipulate tools and equipment correctly in the performance of tasks is necessary to demonstrate transferability of hand skills across a variety of applications.

• 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 the following tasks:

- laying out and fabricating simple items from common aircraft materials

- assembling items using a representative range of common types of aircraft attachment hardware for which relevant fits and clearances, appropriate safety locking devices and fasteners, including lock wire, and applicable lubricants are correctly selected and applied

- assembling/connecting a range of common aircraft connectors and plumbing, applying safety locking devices, where applicable

- assembling/connecting aircraft control cables and applying safety locking devices, where applicable.

- 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 Implementation Guide).

- Assessors must satisfy the requirements of the National Vocational Education and Training Regulator.

1. รหัสหน่วยสมรรถนะ 101306
2. ชื่อหน่วยสมรรถนะ Conduct self in the aviation maintenance environment.
3. ทบทวนครั้งที่ - / -
4. สร้างใหม่ ปรับปรุง
5. สำหรับชื่ออาชีพและรหัสอาชีพ (Occupational Classification)

101 Aircraft Mechanics: Airplane

102 Aircraft Mechanics: Helicopter

103 Aircraft Mechanics: Avionics

6. คำอธิบายหน่วยสมรรถนะ (Description of Unit of Competency)

This skill unit requires application of skills and knowledge on ethical behavior, self-management and skills development for all aspects of aircraft and aircraft component maintenance during scheduled or unscheduled maintenance. The work can be done individually or as part of a team.

7. สำหรับระดับคุณวุฒิ

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8. กลุ่มอาชีพ (Sector)

7232 Aircraft Mechanics

9. ชื่ออาชีพและรหัสอาชีพอื่นที่หน่วยสมรรถนะนี้สามารถใช้ได้ (ถ้ามี)

N/A

10. ข้อกำหนดหรือกฎระเบียบที่เกี่ยวข้อง (Licensing or Regulation Related) (ถ้ามี)

N/A

11. สมรรถนะย่อยและเกณฑ์การปฏิบัติงาน (Elements and Performance Criteria)

สมรรถนะย่อย (Element)	เกณฑ์ในการปฏิบัติงาน (Performance Criteria)	วิธีการประเมิน (Assessment)
101306.01 Manage self and work effectively with others.	101306.01.01 Work is undertaken individually or as a team member to complete maintenance tasks in a timely manner and in accordance with enterprise procedures and requirements. 101306.01.02 Effective communication skills are applied oral and written, including email, forms in English.	
101306.02 Participate in the process of change and innovation.	101306.02.01 Work is undertaken with others to implement change in the workplace 101306.02.02 opportunities for product and service enhancement and options for achieving the desired result are identified and proposed in accordance with enterprise procedures.	

12. ความรู้และทักษะก่อนหน้าที่จำเป็น (Pre-requisite Skill & Knowledge)

N/A

13. ทักษะและความรู้ที่ต้องการ (Required Skills and Knowledge)

(ก) ความต้องการด้านทักษะ

See Appendix A

(ข) ความต้องการด้านความรู้

See Appendix A

14. หลักฐานที่ต้องการ (Evidence Guide)

(a) 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 on at least one occasion. Evidence must be provided that the candidate, during aviation maintenance activities, is capable of:

- oral communication in English regarding maintenance activities
- written communication in English, including email, regarding maintenance activities
- applying principles of equity and diversity
- managing own work performance both individually and as part of a team
- interfacing effectively with others in the performance of maintenance and adapting to change
- applying legislation, regulations and organizational policies and procedures relevant to role and workplace
- contributing to own knowledge, skills and competency development for job performance and career progression
- provision of guidance to other team members.

(b) 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:

- oral and written communication within the aviation maintenance environment, including email
- human factors relating to fatigue, drugs and alcohol and performance of work as an individual and as a team member
- the application within the workplace of legislative requirements and principles regarding equal opportunity, equity and diversity
- aviation maintenance legislation, regulations and organizational policies and procedures that is relevant to the individual's role and workplace
- problem solving principles
- constant improvement principles and procedures
- enterprise procedures for proposing modifications or changes in work procedures
- change management
- methods of providing effective guidance to others in the aviation maintenance environment.

15. ขอบเขต (Range Statement)

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.

16. หน่วยสมรรถนะร่วม (ถ้ามี)

N/A

17. อุตสาหกรรมร่วม/กลุ่มอาชีพร่วม (ถ้ามี)

N/A

18. รายละเอียดกระบวนการและวิธีการประเมิน (Assessment Description and Procedure)

- The assessment are composed of paper exams , interviews, and practical demonstrations, which the paper exam is the main testing. The selection of interviews and practical demonstrations are depending on the assessors' judgment.
- This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job an appropriate simulation must be used where the range of conditions reflects realistic workplace situations.
- 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 and performance criteria of the unit, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
- Evidence of competency attainment shall be obtained via the records in the Log of Industrial Experience and Achievement, or where applicable an equivalent industry evidence guide (refer to the Companion Volume Assessment Guidelines).

1. รหัสหน่วยสมรรถนะ 101307
2. ชื่อหน่วยสมรรถนะ Communicate aviation technical and maintenance management knowledge.
3. ทบทวนครั้งที่ - / -
4. สร้างใหม่ ปรับปรุง
5. สำหรับชื่ออาชีพและรหัสอาชีพ (Occupational Classification)

Aircraft Mechanics: Airplane

Aircraft Mechanics: Helicopter

Aircraft Mechanics: Avionics

6. คำอธิบายหน่วยสมรรถนะ (Description of Unit of Competency)

This unit of competency requires the application of written and oral skills concerning the management of technical knowledge and communication aviation maintenance. Applications include evaluation of technical communication written and verbal reports delivery during scheduled or unscheduled maintenance. The work can be done individually or as part of a team.

7. สำหรับระดับคุณวุฒิ

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8. กลุ่มอาชีพ (Sector)

Aircraft Mechanics

9. ชื่ออาชีพและรหัสอาชีพอื่นที่หน่วยสมรรถนะนี้สามารถใช้ได้ (ถ้ามี)

Aircraft Maintenance: Airplane

Aircraft Maintenance: Helicopter

Aircraft Maintenance: Avionic

10. ข้อกำหนดหรือกฎระเบียบที่เกี่ยวข้อง (Licensing or Regulation Related) (ถ้ามี)

ICAO Doc 7192 / EASA Part 66

11. สมรรถนะย่อยและเกณฑ์การปฏิบัติงาน (Elements and Performance Criteria)

สมรรถนะย่อย (Element)	เกณฑ์ในการปฏิบัติงาน (Performance Criteria)	วิธีการประเมิน (Assessment)
101307.01 Evaluate written technical communication.	101307.01.01 The content of the technical written communication is checked the accuracy and adequacy plain English and literacy . 101307.01.02 communication skillsrelation to dealings with others involved in the work.	

สมรรถนะย่อย (Element)	เกณฑ์ในการปฏิบัติงาน (Performance Criteria)	วิธีการประเมิน (Assessment)
101307.02 Present technical and non-technical briefings.	101307.02.01 Briefing is planned and prepared in a well-structuredmanned information delivered is accurate. 101307.02.02 Audiovisual equipment,where applicable, is used in an effective, professional manner.	

12. ความรู้และทักษะก่อนหน้าที่จำเป็น (Pre-requisite Skill & Knowledge)

N/A

13. ทักษะและความรู้ที่ต้องการ (Required Skills and Knowledge)

(ก) ความต้องการด้านทักษะ

See Appendix A

(ข) ความต้องการด้านความรู้

See Appendix A

14. หลักฐานที่ต้องการ (Evidence Guide)

(a) Performance Evidence

Evidence required to demonstrate competency in this unit should be of interest and meet all requirements of the elements and performance criteria under the specified conditions assessment at least once, and must include: oral communication

written communication

evaluation

planning of briefings and use of aids to delivery.

communicate appropriately in English

b) Knowledge Evidence

Evidence required to demonstrate competency in this unit should be of interest and meet all requirements of the elements and performance criteria and include knowledge of:

applicable technical aspects

requirements for written communication

planning and delivery of briefings.

(c) Assessment recommendation

N/A

Assessment methods

15. ขอบเขต (Range Statement)

This field allows different environments and working conditions that can affect the performance. the essential operating conditions that may be present (depending on the work situation, accessibility requirements, the candidate of the topic, and local industry and regional contexts) are included.

Written technical communication includes:

Instructions

Reports

Requests being submitted in accordance with regulatory requirements.

Regulatory requirements, and organizational policies and procedures include:

Civil Aviation Regulations (CARs) and associated Advisory Circulars (ACs)

Civil Aviation Safety Regulations (CASRs), Manuals of Standards and associated Acceptable Means of Compliance and Guidance Material

Maintenance organization expositions

Continuing airworthiness management organization expositions

Policy manuals

Procedures manuals

Quality manuals

Work instructions

Technical Airworthiness Maintenance Manual

Defense instructions

Standing instructions

Maintenance management plans

Briefings are conducted for:

Employees of the organization

Business associates, such as teaming partners

Clients

Contractors and subcontractors

Representatives of regulatory bodies

Higher authorities

Visitors

Information includes:

Changes to policy and procedures or regulations

Workload requirements

Organizational activities

Organizational familiarization

Technical knowledge and skills

Work procedures

Non-technical matters

16. หน่วยสมรรถนะร่วม (ถ้ามี)

N/A

17. อุตสาหกรรมร่วม/กลุ่มอาชีพร่วม (ถ้ามี)

N/A

18. รายละเอียดกระบวนการและวิธีการประเมิน (Assessment Description and Procedure)

• The assessment are composed of paper exams , interviews, and practical demonstrations, which the paper exam is the main testing. The selection of interviews and practical demonstrations are depending on the assessors' judgment.

• This unit may be assessed on the job, off the job or a combination of both inside and outside of work. Where assessment occurs outside of work, i.e., the candidate is not in productive work, an appropriate simulation should be used in the range of conditions reflecting real work situations they would encounter in planning, technical assistance for the preparation and sessions delivering information related to aviation maintenance activities.

• The candidate must have access to all equipment, materials and documentation required and must be permitted to refer to all relevant site procedures, product specifications and manufacturing, codes, standards, manuals and reference materials. The assessment environment should not harm the candidate.

• The candidate must have access to all equipment, materials and documentation required and must be permitted to refer to all relevant site procedures, product specifications and manufacturing, codes, standards, manuals and reference materials. The assessment environment should not harm 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 the necessary knowledge, and be able to apply competition in new and different situations and contexts.

• Assessors must meet a series of tests that is valid, sufficient, current and authentic. The preferred method is the records of Competition Registration Maintenance Management. Where the individual has no record of proficiency testing can be obtained through a variety of ways, including direct observation, reports supervisor, project work, samples and interrogation. interrogation techniques should not require language, reading, writing and arithmetic in addition to those required in this competition unit.

• The assessors must meet the requirements of the National Education and Vocational Regulator.

1. รหัสหน่วยสมรรถนะ 101308
2. ชื่อหน่วยสมรรถนะ Apply mathematics and physics in aviation maintenance.
3. ทบทวนครั้งที่ - / -
4. สร้างใหม่ ปรับปรุง
5. สำหรับชื่ออาชีพและรหัสอาชีพ (Occupational Classification)

101 Aircraft Mechanics: Airplane

102 Aircraft Mechanics: Helicopter

103 Aircraft Mechanics: Avionics

6. คำอธิบายหน่วยสมรรถนะ (Description of Unit of Competency)

This skill unit requires the application of the principles of mathematics and physics necessary to support the development and implementation of aeronautical skills, aircraft systems and component maintenance. It also meets the requirements of the licensing program in the manual ICAO Doc 7192 / EASA Part 66standards.

7. สำหรับระดับคุณวุฒิ

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8. กลุ่มอาชีพ (Sector)

7232 Aircraft Mechanics

9. ชื่ออาชีพและรหัสอาชีพอื่นที่หน่วยสมรรถนะนี้สามารถใช้ได้ (ถ้ามี)

N/A

10. ข้อกำหนดหรือกฎระเบียบที่เกี่ยวข้อง (Licensing or Regulation Related) (ถ้ามี)

ICAO Doc 7192 / EASA Part 66

11. สมรรถนะย่อยและเกณฑ์การปฏิบัติงาน (Elements and Performance Criteria)

สมรรถนะย่อย (Element)	เกณฑ์ในการปฏิบัติงาน (Performance Criteria)	วิธีการประเมิน (Assessment)
101308.01 Apply mathematical techniques in aviation maintenance.	101308.01.01 Arithmetic, basic algebra and geometry are used in calculations relating to aviation maintenance. 101308.01.02 Graphical representations , simple trigonometric principles and methods are applied in aviation maintenance settings.	

สมรรถนะย่อย (Element)	เกณฑ์ในการปฏิบัติงาน (Performance Criteria)	วิธีการประเมิน (Assessment)
101308.02 Apply physics laws and principles in aviation maintenance.	101308.02.01 Statics principles, Kinetics principles, Dynamics principles, Fluid dynamics principles, Thermodynamics principles, laws and techniques are applied in aviation maintenance settings. 101308.02.02 Typical applications of light characteristics, application of the principles of wave motion and sound in aviation maintenance settings are explained.	

12. ความรู้และทักษะก่อนหน้าที่จำเป็น (Pre-requisite Skill & Knowledge)

N/A

13. ทักษะและความรู้ที่ต้องการ (Required Skills and Knowledge)

(ก) ความต้องการด้านทักษะ

See Appendix A

(ข) ความต้องการด้านความรู้

See Appendix A

14. หลักฐานที่ต้องการ (Evidence Guide)

(a) Performance Evidence

Evidence required to demonstrate competency in this unit must be relevant to and satisfies all of the requirements of the elements and performance criteria under the specified conditions of assessment on at least one occasion, and must include:

- performing arithmetical calculations typically required in aviation maintenance that apply the methods listed in knowledge evidence
- applying physics principles, laws and techniques listed in knowledge evidence that are applicable to aircraft and aircraft systems.

(b) 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:

- arithmetic:
- terms and signs
- methods of multiplication and division
- fractions and decimals
- factors and multiples
- weights, measures and conversion factors
- ratio and proportion
- averages
- percentages
- areas and volumes
- squares, cubes, square and cube roots
- algebra:
- how to evaluate simple algebraic expressions (add, subtract, multiply, divide, brackets, and simple fractions)
- linear equations and their solution
- indices and powers, negative and fractional indices
- simultaneous equations and second degree equations with one unknown
- binary and other applicable numbering systems
- logarithms
- geometry:
- simple geometrical constructions
- graphical representation (nature and use, graphs of equations and functions)
- trigonometry:
- simple trigonometry
- trigonometrical relationships
- use of tables
- rectangular and polar coordinates
- matter:
- nature of matter (chemical elements, atoms and molecules)
- chemical compounds
- states and change between states
- mechanics:
- forces, moments and couples – representation as vectors
- centre of gravity
- elements of theory of stress, strain and elasticity (tension, compression, shear and torsion)
- nature and properties of solid, fluid and gas
- pressure and buoyancy in liquids (barometers)
- linear movement – uniform motion in a straight line, motion under constant acceleration including motion under gravity – Newton's Laws of Motion
- rotational motion – uniform circular motion – centrifugal and centripetal forces
- periodic motion – pendular movement
- simple theory of vibration, harmonics and resonance
- velocity ratio, mechanical advantage and efficiency
- mass
- force, inertia, work, power, energy (potential, kinetic and total), heat and efficiency
- momentum and conservation of momentum
- impulse
- gyroscopic principles
- friction – nature and effects and coefficient of friction
- specific gravity and density
- viscosity, fluid resistance and effects of streamlining
- effects of compressibility of fluids
- static, dynamic and total pressure, Bernoulli's Theorem and venturi
- thermodynamics:
- temperature – thermometers and temperature scales (Celsius, Fahrenheit and Kelvin), heat definition
- heat capacity and specific heat
- heat transfer – convection, radiation and conduction
- volumetric expansion
- first and second laws of thermodynamics
- gases – ideal gas laws, specific heat at constant volume and constant pressure, work done by expanding gas
- isothermal, adiabatic expansion and compression, engine cycles, constant volume and constant pressure, refrigerators and heat pumps
- latent heat of fusion and evaporation, thermal energy and heat of combustion
- optics:
- nature of light and speed of light
- laws of reflection and refraction – reflection at plane surfaces, reflection by spherical mirrors, refraction and lenses
- fiber optics
- wave motion and sound:
- wave motion – mechanical waves, sinusoidal wave motion, interference phenomena and standing waves
- sound – speed of sound, production of sound, intensity, pitch and quality, and Doppler effect.

15. ขอบเขต (Range Statement)

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.

16. หน่วยสมรรถนะรวม (ถ้ามี)

N/A

17. อุตสาหกรรมร่วม/กลุ่มอาชีพร่วม (ถ้ามี)

N/A

18. รายละเอียดกระบวนการและวิธีการประเมิน (Assessment Description and Procedure)

- The assessment are composed of paper exams , interviews, and practical demonstrations, which the paper exam is the main testing. The selection of interviews and practical demonstrations are depending on the assessors' judgment.
- The unit may be assessed off the job in a training classroom environment using problems and application of knowledge relevant to aviation maintenance competencies and relevant knowledge requirements.
- The unit must be linked in its assessment and application to those units that apply to actual maintenance of aircraft.
- Evidence of knowledge about aviation maintenance settings in which mathematical techniques and physics principles, laws and techniques are applied is essential.
- A person cannot be assessed as competent until it can be demonstrated to the satisfaction of the workplace assessor that the relevant elements and the performance criteria of the unit of competency are being achieved off the job in simulated settings.

1. รหัสหน่วยสมรรถนะ 101309
2. ชื่อหน่วยสมรรถนะ Remove and install miscellaneous aircraft electrical hardware/components
3. ทบทวนครั้งที่ - / -
4. สร้างใหม่ ปรับปรุง
5. สำหรับชื่ออาชีพและรหัสอาชีพ (Occupational Classification)

101 Aircraft Mechanics: Airplane

102 Aircraft Mechanics: Helicopter

103 Aircraft Mechanics: Avionics

6. คำอธิบายหน่วยสมรรถนะ (Description of Unit of Competency)

This skill unit requires the use of skills in the welding base and the setting associated with the removal and installation of equipment and various electrical components on aircraft fixed and rotary wing during scheduled maintenance or not . The work can be done individually or as part of a team.

7. สำหรับระดับคุณวุฒิ

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8. กลุ่มอาชีพ (Sector)

7232 Aircraft Mechanics

9. ชื่ออาชีพและรหัสอาชีพอื่นที่หน่วยสมรรถนะนี้สามารถใช้ได้ (ถ้ามี)

N/A

10. ข้อกำหนดหรือกฎระเบียบที่เกี่ยวข้อง (Licensing or Regulation Related) (ถ้ามี)

N/A

11. สมรรถนะย่อยและเกณฑ์การปฏิบัติงาน (Elements and Performance Criteria)

สมรรถนะย่อย (Element)	เกณฑ์ในการปฏิบัติงาน (Performance Criteria)	วิธีการประเมิน (Assessment)
101309.01 Remove aircraft electrical hardware.	101309.01.01 System is rendered safe and prepared in accordance with the applicable maintenance manual and isolation tags are fitted, where necessary, to ensure personnel safety. Removal of electrical hardware is carried out in accordance with the applicable maintenance manual observing all relevant work health and safety (WHS) requirements. 101309.01.02 Required maintenance documentation is completed and processed in accordance with standard enterprise procedures. Removed components are tagged, packaged or discarded in accordance with specified procedures.	

สมรรถนะย่อย (Element)	เกณฑ์ในการปฏิบัติงาน (Performance Criteria)	วิธีการประเมิน (Assessment)
101309.02 Install aircraft electrical hardware.	<p>101309.02.01 Electrical hardware components to be installed are checked to confirm correct part numbers, modification status, serviceability and shelf life. Physical installation of electrical hardware is carried out in accordance with the applicable maintenance manual.</p> <p>101309.02.02 System is reinstated to correct physical condition in preparation for testing, as necessary. Required maintenance documentation is completed and processed in accordance with standard enterprise procedures.</p>	

12. ความรู้และทักษะก่อนหน้าที่จำเป็น (Pre-requisite Skill & Knowledge)

101301 Interpret work health and safety practices in aviation maintenance.

101501 Plan and organize aviation maintenance work activities.

101302 Apply quality standards applicable to aviation maintenance processes.

101303 Interpret and use aviation maintenance industry manuals and specifications.

101304 Complete aviation maintenance industry documentation.

101305 Perform basic hand skills, standard trade practices and fundamentals in aviation maintenance.

13. ทักษะและความรู้ที่ต้องการ (Required Skills and Knowledge)

(ก) ความต้องการด้านทักษะ

See Appendix A

(ข) ความต้องการด้านความรู้

See Appendix A

14. หลักฐานที่ต้องการ (Evidence Guide)

(a) Performance Evidence

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

- the preparation and termination of electrical cables to aircraft industry standards, using crimping techniques, soldering techniques and solder sleeves joints
- the correct interpretation of aircraft wire markings, terminal block identification and plug/socket pin numbering systems
- inspection of electrical looms and harness pre and post-removal and installation to ensure minimum bends are maintained, cable is not in tension, plugs are correctly aligned, security of route ensures no chaffing of insulation, adequate clipping and cable ties have been utilized and construction complies with aircraft industry standards
- positive identification of miscellaneous electrical hardware and/or components in all aircraft systems.

(b) 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:

- component attachment methods
- connection of hardware and plugs
- application of relevant WHS practices
- the use of approved maintenance documentation and aircraft publications relating to miscellaneous aircraft electrical hardware and components
- electrical wiring used in aircraft and wire marking
- plug/socket pin numbering and terminal block identification
- cable and loom installation requirements
- crimping tools and crimp terminals
- soldering techniques and the use of solder sleeve joints
- electrical fundamentals.

15. ขอบเขต (Range Statement)

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.

Hardware connection methods include:

Bolted

Soldered

Plug connectors

Types of electrical hardware include:

Switches, relays, lamps, terminal blocks, current limiters, circuit breakers, fuses, sockets, potentiometers, capacitors, inductors, magnetic amplifiers, transformers, rheostats, resistors and diodes, miscellaneous sensors and minor components hard mounted throughout the aircraft, busbars, lugs, ferrules, splices, connectors and electrical, electronic cables and looms.

Basic soldering and crimping

The work will include the application of basic soldering and crimping skills associated with removal and installation of electrical hardware.

Procedures and requirements include:

Industry standard procedures specified by manufacturers, regulatory authorities or the enterprise.

16. หน่วยสมรรถนะร่วม (ถ้ามี)

N/A

17. อุตสาหกรรมร่วม/กลุ่มอาชีพร่วม (ถ้ามี)

N/A

18. รายละเอียดกระบวนการและวิธีการประเมิน (Assessment Description and Procedure)

- The assessment are composed of paper exams , interviews, and practical demonstrations, which the paper exam is the main testing. The selection of interviews and practical demonstrations are depending on the assessors' judgment.

- Competency should be assessed in the workplace or simulated workplace using tools and equipment specified in maintenance manuals. It is also expected that general-purpose tools, test and ground support equipment found in most routine maintenance situations would be used where appropriate.

- An understanding of the attachment methods, connection of hardware and system operation as they relate to the work must be demonstrated before undertaking any action. The work plan should take account of applicable safety and quality requirements in accordance with the industry and regulatory standards.

- It is essential that applicable cleanliness requirements and WHS safety precautions are fully observed, including awareness of electrostatic discharge procedures.

- Evidence of transferability of skills and knowledge related to removal and installation is essential.

- 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 are being achieved under routine supervision on each of the connection methods:

- bolted
- soldered
- plug connectors.

- 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 Implementation Guide).

1. รหัสหน่วยสมรรถนะ 101311
2. ชื่อหน่วยสมรรถนะ Use electrical test equipment.
3. ทบทวนครั้งที่ - / -
4. สร้างใหม่ ปรับปรุง
5. สำหรับชื่ออาชีพและรหัสอาชีพ (Occupational Classification)

101 Aircraft Mechanics: Airplane

102 Aircraft Mechanics: Helicopter

103 Aircraft Mechanics: Avionics

6. คำอธิบายหน่วยสมรรถนะ (Description of Unit of Competency)

This skill unit requires the use of skills in the use of electrical test equipment to measure voltage, current, frequency and phase angle, and to test the continuity, resistance, insulation and bonding. Applications include aircraft and components both in the shed and a workshop during scheduled maintenance or not. The work can be done individually or as part of a team.

7. สำหรับระดับคุณวุฒิ

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8. กลุ่มอาชีพ (Sector)

7232 Aircraft Mechanics

9. ชื่ออาชีพและรหัสอาชีพอื่นที่หน่วยสมรรถนะนี้สามารถใช้ได้ (ถ้ามี)

N/A

10. ข้อกำหนดหรือกฎระเบียบที่เกี่ยวข้อง (Licensing or Regulation Related) (ถ้ามี)

ICAO Doc 7192 / EASA Part 66

11. สมรรถนะย่อยและเกณฑ์การปฏิบัติงาน (Elements and Performance Criteria)

สมรรถนะย่อย (Element)	เกณฑ์ในการปฏิบัติงาน (Performance Criteria)	วิธีการประเมิน (Assessment)
101311.01 Select and prepare test equipment.	101311.01.01 System/component test requirements are identified and selected. 101311.01.02 Test equipment is checked for serviceability and applicable leads are fitted where required.	
101311.02 Test system or component.	101311.02.01 Test points and polarity are determined. 101311.02.02 Required parameters are measured with the test equipment while observing all relevant work health and safety (WHS) requirements.	

12. ความรู้และทักษะก่อนหน้าที่จำเป็น (Pre-requisite Skill & Knowledge)

101301 Interpret work health and safety practices in aviation maintenance.

101501 Plan and organize aviation maintenance work activities.

101302 Apply quality standards applicable to aviation maintenance processes.

101303 Interpret and use aviation maintenance industry manuals and specifications.

101304 Complete aviation maintenance industry documentation.

101305 Perform basic hand skills, standard trade practices and fundamentals in aviation maintenance.

13. ทักษะและความรู้ที่ต้องการ (Required Skills and Knowledge)

(ก) ความต้องการด้านทักษะ

See Appendix A

(ข) ความต้องการด้านความรู้

See Appendix A

14. หลักฐานที่ต้องการ (Evidence Guide)

(a) Performance Evidence

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

- applying relevant WHS practices
- using selectors and scale adjustment of each item of test equipment to ensure accurate measurement of applicable parameter
- connecting test equipment to components or circuits
- determining polarity and applicable connection points for measurement or testing. The underlying skills inherent in this unit should be transferable into all areas which require the use of electrical test equipment. It is essential that the general aspects of electrical test equipment selection, preparation for use and safe application to a representative range of measurement and testing tasks are clearly understood. Evidence is required of knowledge about the selection and use of the range of test equipment used for the measurement and testing tasks listed in the Range of Conditions, and of the methods used to identify applicable polarity and connection to components and circuits for required measurement or testing.

(b) 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:

- the range of electrical test equipment used to measure or test:
- volts, amps and power
- frequency
- phase angle
- continuity, resistance and insulation
- bonding
- test equipment construction and calibration, and testing for serviceability.

15. ขอบเขต (Range Statement)

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.

System/component test requirements include:

Measurement of or testing:

volts, amps and power

frequency

phase angle (where applicable to the enterprise)

continuity, resistance and insulation

bonding

Procedures and requirements include:

Industry standard procedures specified by manufacturers, regulatory authorities or the enterprise

16. หน่วยสมรรถนะร่วม (ถ้ามี)

N/A

17. อุตสาหกรรมร่วม/กลุ่มอาชีพร่วม (ถ้ามี)

N/A

18. รายละเอียดกระบวนการและวิธีการประเมิน (Assessment Description and Procedure)

• The assessment are composed of paper exams , interviews, and practical demonstrations, which the paper exam is the main testing. The selection of interviews and practical demonstrations are depending on the assessors' judgment.

• Competency should be assessed in the work environment, or simulated work environment, using electrical test equipment specified in maintenance documentation. It is also expected that applicable test equipment can be selected on the basis of general trade knowledge where specific test equipment is not specified.

• 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 in the selection of appropriate items of test equipment and their use to perform the measurements and test each of:

- volts, amps and power
- frequency
- phase angle (may be omitted if not relevant to the enterprise)
- continuity, resistance and insulation
- bonding.

• 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).

1. รหัสหน่วยสมรรถนะ 101312
2. ชื่อหน่วยสมรรถนะ Perform aircraft flight servicing.
3. ทบทวนครั้งที่ - / -
4. สร้างใหม่ ปรับปรุง
5. สำหรับชื่ออาชีพและรหัสอาชีพ (Occupational Classification)

101 Aircraft Mechanics: Airplane

102 Aircraft Mechanics: Helicopter

103 Aircraft Mechanics: Avionics

6. คำอธิบายหน่วยสมรรถนะ (Description of Unit of Competency)

This skill unit requires the use of the skills of the labor standards and business practices in the implementation of pre- and post-flight maintenance and application handling procedures on aircraft on both fixed wing aircraft and rotating.

7. สำหรับระดับคุณวุฒิ

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8. กลุ่มอาชีพ (Sector)

7232 Aircraft Mechanics

9. ชื่ออาชีพและรหัสอาชีพอื่นที่หน่วยสมรรถนะนี้สามารถใช้ได้ (ถ้ามี)

N/A

10. ข้อกำหนดหรือกฎระเบียบที่เกี่ยวข้อง (Licensing or Regulation Related) (ถ้ามี)

ICAO Doc 7192 / EASA Part 66

11. สมรรถนะย่อยและเกณฑ์การปฏิบัติงาน (Elements and Performance Criteria)

สมรรถนะย่อย (Element)	เกณฑ์ในการปฏิบัติงาน (Performance Criteria)	วิธีการประเมิน (Assessment)
101312.01 Inspect aircraft and systems, and prepare for flight.	101312.01.01 Aircraft is positioned as required. Groundlocks, aircraft support and safety devices and covers are removed and stowed in accordance with maintenance documentation. Aircraft tie-down devices are removed and stowed/stored. 101312.01.02 Aircraft and systems are visually or physically checked for external signs of defects in accordance with maintenance documentation while observing all relevant work health and safety (WHS) requirements.	

สมรรถนะย่อย (Element)	เกณฑ์ในการปฏิบัติงาน (Performance Criteria)	วิธีการประเมิน (Assessment)
101312.02 Replenish aircraft systems.	<p>101312.02.01 Fluid level checks and replenishments are carried out in accordance with maintenance documentation requirements while observing all relevant WHS requirements, including the use of material safety data sheets (MSDS) and items of personal protective equipment (PPE).</p> <p>101312.02.02 Maintenance of gaseous levels (nitrogen and compressed air) is carried out in accordance with maintenance documentation requirements while observing all relevant WHS requirements.</p> <p>101312.02.03 Required maintenance documentation is completed and processed in accordance with standard enterprise procedures.</p>	

12. ความรู้และทักษะก่อนหน้าที่จำเป็น (Pre-requisite Skill & Knowledge)

101301 Interpret work health and safety practices in aviation maintenance.

101501 Plan and organize aviation maintenance work activities.

101302 Apply quality standards applicable to aviation maintenance processes.

101303 Interpret and use aviation maintenance industry manuals and specifications.

101304 Complete aviation maintenance industry documentation.

101305 Perform basic hand skills, standard trade practices and fundamentals in aviation maintenance.

13. ทักษะและความรู้ที่ต้องการ (Required Skills and Knowledge)

(ก) ความต้องการด้านทักษะ

See Appendix A

(ข) ความต้องการด้านความรู้

See Appendix A

14. หลักฐานที่ต้องการ (Evidence Guide)

(a) Performance Evidence

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

- ground handling of aircraft
- using hand skills and tools to perform flight servicing activities
- correctly installing and securing of aircraft hardware
- locating, using and correctly stowing of aircraft safety and security equipment (includes ground locks, covers, support and safety devices and tie-down devices)
- applying ground power (where applicable)
- inspecting structure for damage and deterioration
- recognizing external signs of component damage, leakage and security in aircraft systems
- recognizing visual signs of damage, leakage and security with regard to engines and propellers (where applicable)
- refueling the aircraft with the correct type, quantity and distribution of fuel
- checking and replenishing fluid level using the correct fluids
- recharging of gaseous levels using the correct support equipment and procedures
- checking fire protection systems (where applicable) for correct gas charge levels and portable fire extinguishers for serviceability and correct stowage
- replacing role equipment requiring pre-flight replacement
- using of maintenance data and manuals to determine flight servicing requirements and procedures
- applying standard procedures
- observing all relevant WHS procedures, including the use of MSDS and items of PPE. It is essential that the specific aspects of the aircraft flight servicing are checked to ensure quality and safety standards are fully observed, understood and complied with. Safety precautions applicable to the system being maintained are to be fully observed. An understanding of system operation as it relates to the work must be demonstrated before undertaking any action. Evidence of knowledge of system operation, recognition of defects and completion of documentation, the relationship of individual components and the links with other systems will be necessary to the extent required for completion of flight servicing before undertaking any action.

(b) 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:

- standard trade practices relating to tool usage and installation/securing of aircraft hardware
- the aircraft structure to the extent required to be able to recognize typical types of structural damage and deterioration during flight servicing activities
- system layout, operation and typical external signs of faults to the extent required to perform flight servicing activities
- aircraft flight servicing requirements
- ground de-icing of aircraft
- aircraft ground handling procedures, including towing and marshaling
- aircraft safety and security equipment, including:
 - ground locks
 - wheel chocks
 - covers
 - support and safety devices
 - tie-down devices and picketing
- types and characteristics of fuels and fuel additives
- types and characteristics of lubricants
- types and characteristics of hydraulic fluids
- WHS procedures relating to flight servicing activities
- how to obtain MSDS
- selection and use of PPE
- relevant maintenance manuals
- relevant regulatory requirements and standard procedures.

15. ขอบเขต (Range Statement)

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.

- Flight servicing activities are performed during:
- Preparation for flight following maintenance
 - Before flight servicing
 - After flight servicing
 - Turn around servicing
 - Maintenance documentation includes:
 - Maintenance manuals
 - Servicing schedules
 - Applicable airworthiness regulations
 - Aircraft maintenance program
 - Procedures and requirements include:
 - Industry standard procedures specified by manufacturers, regulatory authorities or the enterprise

16. หน่วยสมรรถนะรวม (ถ้ามี)

N/A

17. อุตสาหกรรมร่วม/กลุ่มอาชีพร่วม (ถ้ามี)

N/A

18. รายละเอียดกระบวนการและวิธีการประเมิน (Assessment Description and Procedure)

- The assessment are compose of paper exams , interviews, and practical demonstrations, which the paper exam is the main testing. The selection of interviews and practical demonstrations are depending on the assessors' judgment.
- Competency should be assessed in the work environment or simulated work environment using procedures, tools and equipment specified in maintenance documentation. It is also expected that applicable general-purpose tools, test and ground support equipment found in most routine situations would be used where appropriate.
- The work plan should take account of applicable safety and quality requirements in accordance with the industry and regulatory standards
- 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 this unit of competency are being achieved under routine supervision on the following flight servicings that are applicable to the enterprise:
 - preparation for flight following maintenance
 - before flight servicing
 - after flight servicing
 - turn around servicing.
- 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).

1. รหัสหน่วยสมรรถนะ 101313
2. ชื่อหน่วยสมรรถนะ Remove and install aircraft hydro-mechanical and landing gear system.
3. ทบทวนครั้งที่ - / -
4. สร้างใหม่ ปรับปรุง
5. สำหรับชื่ออาชีพและรหัสอาชีพ (Occupational Classification)

101 Aircraft Mechanics: Airplane

102 Aircraft Mechanics: Helicopter

6. คำอธิบายหน่วยสมรรถนะ (Description of Unit of Competency)

It requires the application of the commercial workforce skills and practical standards in the removal and installation of the system and landing gear components for hydro-mechanical aircraft mounted on both aircraft fixed and rotary wing during execution of scheduled or unscheduled maintenance. Maintenance can be performed individually or as part of a team.

7. สำหรับระดับคุณวุฒิ

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8. กลุ่มอาชีพ (Sector)

7232 Aircraft Mechanics

9. ชื่ออาชีพและรหัสอาชีพอื่นที่หน่วยสมรรถนะนี้สามารถใช้ได้ (ถ้ามี)

N/A

10. ข้อกำหนดหรือกฎระเบียบที่เกี่ยวข้อง (Licensing or Regulation Related) (ถ้ามี)

ICAO Doc 7192 / EASA Part 66

11. สมรรถนะย่อยและเกณฑ์การปฏิบัติงาน (Elements and Performance Criteria)

สมรรถนะย่อย (Element)	เกณฑ์ในการปฏิบัติงาน (Performance Criteria)	วิธีการประเมิน (Assessment)
101313.01 Remove hydro-mechanical system and landing gear components.	101313.01.01 Removal of hydro-mechanical and landing gear components is carried out in accordance with the applicable maintenance manual. 101313.01.02 Required maintenance documentation is accurately completed, and removed components are tagged, sealed and packaged in accordance with specified procedures.	
101313.02 Install hydro-mechanical system and landing gear components.	101313.02.01 Components to be installed are checked to confirm correct part numbers, serviceability and modification status. 101313.02.02 Required maintenance documentation is completed and processed in accordance with standard enterprise procedures.	

12. ความรู้และทักษะก่อนหน้าที่จำเป็น (Pre-requisite Skill & Knowledge)

101301 Interpret work health and safety practices in aviation maintenance

101501 Plan and organise aviation maintenance work activities

101302 Apply quality standards applicable to aviation maintenance processes

101303 Interpret and use aviation maintenance industry manuals and specifications

101304 Complete aviation maintenance industry documentation

101305 Perform basic hand skills, standard trade practices and fundamentals in aviation maintenance

13. ทักษะและความรู้ที่ต้องการ (Required Skills and Knowledge)

(ก) ความต้องการด้านทักษะ

See Appendix A

(ข) ความต้องการด้านความรู้

See Appendix A

14. หลักฐานที่ต้องการ (Evidence Guide)

(a) 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:

- using hand skills and tools to remove and install hydraulic and fuel system components
- jacking of the aircraft as required for landing gear component removal and installation
- correctly installing and securing of aircraft hardware
- using hand skills and tools to remove and install landing gear components and the correct handling of heavy components
- using maintenance manuals to prepare the aircraft for component removal and installation and correct interpretation of removal and installation instructions
- applying standard procedures
- observing all relevant WHS procedures including the use of MSDS and relevant items of PPE. It is essential that system cleanliness requirements and safety precautions applicable to the system being maintained are fully observed, understood and complied with. Evidence of transferability of skills and knowledge related to removal and installation is essential. This may be demonstrated through application across a number of aircraft systems or aircraft types, but must cover a sufficient range of tasks to demonstrate familiarity with attachment methods, connection hardware and couplings peculiar to each type of system, and of safe handling of heavy components.

(b) 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:

- standard trade practices relating to tool usage and installation/securing of aircraft hardware
- hydraulic fluids (mineral and synthetic) and handling precautions
- hydraulic seal types and applications
- how to locate and correctly remove and install components of hydraulic systems
- aircraft fuels and handling precautions
- fuel seal types and applications
- how to locate and correctly remove and install fuel system components
- electrical circuit isolation and plug removal and installation
- how to jack the aircraft for landing gear component removal and installation
- how to locate and correctly remove and install landing gear components, including the handling of heavy components
- WHS procedures relating to hydraulic systems, fuel systems and landing gear components
- how to obtain MSDS
- the selection and use of items of PPE
- relevant maintenance manuals
- relevant regulatory requirements and standard procedures.

15. ขอบเขต (Range Statement)

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.

Hydro-mechanical systems include:

Hydraulic systems

Fuel systems

Components of hydro-mechanical systems include:

Hydraulic accumulators, filters, reservoirs, valves, pumps, motors, actuators, regulators and direct reading gauges

Fuel system filters, valves, pumps, rigid and flexible storage cells/tanks

Rigid and flexible pipelines, hoses and fittings

Landing gear components include:

Wheel assemblies or skids

Brake units (not applicable to rotary wing aircraft with skids or floats)

Struts/oleos (not applicable to rotary wing aircraft with skids or floats) .

Electrical interface includes:

Associated electrical loom terminations and/or plugs where components are electrically actuated or controlled.

Procedures and requirements include:

Industry standard procedures specified by manufacturers, regulatory authorities or the enterprise.

16. หน่วยสมรรถนะร่วม (ถ้ามี)

N/A

17. อุตสาหกรรมร่วม/กลุ่มอาชีพร่วม (ถ้ามี)

N/A

18. รายละเอียดกระบวนการและวิธีการประเมิน (Assessment Description and Procedure)

- The assessment are composed of paper exams , interviews, and practical demonstrations, which the paper exam is the main testing. The selection of interviews and practical demonstrations are depending on the assessors' judgment.

- Competency should be assessed in the work environment or simulated work environment, using procedures, tools and equipment specified in maintenance documentation. It is also expected that applicable general-purpose tools, test and ground support equipment found in most routine situations would be used where appropriate.

- An understanding of system operation as it relates to the work must be demonstrated before undertaking any action. The work plan should take account of applicable safety and quality requirements in accordance with the industry and regulatory standards.

- 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 this unit of competency are being achieved under routine supervision on each type of system and on at least one (1) component of each group listed in the Range of Conditions, as follows:

- hydraulic systems – preparation of a system for safe component removal and replacement of at least one (1) component from each of the following groups of components:

- hydraulic accumulators, filters, reservoirs, valves, pumps, motors, actuators, regulators and direct reading gauges
- rigid and flexible pipelines, hoses and fittings

- fuel systems – preparation of a system for safe component removal and replacement of at least one (1) component from each of the following groups of components:

- fuel system filters, valves, pumps, rigid and flexible storage cells/tanks
- rigid and flexible pipelines, hoses and fittings
- landing gear components – one (1) each of:
 - wheel assemblies or skids
 - brake units
 - struts/oleos.

- Coverage of brakes and struts/oleos are not required where the aircraft is rotary wing and is fitted with skids or floats.

- 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).

1. รหัสหน่วยสมรรถนะ 101314
2. ชื่อหน่วยสมรรถนะ Remove and install aircraft pneumatic system components.
3. ทบทวนครั้งที่ - / -
4. สร้างใหม่ ปรับปรุง
5. สำหรับชื่ออาชีพและรหัสอาชีพ (Occupational Classification)

101 Aircraft Mechanics: Airplane

102 Aircraft Mechanics: Helicopter

6. คำอธิบายหน่วยสมรรถนะ (Description of Unit of Competency)

This skill unit requires the use of workforce skills and use of maintenance publications for removing and installing the components of the pneumatic system of aircraft pressurization systems, air cycle air conditioning systems and systems extinguishing fire in fixed and rotary wing aircraft for scheduled maintenance and unscheduled.

7. สำหรับระดับคุณวุฒิ

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8. กลุ่มอาชีพ (Sector)

7232 Aircraft Mechanics

9. ชื่ออาชีพและรหัสอาชีพอื่นที่หน่วยสมรรถนะนี้สามารถใช้ได้ (ถ้ามี)

N/A

10. ข้อกำหนดหรือกฎระเบียบที่เกี่ยวข้อง (Licensing or Regulation Related) (ถ้ามี)

ICAO Doc 7192 / EASA Part 66

11. สมรรถนะย่อยและเกณฑ์การปฏิบัติงาน (Elements and Performance Criteria)

สมรรถนะย่อย (Element)	เกณฑ์ในการปฏิบัติงาน (Performance Criteria)	วิธีการประเมิน (Assessment)
101314.01 Remove pneumatic system components.	101314.01.01 Pneumatic system is rendered safe and prepared in accordance with the applicable maintenance manual and isolation tags are fitted, where necessary, to ensure personnel safety, Removal of components is carried out in accordance, Required maintenance documentation is completed and processed in accordance with standard enterprise procedures, Removed components are tagged, sealed and packaged in accordance with specified procedures. 101314.01.02 Components to be installed are checked to confirm correct part numbers, serviceability and modification status, Installation is carried out to pneumatic system in accordance with the applicable maintenance manual while observing all relevant WHS requirements, including the use of MSDS and items of PPE, Required maintenance documentation is completed and processed in accordance with standard enterprise procedures.	
101314.02 Install pneumatic system components.	101314.02.01 Components to be installed are checked to confirm correct part numbers, serviceability and modification status. 101314.02.02 Installation is carried out to pneumatic system in accordance with the applicable maintenance manual while observing all relevant WHS requirements, including the use of MSDS and items of PPE, Required maintenance documentation is completed and processed in accordance with standard enterprise procedures.	

12. ความรู้และทักษะก่อนหน้าที่จำเป็น (Pre-requisite Skill & Knowledge)

N/A

13. ทักษะและความรู้ที่ต้องการ (Required Skills and Knowledge)

(ก) ความต้องการด้านทักษะ

See Appendix A

(ข) ความต้องการด้านความรู้

See Appendix A

14. หลักฐานที่ต้องการ (Evidence Guide)

(a) 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 practices, including the use of MSDS and PPE
- using relevant maintenance documentation and aircraft manuals to:
 - locate and correctly remove and install components in pneumatic systems, including fire-extinguishing systems
 - locate and correctly remove and install components in air cycle air conditioning systems
 - locate and correctly remove and install components in pressurisation systems
 - correctly remove and install rigid and flexible pipelines
 - correctly remove and install ducting
- observing regulations governing the handling and custody of fire-extinguishers containing ODS or SGG extinguishing agents (e.g. BCF). It is

essential that system cleanliness requirements and safety precautions applicable to the system being maintained are fully observed, understood and complied with. Evidence of transferability of skills and knowledge related to removal and installation is essential. This may be demonstrated through application across a number of aircraft systems

or aircraft types, but must cover a sufficient range of tasks to demonstrate familiarity with attachment methods, connection hardware and couplings peculiar to each type of system, and of safe handling of heavy components.

(b) 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: component attachment methods connection hardware and couplings standard trade practices relating to tool usage and installation/securing of aircraft Hardware how to locate and correctly remove and install components of: pneumatic systems air cycle air conditioning system components pressurisation system components fire-extinguishers, including the effect of ODS or SGG extinguishing agents and regulations covering special precautions and handling requirements for BCF fire-extinguishers electrical circuit isolation and plug removal and installation WHS procedures relating to pneumatic, air conditioning and pressurisation systems show to obtain MSDS the selection and use of items of PPE relevant maintenance manuals relevant regulatory requirements and standard procedures, including those relating to the handling and control of halon fire-extinguishers.

15. ขอบเขต (Range Statement)

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.

Pneumatic components include:

Filters, valves, pumps, motors, actuators and regulators

Gauges (direct reading), temperature sensors, pressurisation controllers and temperature controllers

Heat exchangers, pressure vessels, condensers, compressors, expansion turbines and humidifiers

Rigid and flexible pipelines, hoses and fittings

Ducting

Fire-extinguishers, including those containing ozone

depleting substances (ODS) or synthetic greenhouse gas

(SGG) extinguishing agents (e.g. BCF) (where applicable to the enterprise)

Procedures and requirements include:

Industry standard procedures specified by manufacturers, regulatory authorities or the enterprise

16. หน่วยสมรรถนะร่วม (ถ้ามี)

N/A

17. อุตสาหกรรมร่วม/กลุ่มอาชีพร่วม (ถ้ามี)

N/A

18. รายละเอียดกระบวนการและวิธีการประเมิน (Assessment Description and Procedure)

- The assessment are composed of paper exams , interviews, and practical demonstrations, which the paper exam is the main testing. The selection of interviews and practical demonstrations are depending on the assessors' judgment.
- Competency should be assessed in the work environment or simulated work environment using tools and equipment specified in maintenance manuals. It is also expected that general-purpose tools, test and ground support equipment found in most routine situations would be used where appropriate.
- An understanding of system operation as it relates to the work must be demonstrated before undertaking any action. The work plan should take account of applicable safety and quality requirements in accordance with the industry and regulatory standards.
- 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 one (1) item from each from the following groups: filters, valves, pumps, motors, actuators and regulators gauges (direct reading), temperature sensors, pressurisation controllers and temperature controllers, heat exchangers, pressure vessels, condensers, compressors, expansion turbines and humidifiers rigid and flexible pipelines, hoses and fitting ducting fire-extinguishers, including those containing ODS or SGG extinguishing agents (e.g. BCF) (may be omitted where not applicable to enterprise).
- This shall be established via the records in the Log of Industrial Experience and a achievement or, where appropriate, an equivalent Industry Evidence Guide (for details refer to the Companion Volume Assessment Guidelines).

1. รหัสหน่วยสมรรถนะ 101317
2. ชื่อหน่วยสมรรถนะ Remove and install engines and engine system components.
3. ทบทวนครั้งที่ - / -
4. สร้างใหม่ ปรับปรุง
5. สำหรับชื่ออาชีพและรหัสอาชีพ (Occupational Classification)

101 Aircraft Mechanics: Airplane

6. คำอธิบายหน่วยสมรรถนะ (Description of Unit of Competency)

This skill unit requires the use of workforce skills and use of maintenance publications for removing and installing gas turbine or piston engines and engine components system of fixed and rotary wing aircraft during maintenance planned and unplanned.

7. สำหรับระดับคุณวุฒิ

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8. กลุ่มอาชีพ (Sector)

7232 Aircraft Mechanics

9. ชื่ออาชีพและรหัสอาชีพอื่นที่หน่วยสมรรถนะนี้สามารถใช้ได้ (ถ้ามี)

N/A

10. ข้อกำหนดหรือกฎระเบียบที่เกี่ยวข้อง (Licensing or Regulation Related) (ถ้ามี)

ICAO Doc 7192 / EASA Part 66

11. สมรรถนะย่อยและเกณฑ์การปฏิบัติงาน (Elements and Performance Criteria)

สมรรถนะย่อย (Element)	เกณฑ์ในการปฏิบัติงาน (Performance Criteria)	วิธีการประเมิน (Assessment)
101317.01 Remove engine.	101317.01.01 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 safety of personnel and freedom from damage during engine removal, and removal is carried out in accordance with the 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). 101317.01.02 Engine is tagged and prepared for transport or storage in accordance with the specified procedures. Required maintenance documentation is completed and processed in accordance with standard enterprise procedures.	

สมรรถนะย่อย (Element)	เกณฑ์ในการปฏิบัติงาน (Performance Criteria)	วิธีการประเมิน (Assessment)
101317.02 Remove engine system components.	<p>101317.02.01 Aircraft and/or engine system is prepared and rendered safe in accordance with the applicable maintenance manual and isolation tags are fitted, where necessary, to ensure the safety of personnel, and 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.</p> <p>101317.02.02 Engine system component is tagged and prepared for transport or storage in accordance with the specified procedures. Required maintenance documentation is completed and processed in accordance with standard enterprise procedures.</p>	
101317.03 Install engine, engine system components.	<p>101317.03.01 Engine to be installed is checked to confirm correct part or model numbers, modification status and serviceability, Installation is carried out in accordance with the applicable maintenance manual, and engine components to be installed are checked to confirm correct part or model numbers, modification status and serviceability.</p> <p>101317.03.02 Installation 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, support/safety equipment is removed at the appropriate time to ensure personnel safety and freedom from structural damage. Required maintenance documentation is completed and processed in accordance with standard enterprise procedures.</p>	

12. ความรู้และทักษะก่อนหน้าที่จำเป็น (Pre-requisite Skill & Knowledge)

N/A

13. ทักษะและความรู้ที่ต้องการ (Required Skills and Knowledge)

(ก) ความต้องการด้านทักษะ

See Appendix A

(ข) ความต้องการด้านความรู้

See Appendix A

14. หลักฐานที่ต้องการ (Evidence Guide)

(a) 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 WHS practices, including lifting and handling heavy components using MSDS and PPE using relevant maintenance documentation and aircraft manuals to:

- correctly remove and install engines, engine change units and auxiliary power units

(APUs) prepare removed engines for transportation and/or storage locate and correctly remove and install the range of engine system components listed

in the Range of Conditions identifying the requirement for adjustment and rigging of systems and controls after the installation of engines or system components.

It is essential that safety precautions applicable to engines and engine systems being maintained are fully observed, understood and complied with, including allowance for the effect on aircraft centre of gravity when engines are removed. Awareness must be demonstrated of dual inspection requirements associated with work on engine control systems.

Evidence of transferability of skills and knowledge related to removal and installation is essential. This may be demonstrated through removal and installation of a representative range of engines and engine system components as listed in the Assessment Conditions.

(b) 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:

removal and installation procedures for aircraft:

engines

engine change units

APUs

engine inhibiting and de-inhibiting procedures

layout, installation and connection of components of:

fuel systems

lubrication systems

air systems

super and turbo charging systems

exhaust systems

ignition and igniter systems

starting systems

fire protection systems

accessories and associated drives

engine control system component removal and installation, including the requirement for rigging and for the independent inspection of work performed

engine maintenance documentation and manuals

relevant WHS practices, including those relating to the lifting and handling of heavy items

how to obtain MSDS

use of PPE

relevant maintenance manuals

relevant regulatory requirements and standard procedures.

15. ขอบเขต (Range Statement)

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.

Engines and engine system components include:

Engine change unit or auxiliary power unit (turbo-prop, turbofan, turboshaft, turbojet and piston)

Fuel, oil and air system (or induction and super/turbo charger systems in the case of piston engine)

components

Engine control system components

Ignition or igniter system components

Starting system components

Fire protection system components.

Accessories and associated drives

Procedures and requirements include:

Industry standard procedures specified by manufacturers, regulatory authorities or the enterprise

16. หน่วยสมรรถนะร่วม (ถ้ามี)

N/A

17. อุตสาหกรรมร่วม/กลุ่มอาชีพร่วม (ถ้ามี)

N/A

18. รายละเอียดกระบวนการและวิธีการประเมิน (Assessment Description and Procedure)

The assessment are composed of paper exams , interviews, and practical demonstrations, which the paper exam is the main testing. The selection of interviews and practical demonstrations are depending on the assessors' judgment. Competency should be assessed in the work environment, or by the use of simulated activities, using tools and equipment specified in aircraft maintenance manuals. It is also expected that applicable general-purpose tools, test and ground support equipment found in most routine situations would be used where appropriate.

An understanding of component attachment methods and the need for adjustment, rigging and system operation as it relates to the work must be demonstrated 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 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 the following groups:

engine change unit or auxiliary power unit (turbo-prop, turbofan, turboshaft, turbojet, piston)fuel, oil and air system (or induction and super/turbo charger systems in the case of piston engine) components engine control system components

ignition or igniter system components

starting system components

fire protection system components.

accessories and associated drives.

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. Where the unit is to be used for licensing purposes the Assessor must also meet the criteria specified in the CASR Part 147 Manual of Standards.

Individuals being assessed who have already attained 101319 Maintain basic light aircraft engines and propellers will have satisfied the requirements of this unit with regard to common Range Statement variables. The Log of Industrial Experience and Achievement records relating to 101319 Maintain basic light aircraft engines and propellers may be accepted as also meeting the evidence requirements for this unit in the applicable common areas.

1. รหัสหน่วยสมรรถนะ 101320
2. ชื่อหน่วยสมรรถนะ Inspect and maintain structures and related components of non-pressurized small aircraft.
3. ทบทวนครั้งที่ - / -
4. สร้างใหม่ ปรับปรุง
5. สำหรับชื่ออาชีพและรหัสอาชีพ (Occupational Classification)

Aircraft Mechanics: Airplane

Aircraft Mechanics: Helicopter

Aircraft Mechanics: Avionics

6. คำอธิบายหน่วยสมรรถนะ (Description of Unit of Competency)

This unit competition requires the application of procedures and techniques related to the inspection and maintenance of small structures unpressurized aircraft during scheduled or unscheduled maintenance, including required special inspections after events such as landings, an overload or a flight through heavy turbulence.

The unit also includes performing a limited number of minor repairs metals and compounds minor classified as elementary maintenance. application procedures is also required and techniques associated with the removal and installation of structural and nonstructural components related, including elements such as internal adjustment, seats and emergency equipment. The work can be done individually or as part of a team.

7. สำหรับระดับคุณวุฒิ

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8. กลุ่มอาชีพ (Sector)

10 Aircraft Mechanics

9. ชื่ออาชีพและรหัสอาชีพอื่นที่หน่วยสมรรถนะนี้สามารถใช้ได้ (ถ้ามี)

101 Aircraft Maintenance: Airplane

102 Aircraft Maintenance: Helicopter

103 Aircraft Maintenance: Avionic

10. ข้อกำหนดหรือกฎระเบียบที่เกี่ยวข้อง (Licensing or Regulation Related) (ถ้ามี)

ICAO Doc 7192 / EASA Part 66

11. สมรรถนะย่อยและเกณฑ์การปฏิบัติงาน (Elements and Performance Criteria)

สมรรถนะย่อย (Element)	เกณฑ์ในการปฏิบัติงาน (Performance Criteria)	วิธีการประเมิน (Assessment)
101320.01 Inspect and maintain aircraft structure.	<p>101320.01.01 Aircraft structure visually or physically checked for signs of defects of deformation or damage in accordance with maintenance documentation and procedures approved, while observing all requirements of relevant occupational health and safety (OHS), including the use of safety data sheets (SDS) and items of personal protective equipment (PPE), and damage or defects are assessed against damage or wear limits specified by structural repair manual or other approved data to determine if repair or replacement is required.</p> <p>101320.01.02 Preventative maintenance techniques are employed to preserve the integrity of aircraft structure, and required maintenance documentation is completed and processed in accordance with standard enterprise procedures.</p>	
101320.02 Prepare and Install components.	<p>101320.02.01 Structure is supported and prepared in accordance with the applicable maintenance manual to ensure the safety of personnel and the absence of damage to the aircraft or component during removal of components.</p> <p>101320.02.02 Component extraction is carried out in accordance with the maintenance manual applicable to observe all relevant requirements of the OHS, including the use of SDS and PPE items.</p> <p>101320.02.03 Support/safety equipment is removed at an appropriate time to ensure personnel safety and freedom from structural damage.</p>	

12. ความรู้และทักษะก่อนหน้าที่จำเป็น (Pre-requisite Skill & Knowledge)

101301 Interpret work health and safety practices in aviation maintenance

101501 Plan and organise aviation maintenance work activity

101302 Apply quality standards applicable to aviation maintenance processes

101303 Interpret and use aviation maintenance industry manuals and specifications

101304 Complete aviation maintenance industry documentation

101305 Perform basic hand skills, standard trade practices and fundamentals in aviation maintenance

13. ทักษะและความรู้ที่ต้องการ (Required Skills and Knowledge)

(ก) ความต้องการด้านทักษะ

See Appendix A

(ข) ความต้องการด้านความรู้

See Appendix A

14. หลักฐานที่ต้องการ (Evidence Guide)

(a) Performance Evidence

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

- applying all relevant WHS procedures, including the selection and use of MSDS and applicable items of PPE
- demonstrating appropriate cleaning procedures to enable structure inspection
- demonstrating correct inspection procedures in accordance with aircraft and procedures manuals
- identifying damage to aircraft metallic (ferrous and non-ferrous) structures and/or components by way of impact, fatigue or the various types of corrosion
- inspecting damage and assessing composite components/structures
- identifying various aircraft metals and their basic properties
- identifying composite materials used in aircraft construction, associated safety precautions and hazards
- using appropriate hand tools and machines, including riveting equipment, drilling equipment, aligning tools and material fasteners (grip pins)
- applying correct removal, installation and repair techniques for a range of rivets (blind and solid) using hand, squeeze and pneumatic situations
- performing metal, composite and fabric minor repairs classified as elementary maintenance
- restoring aircraft structure sealing and surface finishes
- using relevant maintenance documentation and aircraft manuals to:
 - remove and install structural and non-structural components
 - remove and install aircraft interior fittings
 - remove and install doors, door seals, windows and transparent panels
 - checking and adjusting all doors and access panels, including locking mechanisms
 - removing and installing emergency equipment.

It is essential that the procedures take account of all aircraft and personal safety precautions related to the airframe. Evidence of transferability of skills and knowledge related to the inspection, testing and minor repairs to the aircraft structure, except primary structure is essential.

This can be demonstrated by applying through a number of aircraft structures or types of aircraft. Ability to interpret inspection procedures and minor repair and apply them in practice is essential.

(b) 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:

- applicable WHS procedures, including the use of PPE and MSDS
- construction methods and materials used in:
 - fuselage sections
 - wing sections
 - engine nacelles and mounts
 - windows and window frames
 - doors, locks and access panels
- definition of structural terms, i.e. safe life, damage tolerant, failsafe, stress, strain, shear and cycles
- inspection requirements for metal and composite structure, including:
 - ageing aircraft inspection requirements
 - safe life structure
 - damage tolerant structure
 - fail safe structure
- inspection following abnormal events
- potential causes of structural failure
- NDT methods and application of the various techniques
- construction methods of, and assessing common defects in, aircraft plastic transparencies
- basic constructional features of, and assessing common defects in, glass windcreens
- aircraft fabric coverings and methods for performance of minor repairs classified as elementary maintenance
- the various forms of structural corrosion, stating the causes and structural effects of corrosion on aircraft
- the terms associated with composite materials and types of composite materials
- non-structural component methods of attachment and faying surface treatment
- non-pressurised fuselage aircraft doors, related seals and window and transparent panel attachment methods and sealing
- aircraft interior fittings (trim, linings, seats and floor panels) construction and attachment methods
- the location and attachment or stowage methods for emergency equipment
- assessment of structural damage:
 - types and classes of mechanical damage
 - types of corrosion and determining the extent of damage
- relevant documentation and manuals
- damage limits and repair schemes for metallic and non-metallic structure
- how to perform minor repairs to metal and composite structure that are classified as elementary maintenance
- surface finishes and methods of restoration, including specific WHS and PPE requirements
- how to obtain MSDS
- relevant maintenance and structural repair manuals
- relevant regulatory requirements and standard procedures.

(c) Assessment recommendation

N/A

15. ขอบเขต (Range Statement)

(a) Recommendation

This field allows different environments and working conditions that can affect the performance. the essential operating conditions that

may be present (depending on the work situation, accessibility requirements, the candidate of the topic, and local industry and regional contexts) are included.

Inspection of aircraft structure and removable components of structure include:

- Non-ferrous and ferrous alloys and composite (FRP) materials used in aircraft construction
- Structural fastening and attachment hardware and/or devices
- Seals and sealants
- Glass and moulded plastics
- Preparation for application of non-destructive testing (NDT) techniques
- Doors, hinges and locking mechanisms for damage/misalignment
- Inspections applicable to each of safe life, damage tolerant and fail safe structure relevant to enterprise
- Ageing aircraft inspection programs
- Inspection after abnormal events

Damage or defects include:

- Impact damage
- Fatigue cracking
- Corrosion
- Delamination of composites and bonded structures

Minor minor repairs include:

- Performing minor repair tasks classified as elementary maintenance, including:
 - Repair of non-structural fairings, cover plates and cowlings
 - stop drilling of cracks and bonding to acrylic or Perspex windscreens
 - minor minor repairs to fabric suurfaces
 - restoration of preservative or protective materials

Removable components include:

Those that are installed using bolts and/or screws. Where component removal and installation requires the removal and installation of

rivets.

Components include:

- Removable components of wings, tail booms, pylons, empennage, skids, fairings and nacelles
- Removable components or sections of non-pressurised fuselages
- Non-pressurised fuselage entry, cargo, access doors and associated seals, including checking and adjustment of all doors and access panels and associated locking mechanisms
- Non-pressurised fuselage windows and transparent panels
- Floor panels

Specialist advice is obtained from:

Supervisors

Specialist structures personnel

Maintenance documentation includes:

Servicing schedules

Maintenance manuals

Procedures and requirements include:

Industry standard procedures specified by manufacturers, regulatory authorities or the enterprise

(b) Description

N/A

16. หน่วยสมรรถนะร่วม (ถ้ามี)

N/A

17. อุตสาหกรรมร่วม/กลุ่มอาชีพร่วม (ถ้ามี)

N/A

18. รายละเอียดกระบวนการและวิธีการประเมิน (Assessment Description and Procedure)

The assessment are composed of paper exams , interviews, and practical demonstrations, which the paper exam is the main testing. The selection of interviews and practical demonstrations are depending on the assessors' judgment. Competition should be assessed in the workplace or work environment simulated using tools and equipment specified in the maintenance documentation. It is also expected that the general purpose tools and test equipment found in most routine situations would be used where appropriate.

- The following conditions of assessment represent the requirements of the Regulators 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 across the variables in the Range of Conditions as follows:

- inspection and/or testing of at least one (1) item from each of the following groups:
 - non-ferrous and ferrous alloys and composite (FRP) materials used in aircraft construction
 - structural fastening and attachment hardware and/or devices
 - seals and sealants
 - glass and moulded plastics
 - preparation for application of NDT techniques
 - doors, hinges and locking mechanisms for damage/misalignment
 - inspections applicable to each of safe life, damage tolerant and fail safe structure relevant to enterprise
 - ageing aircraft inspection programs
 - inspection after abnormal events
 - recognition of each type of damage:
 - impact damage
 - fatigue cracking
 - corrosion
 - delamination of composites and bonded structures
 - one (1) minor elementary maintenance repair task from each of the following groups:
 - repair of non-structural fairings, cover plates and cowlings
 - stop drilling of cracks and bonding to acrylic or Perspex windscreens
 - restoration of preservative or protective materials
 - one (1) removal and installation task from each of the following groups:
 - removable components of wings, tail booms, pylons, empennage, skids, fairings and nacelles
 - removable components or sections of non-pressurised fuselages
 - non-pressurised fuselage entry, cargo, access doors and associated seals (including checking and adjustment of all doors and access panels and associated locking mechanisms)
 - non-pressurised fuselage windows and transparent panels
 - floor panels.
- 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 National Vocational Education and Training Regulator.

1. รหัสหน่วยสมรรถนะ 101321
2. ชื่อหน่วยสมรรถนะ Participate in environmentally sustainable work practices.
3. ทบทวนครั้งที่ - / -
4. สร้างใหม่ ปรับปรุง
5. สำหรับชื่ออาชีพและรหัสอาชีพ (Occupational Classification)

Aircraft Mechanics: Airplane

Aircraft Mechanics: Helicopter

Aircraft Mechanics: Avionics

6. คำอธิบายหน่วยสมรรถนะ (Description of Unit of Competency)

This competition applies to operators / Team Members are required to follow the procedures in order to work in an environmentally sustainable manner. This ensures compliance and also aims to minimize environmental risks and maximizes the environmental performance of processes and organization. It includes: resources used potential environmental risks Improve environmental performance (within the scope of competence and authority).

This competition applies to all sectors of the manufacturing industry and members of their value chain. It can also be applied to all sectors of an organization, including offices, warehouses, etc. You will have to be properly contextualized This unit of measure applies throughout the organization and in the various sectors of industry.

7. สำหรับระดับคุณวุฒิ

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8. กลุ่มอาชีพ (Sector)

10 Aircraft Mechanics

9. ชื่ออาชีพและรหัสอาชีพอื่นที่หน่วยสมรรถนะนี้สามารถใช้ได้ (ถ้ามี)

101 Aircraft Maintenance: Airplane

102 Aircraft Maintenance: Helicopter

103 Aircraft Maintenance: Avionic

10. ข้อกำหนดหรือกฎระเบียบที่เกี่ยวข้อง (Licensing or Regulation Related) (ถ้ามี)

N/A

11. สมรรถนะย่อยและเกณฑ์การปฏิบัติงาน (Elements and Performance Criteria)

สมรรถนะย่อย (Element)	เกณฑ์ในการปฏิบัติงาน (Performance Criteria)	วิธีการประเมิน (Assessment)
101321.01 Identify current resource use and environmental issues.	101321.01.01 Identify workplace environmental and resource efficiency issues and identify resources used in own work role. 101321.01.02 Measure and record current usage of resources using appropriate techniques.	

สมรรถนะย่อย (Element)	เกณฑ์ในการปฏิบัติงาน (Performance Criteria)	วิธีการประเมิน (Assessment)
101321.02 Comply with environmental regulations and seek opportunities to improve environmental practices and resource efficiency.	101321.02.01 Follow procedures to ensure compliance and report environmental incidents to appropriate personnel. 101321.02.02 Follow enterprise plans to improve environmental practices and resource efficiency and make suggestions for improvements to workplace practices in own work area.	

12. ความรู้และทักษะก่อนหน้าที่จำเป็น (Pre-requisite Skill & Knowledge)

N/A

13. ทักษะและความรู้ที่ต้องการ (Required Skills and Knowledge)

(ก) ความต้องการด้านทักษะ

N/A

(ข) ความต้องการด้านความรู้

N/A

14. หลักฐานที่ต้องการ (Evidence Guide)

Required skills include the ability to:

- report as required by procedures
- follow procedures and instructions and respond to change
- ask questions and seek clarifications relating to work requirements
- Reading and writing is required in order to interpret required procedures and complete required workplace forms/reports.

Numeracy is required to interpret numeric workplace information, readings and measurements, handle data as required and complete numeric components of workplace forms/reports.

Competency includes sufficient knowledge to:

- have a basic understanding of sustainability
- know the environmental hazards/risks, resource use and inefficiencies associated with own workplace (at an appropriate level)
- know the relevant environmental and resource efficiency systems and procedures for own work area
- know the impact of laws and regulations to a level relevant to the work context

15. ขอบเขต (Range Statement)

(a) Recommendation

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect the performance. wording in bold italics, if used in the performance criteria, is detailed below. Essential operating conditions that may be present in the training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included

Procedures

All operations are carried out according to procedures including all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Environmental and resource efficiency issues

environmental issues and resource efficiency including the minimization of environmental risks and maximizing opportunities to improve the environmental performance of business and to promote the production and consumption of natural resources more efficiently, for example :

- minimisation of waste, through implementation of the waste management hierarchy
- efficient and effective use of energy and other resources
- seeking alternative sources of energy
- efficient use of materials and appropriate disposal of waste
- use of controls to minimise the risk of environmental damage from hazardous substances
- efficient water use
- reducing emissions
- life cycle analysis applied to issues such as energy supply, materials, transport, production

Measure

Measure should be interpreted in a manner consistent with the scope of the job and may include things like:

- counting the number of items entering/leaving a work area
- reading indicators in the work area
- obtaining relevant information from support personnel

Appropriate techniques

Appropriate techniques include:

- material fed to/consumed by plant/equipment
- plant meters and gauges
- job cards including kanbans
- examination of invoices from suppliers
- measurements made under different conditions examination of relevant information and data.

Compliance

Compliance includes meeting relevant federal, state and local government laws, by-laws, regulations and mandated codes of practice. It also includes any codes and standards that the enterprise applies voluntarily.

Incidents

Incidents include:

- breaches or potential breaches of regulations
- occurrences outside of standard procedure which may lead to lower environmental performance.

Enterprise plans

Enterprise plans include:

- documented policies and procedures
- work plans to minimise waste, increase efficiency of water/energy use, minimise environmental hazards

Suggestions

Suggestions include ideas that help to:

- prevent and minimise environmental risks and maximise opportunities
- reduce emissions of greenhouse gases
- reduce use of non-renewable resources
- improve energy efficiency
- increase use of renewable, recyclable, reusable and recoverable resources
- reduce waste
- increasing the reusability/recyclability of wastes/products
- reduce water usage and/or water wastage.

16. หน่วยสมรรถนะร่วม (ถ้ามี)

N/A

17. อุตสาหกรรมร่วม/กลุ่มอาชีพร่วม (ถ้ามี)

N/A

18. รายละเอียดกระบวนการและวิธีการประเมิน (Assessment Description and Procedure)

Overview of assessment

A person who demonstrates competence in this unit should be able to provide evidence of the ability to follow work procedures according to the instructions and to participate in the improvement of environmental resources and efficient working practices in the own level of responsibility. Evidence must be strictly relevant to the role of the workplace in particular.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to:

- identify and measure resources used in their job
- identify situations likely to lead to an environmental incident
- follow procedures related to environmental performance.

Consistent performance should be demonstrated. For example, look to see that:

- work is routinely to procedures
- the minimum of resources is used consistent with the job requirements, good practice and the procedures.

Context of and specific resources for assessment

Assessors should be satisfied that the person can constantly make the unit as a whole, as defined by the elements, performance criteria and skills and knowledge.

Depending on the selected methods of assessment access may be required to:

- workplace procedures and plans
- documentation in relation to production, waste, overheads, hazard control/management
- reports from supervisors/managers
- case study/scenarios

Method of assessment

A holistic approach should be taken to the assessment.

Competence in this unit may be assessed:

- by demonstration in the workplace
- using targeted questioning for appropriate portions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques

In all cases it is expected that practical assessment will be combined with the specific interrogation to assess the underlying theoretical knowledge and evaluation will be combined with appropriate practical arrangements / simulation or similar assessment.

1. รหัสหน่วยสมรรถนะ 102301
2. ชื่อหน่วยสมรรถนะ Remove and install rotary wing rotor and flight control system components.
3. ทบทวนครั้งที่ - / -
4. สร้างใหม่ ปรับปรุง
5. สำหรับชื่ออาชีพและรหัสอาชีพ (Occupational Classification)

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6. คำอธิบายหน่วยสมรรถนะ (Description of Unit of Competency)

This unit of competency applies hand skills and employs maintenance publications in the removal and installation of rotary wing aircraft rotors and associated flight control system components during scheduled or unscheduled maintenance. This work may be carried out individually or as part of a team.

7. สำหรับระดับคุณวุฒิ

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8. กลุ่มอาชีพ (Sector)

10 Aircraft Mechanics

9. ชื่ออาชีพและรหัสอาชีพอื่นที่หน่วยสมรรถนะนี้สามารถใช้ได้ (ถ้ามี)

N/A

10. ข้อกำหนดหรือกฎระเบียบที่เกี่ยวข้อง (Licensing or Regulation Related) (ถ้ามี)

ICAO Doc 7192 / EASA Part 66

11. สมรรถนะย่อยและเกณฑ์การปฏิบัติงาน (Elements and Performance Criteria)

สมรรถนะย่อย (Element)	เกณฑ์ในการปฏิบัติงาน (Performance Criteria)	วิธีการประเมิน (Assessment)
102301.01 Remove and install rotary wing rotor.	<p>102301.01.01 System is rendered safe and prepared according to relevant aircraft publications/maintenance regulations/orders and standards and practices. Isolation and warning signs are installed/attached to ensure personnel safety. Rotary wing rotor removal is performed according to relevant aircraft publications/maintenance regulations/orders and standards and practices while noticing all relevant work health and safety (WHS) requirements. Required aircraft maintenance documentation is accomplished and processed according to standard enterprise procedures. Removed components are labelled, sealed and packaged according to relevant aircraft publications/maintenance regulations/orders and standards and practices.</p> <p>102301.01.02 Rotor to be installed is checked to ensure correct part or model numbers, modification status and serviceability. Mass balance of rotor blades/head is checked according to relevant aircraft publications/maintenance regulations/orders and standards and practices. Installation is performed according to relevant aircraft publications/maintenance regulations/orders and standards and practices while noticing all relevant WHS requirements. Support/safety equipment is removed at the appropriate time to ensure personnel safety and freedom from structural damage.</p>	

สมรรถนะย่อย (Element)	เกณฑ์ในการปฏิบัติงาน (Performance Criteria)	วิธีการประเมิน (Assessment)
102301.02 Remove and install rotary wing flight control system components.	<p>102301.02.01 System is rendered safe and prepared according to relevant aircraft publications/maintenance regulations/orders and standards and practices. Isolation and warning signs are installed/attached to ensure personnel safety. Rotary wing flight control system component removal is performed according to relevant aircraft publications/maintenance regulations/orders and standards and practices while noticing all relevant WHS requirements. Required aircraft maintenance documentation is accomplished and processed according to standard enterprise procedures. Removed components are labelled, sealed and packaged according to relevant aircraft publications/maintenance regulations/orders and standards and practices.</p> <p>102301.02.02 Rotary wing flight control system components to be installed are checked to ensure correct part or model numbers, modification status and serviceability. Installation is performed according to relevant aircraft publications/maintenance regulations/orders and standards and practices while noticing all relevant WHS requirements. Support/safety equipment is removed at the appropriate time to ensure personnel safety and freedom from structural damage. Required aircraft maintenance documentation is accomplished and processed according to standard enterprise procedures.</p>	

12. ความรู้และทักษะก่อนหน้าที่จำเป็น (Pre-requisite Skill & Knowledge)

101313 Remove and install aircraft hydro-mechanical and landing gear system Components

13. ทักษะและความรู้ที่ต้องการ (Required Skills and Knowledge)

(ก) ความต้องการด้านทักษะ

See Appendix A

(ข) ความต้องการด้านความรู้

See Appendix A

14. หลักฐานที่ต้องการ (Evidence Guide)

(a) Performance Evidence

Evidence required to express competency in this unit must be related to and fulfil all of the requirements of the elements and performance criteria under the indicated conditions of assessment, and must include:

- applying relevant WHS practices, including lifting and handling heavy components
- using relevant maintenance documentation and aircraft manuals to:
 - correctly remove and install main rotors and rotor heads
 - check the mass balance of rotor blades and heads
 - correctly remove and install tail rotor blades and pitch control assemblies
 - locate and correctly remove and install mechanical flight control system components
 - locate and correctly remove and install drive train components, such as gearboxes and drive shafts and couplings
 - identify the requirements for component balancing
- identifying the requirements for adjustment and rigging of systems after component removal and installation.

It is crucial that safety precautions related to the rotary wing rotor and flight control system components being maintained, including allowance for the effect on weight and balance (i.e. centre of gravity) when heavy components are removed, are fully perceived, understood and complied with.

Transferability evidence of skills and knowledge related to removal and installation is important. This may be demonstrated through removal and installation of a representative range of the rotary wing rotor and flight control system components as specified in the Assessment Conditions.

(b) Knowledge Evidence

Evidence required to express competency in this unit must be related to and fulfil all of the requirements of the elements and performance criteria and include knowledge of:

- component attachment methods
- removal and installation procedures for:
 - main rotors and rotor blades
 - rotor heads
 - tail rotors and tail rotor blades
 - swash plates
- tail rotor pitch control assemblies
- requirements for the checking and adjustment of blade tracking after rotor maintenance
- control system layout, linkages and operation (operation only to the extent necessary for the specified tasks), including the requirement for rigging and the independent inspection of work performed
- power train layout and assembly:
 - main rotor gearboxes
 - intermediate gearboxes
 - tail rotor gearboxes
 - drive shafts
 - couplings
- relevant WHS practices, including those relating to lifting and handling of heavy items
- relevant maintenance manuals
- relevant regulatory requirements and standard procedures.

(c) Assessment recommendation

N/A

15. ขอบเขต (Range Statement)

(a) Recommendation

Different working environments and conditions that may affect performance are admissible in this field. Crucial operating conditions that may be present (depending on the worksituation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are

included.

(b) Description

Rotary wing rotors and flight control system components include:

- Main rotor blades and tail rotor blades
- Rotor heads
- Swash plates, and tail rotor pitch control assemblies
- Mechanical flight control components (i.e. cables, pulleys, guides, fairleads, tension regulators, control rods, bellcranks, torque tubes, control sticks or columns, tail rotor pedals) and mechanical components of powered flight control systems
- Main rotor, intermediate or tail rotor gearboxes
- Drive shafts and couplings

Powered flight controls:

- In the case of hydraulically powered rotor control system components and related plumbing, maintenance work should be assessed against 101313 Remove and install aircraft hydro-mechanical and landing gear system components

Procedures and requirements include:

- Industry standard procedures specified by manufacturers, regulatory authorities or the enterprise

16. หน่วยสมรรถนะร่วม (ถ้ามี)

N/A

17. อุตสาหกรรมร่วม/กลุ่มอาชีพร่วม (ถ้ามี)

N/A

18. รายละเอียดกระบวนการและวิธีการประเมิน (Assessment Description and Procedure)

- The assessment are composed of paper exams , interviews, and practical demonstrations, which the paper exam is the main testing. The selection of interviews and practical demonstrations are depending on the assessors' judgment.

- Competency should be assessed in the work environment or simulated work environment using tools and equipment stated in aircraft maintenance manuals. It is also expected that applicable general-purpose tools, test and ground support equipment found in most routine situations would be used where appropriate

- Before undertaking any action,an understanding of component attachment methods, the need for adjustment or rigging and system operation as it relates to the work must be demonstrated. The work plan should consider applicable safety and quality requirements according to the industry and regulatory standards.

- 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 the following groups:

- main rotor blades and tail rotor blades

- rotor heads

- swash plates, tail rotor pitch control assemblies

- mechanical flight control components (i.e. cables, pulleys, guides, fairleads, tension regulators, control rods, bellcranks, torque tubes, control sticks or columns, tail rotor pedals) and mechanical components of powered flight control systems

- main rotor, intermediate or tail rotor gearboxes

- drive shafts and couplings.This shall be proven via the records in the Log of Industrial Experience and Achievement or, where appropriate, an equivalent Industry Evidence Guide.

- Individuals being assessed who have already attained 102303 Maintain basic rotarywing aircraft systems will have satisfied the requirements of this unit with regard tocommon Range Statement variables. The Log of Industrial Experience and Achievementrecords relating to 102303 Maintain basic rotary wing aircraft systems may be acceptedas also meeting the evidence requirements for this unit in the applicable common areas.

1. รหัสหน่วยสมรรถนะ 102302
2. ชื่อหน่วยสมรรถนะ Remove and install avionic system components.
3. ทบทวนครั้งที่ - / -
4. สร้างใหม่ ปรับปรุง
5. สำหรับชื่ออาชีพและรหัสอาชีพ (Occupational Classification)

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6. คำอธิบายหน่วยสมรรถนะ (Description of Unit of Competency)

This skill unit requires the use of workforce skills and use of maintenance documentation / publications in the certification of the avionics system components fixed wing and rotary aircraft removal, installation and during the task the execution of planned maintenance or unplanned system maintainability which can be established by a simple self-test facility, other test systems / board equipment or by the simple ramp test equipment. Maintenance can be performed individually or as part of a team.

7. สำหรับระดับคุณวุฒิ

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8. กลุ่มอาชีพ (Sector)

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9. ชื่ออาชีพและรหัสอาชีพอื่นที่หน่วยสมรรถนะนี้สามารถใช้ได้ (ถ้ามี)

N/A

10. ข้อกำหนดหรือกฎระเบียบที่เกี่ยวข้อง (Licensing or Regulation Related) (ถ้ามี)

ICAO Doc 7192 / EASA Part 66

11. สมรรถนะย่อยและเกณฑ์การปฏิบัติงาน (Elements and Performance Criteria)

สมรรถนะย่อย (Element)	เกณฑ์ในการปฏิบัติงาน (Performance Criteria)	วิธีการประเมิน (Assessment)
102302.01 Remove avionic system components.	102302.01.01 System is rendered safe and prepared in accordance with the applicable maintenance manual and isolation tags are fitted, where necessary, to ensure personnel safety. Avionic component removal is carried out in accordance with the applicable maintenance manual while observing all relevant work health and safety (WHS) requirements 102302.01.02 Required maintenance documentation is completed and processed in accordance with standard enterprise procedures. Removed components are tagged and packaged in accordance with specified procedures	

สมรรถนะย่อย (Element)	เกณฑ์ในการปฏิบัติงาน (Performance Criteria)	วิธีการประเมิน (Assessment)
102302.02 Install avionic system components and verify system serviceability.	102302.01.01 System is rendered safe and prepared in accordance with the applicable maintenance manual and isolation tags are fitted, where necessary, to ensure personnel safety. Avionic component removal is carried out in accordance with the applicable maintenance manual while observing all relevant work health and safety (WHS) requirements 102302.01.02 Required maintenance documentation is completed and processed in accordance with standard enterprise procedures. Removed components are tagged and packaged in accordance with specified procedures.	

12. ความรู้และทักษะก่อนหน้าที่จำเป็น (Pre-requisite Skill & Knowledge)

103406 Test and troubleshoot aircraft electrical systems and components

13. ทักษะและความรู้ที่ต้องการ (Required Skills and Knowledge)

(ก) ความต้องการด้านทักษะ

EASA Part 66: Module 5 Digital Technique/Electronic Instrument Systems

EASA Part 66: Module 6 Materials and Hardware

(ข) ความต้องการด้านความรู้

EASA Part 66: Module 5 Digital Technique/Electronic Instrument Systems

EASA Part 66: Module 6 Materials and Hardware

14. หลักฐานที่ต้องการ (Evidence Guide)

(a) 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:

- locating and identifying avionic components that are part of instrument and radio systems
- determining that component and system serviceability can be confirmed by a simple self-test facility, other on-board test systems/equipment or by simple ramp test equipment requiring a simple go/no go decision
- applying relevant WHS practices
- applying component attachment methods
- connecting hardware and plugs
- handling precautions for electrostatic sensitive devices
- using approved maintenance documentation and aircraft publications relating to avionic systems
- using built-in test equipment to confirm system serviceability (this may involve the operation of specific built-in test equipment, on-board maintenance systems and Integrated Modular Avionic modules). It is essential that cleanliness requirements and safety precautions applicable to the system being maintained are fully observed, understood and complied with, as well as work practices associated with electrostatic sensitive devices. Evidence of transferability of skills and knowledge related to removal and installation is essential. This is to be demonstrated by application across a range of aircraft avionic system components as listed in the Assessment Conditions.

(b) 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 basic knowledge of:

- electronic fundamentals
- digital techniques relating to electronic instrument systems
- engine indication systems
- the operation of built-in test equipment
- on-board maintenance systems
- Integrated Modular Avionics and the interface with hydraulic, fuel and pneumatic systems.

15. ขอบเขต (Range Statement)

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.

Procedures and requirements include:

Industry standard procedures specified by manufacturers, regulatory authorities or the enterprise.

Avionic components include:

Components/line replaceable units (LRUs) from electronic instrument systems

Components/LRUs from engine indication systems

Communication system components

Navigation system components

Software updates to avionic systems where serviceability can be determined by a simple test

Tested for serviceability includes:

Confirming system serviceability through the operation of built-in test equipment or any other on-board system that can confirm correct

operation

Using only off-aircraft test equipment that provides a simple go/no go decision regarding system serviceability

16. หน่วยสมรรถนะร่วม (ถ้ามี)

N/A

17. อุตสาหกรรมร่วม/กลุ่มอาชีพร่วม (ถ้ามี)

N/A

18. รายละเอียดกระบวนการและวิธีการประเมิน (Assessment Description and Procedure)

- The assessment are composed of paper exams , interviews, and practical demonstrations, which the paper exam is the main testing. The selection of interviews and practical demonstrations are depending on the assessors' judgment.

- Competency should be assessed in the workplace or simulated workplace using tools and equipment specified in maintenance manuals. It is also expected that applicable general-purpose tools, test and ground support equipment found in most routine situations would be used where appropriate.

- An understanding of the attachment methods, connection of hardware, and system test requirements as they relate to the work must be demonstrated before undertaking any action.

- The work plan should take account of applicable safety and quality requirements in accordance with the industry and regulatory standards.

- 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 a representative range of avionic components, as listed in the Range of Conditions:

- components/LRUs from electronic instrument systems
- components/LRUs from engine indication systems
- communication system components
- navigation system components
- software updates to avionic systems where serviceability can be determined by a simple test.

- 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).

1. รหัสหน่วยสมรรถนะ 102303
2. ชื่อหน่วยสมรรถนะ Maintain basic rotary wing aircraft systems.
3. ทบทวนครั้งที่ - / -
4. สร้างใหม่ ปรับปรุง
5. สำหรับชื่ออาชีพและรหัสอาชีพ (Occupational Classification)

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6. คำอธิบายหน่วยสมรรถนะ (Description of Unit of Competency)

This unit of competency applies hand skills and employs system/component knowledge and applicable maintenance publications and test equipment in the inspection, testing and troubleshooting, and replacement of components of rotor, rotor control systems and airframe systems of basic rotary wing aircraft during scheduled or unscheduled maintenance. This work may be carried out individually or as part of a team.

7. สำหรับระดับคุณวุฒิ

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8. กลุ่มอาชีพ (Sector)

10 Aircraft Mechanics

9. ชื่ออาชีพและรหัสอาชีพอื่นที่หน่วยสมรรถนะนี้สามารถใช้ได้ (ถ้ามี)

N/A

10. ข้อกำหนดหรือกฎระเบียบที่เกี่ยวข้อง (Licensing or Regulation Related) (ถ้ามี)

ICAO Doc 7192 / EASA Part 66

11. สมรรถนะย่อยและเกณฑ์การปฏิบัติงาน (Elements and Performance Criteria)

สมรรถนะย่อย (Element)	เกณฑ์ในการปฏิบัติงาน (Performance Criteria)	วิธีการประเมิน (Assessment)
<p>102303.01 Inspect and test/adjust basic rotary wing airframe systems and components.</p>	<p>102303.01.01 Isolation and warning signs are attached/installed to the system or related systems and the aircraft configured for safe system inspection and operation according to relevant aircraft publications/maintenance regulations orders and standards and practices. Rotor and rotor control system is visually or physically checked/inspected for external signs of defects according to relevant aircraft publications maintenance regulations/orders and standards and practices while noticing all relevant work health and safety (WHS) requirements, including the use of material safety data sheets (MSDS) and items of personal protective equipment (PPE). Defects are identified and recorded according to standard enterprise procedures.</p> <p>102303.01.02 Aircraft and systems are prepared according to relevant aircraft publications/maintenance regulations orders and standards and practices for the operation of engine and rotor system. Rotor and rotor control system are functionally tested according to relevant aircraft publications maintenance regulations/orders and standards and practices for indication of malfunction. System calibration or adjustments are carried out according to relevant aircraft publications/maintenance regulations/orders and standards and practices.</p>	

สมรรถนะย่อย (Element)	เกณฑ์ในการปฏิบัติงาน (Performance Criteria)	วิธีการประเมิน (Assessment)
102303.02 Troubleshoot basic rotary wing airframe systems and components.	<p>102303.02.01 Relevant maintenance documentation and modification status, including system defect reports, where relevant, are employed to identify specific inspection requirements. Isolation tags are checked and aircraft configured for safe system inspection and operation according to the applicable maintenance manual. Airframe system components are visually or physically checked for external signs of defects according to applicable maintenance manual while noticing all relevant WHS requirements, including the use of MSDS and items of PPE. Defects are correctly identified and reported.</p> <p>102303.02.02 Aircraft and system are prepared according to applicable maintenance manual for the application of power/system operation. Airframe system is functionally tested according to maintenance manual for indication of serviceability or malfunction. System adjustment is carried out according to maintenance manual.</p>	
102303.03 Troubleshoot rotor and rotor control systems	<p>102303.03.01 Available information from aircraft maintenance documentation, inspection and test results is employed to assist in fault determination. Relevant aircraft publication fault diagnosis guide and logical processes are employed to ensure efficient and accurate troubleshooting to line replacement level. Specialist advice is acquired to assist with the troubleshooting process.</p> <p>102303.03.02 Rotor and rotor control system faults are located and the causes of the faults are clearly identified and recorded in aircraft maintenance documentation according to standard enterprise procedures. Fault rectification requirements are determined.</p>	

สมรรถนะย่อย (Element)	เกณฑ์ในการปฏิบัติงาน (Performance Criteria)	วิธีการประเมิน (Assessment)
102303.04 Troubleshoot basic rotary wing airframe systems	<p>102303.04.01 Available information from maintenance documentation, inspection and test results is employed, where necessary, to assist in fault determination. Maintenance manual fault diagnosis guides and logic processes are employed to ensure efficient and accurate troubleshooting. Specialist advice is acquired, where required, to assist with the troubleshooting process.</p> <p>102303.04.02 Airframe system faults are located and the causes of the faults are clearly identified and correctly recorded in maintenance documentation, where required, according to standard enterprise procedures. Rectification requirements are determined.</p>	
102303.05 Remove and install rotary wing rotor and rotor system components	<p>102303.05.01 System is rendered safe and prepared according to relevant aircraft publications/maintenance regulations/orders and standards and practices, and isolation and warning signs are installed/attached to ensure personnel safety. Rotor and rotor system component removal is performed according to relevant aircraft publications/maintenance regulations/orders and standards and practices while noticing all relevant WHS requirements, including the use of MSDS and items of PPE. Required aircraft maintenance documentation is accomplished and processed in accordance with standard enterprise procedures. Removed components are labelled, sealed and packaged according to relevant aircraft publications/maintenance regulations/orders and standards and practices.</p> <p>102303.05.02 Rotor or rotor system component to be installed is checked to ensure correct part or model numbers, modification status and serviceability. Mass balance of rotor blades/head is checked according to relevant aircraft publications/maintenance regulations/orders and standards and practices. Installation is performed according to relevant aircraft publications/maintenance regulations/orders and standards and practices. Support/safety equipment is removed at the appropriate time to ensure personnel safety and freedom from structural damage.</p>	

สมรรถนะย่อย (Element)	เกณฑ์ในการปฏิบัติงาน (Performance Criteria)	วิธีการประเมิน (Assessment)
<p>102303.06 Remove and install rotor control system components</p>	<p>102303.06.01 System is rendered safe and prepared according to relevant aircraft publications/maintenance regulations/orders and standards and practices, and isolation and warnings signs are installed/attached to ensure personnel safety. Rotary wing flight control system component removal is performed according to relevant aircraft publications/maintenance regulations/orders and standards and practices while noticing all relevant WHS requirements, including the use of MSDS and items of PPE. Required aircraft maintenance documentation is accomplished and processed according to standard enterprise procedures. Removed components are labelled, sealed and packaged according to relevant aircraft publications/maintenance regulations/orders and standards and practices.</p> <p>102303.06.02 Rotary wing flight control system components to be installed are checked to ensure correct part or model numbers, modification status and serviceability. Installation is performed according to relevant aircraft publications/maintenance regulations/orders and standards and practices. Support/safety equipment is removed at the appropriate time to ensure personnel safety and freedom from structural damage. Required aircraft maintenance documentation is accomplished and processed according to standard enterprise procedures.</p>	

สมรรถนะย่อย (Element)	เกณฑ์ในการปฏิบัติงาน (Performance Criteria)	วิธีการประเมิน (Assessment)
102303.07 Remove and install basic rotary wing airframe system components	<p>102303.07.01 System is rendered safe according to the applicable maintenance manual and isolation tags are attached, where necessary, to ensure personnel safety. Airframe system component removal is performed according to the applicable maintenance manual while noticing all relevant WHS requirements, including the use of MSDS and items of PPE. Required maintenance documentation is accurately accomplished and correctly processed. Removed components are tagged, sealed and packaged according to specified procedures.</p> <p>102303.07.02 Components to be installed are checked to ensure correct part numbers, serviceability and modification status. Mass balance of control surfaces to be installed is checked according to the applicable maintenance manual, if required. Installation is performed according to the applicable maintenance manual. Required maintenance documentation is accomplished and processed according to standard enterprise procedures.</p>	

12. ความรู้และทักษะก่อนหน้าที่จำเป็น (Pre-requisite Skill & Knowledge)

- 101301 Interpret work health and safety practices in aviation maintenance
- 101302 Apply quality standards applicable to aviation maintenance processes
- 101303 Interpret and use aviation maintenance industry manuals and specifications
- 101304 Complete aviation maintenance industry documentation
- 101305 Perform basic hand skills, standard trade practices and fundamentals in aviation maintenance

13. ทักษะและความรู้ที่ต้องการ (Required Skills and Knowledge)

(ก) ความต้องการด้านทักษะ

See Appendix A

(ข) ความต้องการด้านความรู้

See Appendix A

14. หลักฐานที่ต้องการ (Evidence Guide)

(a) Performance Evidence

Evidence required to express competency in this unit must be related to and fulfil all of the requirements of the elements and performance criteria under the indicated conditions of assessment, and must include:

- using hand skills, tools and test equipment in the testing, adjustment and troubleshooting of:
- rotary wing mechanical control systems
- helicopter airframe systems and components, including rotors and rotor system
- recognising system and component defects/external damage, correct installation and security for the range of airframe systems listed in the Range of Conditions
- removing, installing and rigging of rotor systems and rotor/flight controls
- removing and installing the range of airframe components listed in the Range of Conditions
- checking rotor mass balance
- performing system functional tests and checks to isolate system faults and assess post-maintenance serviceability
- effectively using maintenance documentation and relevant fault diagnosis guides in the troubleshooting process and for component removal and installation
- applying standard procedures
- observing all relevant WHS procedures, including the use of PPE and MSDS.

The fundamental skills inherent in this unit should be transferable across a range of inspection, testing and troubleshooting tasks (including the timely involvement of supervisors or other trades) associated with the, rotors, rotor control systems, airframe systems and components of basic rotary wing aircraft. It is crucial that relevant procedures, requirements for cleanliness and safety precautions are fully perceived, understood and complied with.

It is essential to be able to interpret inspection procedures and specifications (allowable limits) and apply them in practice. This shall be demonstrated through application across a range of rotors, rotor control systems, airframe systems and components as specified in the Assessment Conditions.

(b) Knowledge Evidence

Evidence required to express competency in this unit must be related to and fulfil all of the requirements of the elements and performance criteria and include knowledge of:

- WHS precautions relevant to airframe system maintenance, including the lifting and handling of heavy components and how to obtain PPE and MSDS
- standard trade practices relating to tool and test/rigging equipment usage and installation/securing of system components
- theory of flight:
 - airflow
 - conditions of flight
 - lift and forces
 - drag
- rotary flight principles:
- terminology relating to:
 - aerofoils
 - main rotor blades
 - rotor discs
 - rotors (main and tail)
- aerodynamic characteristics:
 - aerofoil design
 - forces
- rotor thrust and power requirements
- vortex ring
- autorotation
- helicopter stability
- helicopter dynamic components:
 - main rotors:
 - blades
 - heads
 - linkages
 - tail rotors
 - swash plates
 - transmissions and drive shafts
- helicopter structure and airframe systems:
 - structure and layout
 - engine and transmission
 - flight control system layout and operation
 - cabin heater system layout and operation
 - fuel system layout and operation
 - helicopter maintenance procedures and troubleshooting
 - relevant maintenance manuals
 - relevant regulatory requirements and standard procedures, including requirements for engine and rotor system operation

(c) Assessment recommendation

N/A

15. ขอบเขต (Range Statement)

(a) Recommendation

Different working environments and conditions that may affect performance are admissible in this field. Crucial 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.

(b) Description

Rotor and rotor control system components include:

- Main rotor blades and tail rotor blades
- Rotor heads, swash plates and tail rotor pitch control assemblies
- Mechanical flight control components (collective and cyclic pitch levers, rudder pedals, cables, pulleys, guides, fairleads, bellcranks, rods, torque tubes, chains and sprockets)
- Main rotor, intermediate or tail rotor gearboxes
- Drive shafts and couplings

Engine and rotor system operation:

- Must be performed by a qualified pilot

Airframe systems include:

- Fuel systems
- Cabin heating systems

Airframe system components include:

- Rigid or flexible fuel tanks, selector/shutoff valves and rigid or flexible plumbing
- Cabin heater ducting and control valves

Procedures and requirements include:

- Industry standard procedures specified by manufacturers, regulatory authorities or the enterprise

16. หน่วยสมรรถนะรวม (ถ้ามี)

N/A

17. อุตสาหกรรมร่วม/กลุ่มอาชีพร่วม (ถ้ามี)

N/A

18. รายละเอียดกระบวนการและวิธีการประเมิน (Assessment Description and Procedure)

- The assessment are composed of paper exams , interviews, and practical demonstrations, which the paper exam is the main testing. The selection of interviews and practical demonstrations are depending on the assessors' judgment.

- Competency should be assessed in the work environment or simulated work environment using tools and equipment stated in maintenance documentation. It is also expected that applicable general-purpose tools and test equipment found in most routine situations would be used where appropriate.

- Before undertaking any action, the application of testing procedures should clearly indicate knowledge of system operation, the relationship of individual components and the links with other systems (if applicable) within the limits of the aircraft/system fault-finding guide. The work plan should consider applicable safety and quality requirements in accordance with the industry and regulatory standards.

- 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 this unit of competency are being achieved under routine supervision on groups listed in the Range of Conditions, as follows:

- at least one (1) component from each of:

- main rotor blades and tail rotor blades

- rotor heads, swash plates and tail rotor pitch control assemblies

- mechanical flight control components (collective and cyclic pitch levers, rudder pedals, cables, pulleys, guides, fairleads, bellcranks, rods, torque tubes, chains and sprockets)

- main rotor, intermediate or tail rotor gearboxes

- drive shafts and couplings

- fuel systems

- cabin heating systems

- a representative range of components from:

- rigid or flexible fuel tanks, selector/shutoff valves and rigid or flexible plumbing

- cabin heater ducting and control valves.

This shall be proven via the records in the Log of Industrial Experience and Achievement or, where appropriate, an equivalent Industry Evidence Guide.