มาตรฐานอาชีพและคุณวุฒิวิชาชีพ

Occupational Standard and Professional Qualifications

Of Aircraft Mechanics

จัดทำโดย Thailand Professional Qualification Institute (Public Organization)

1. ชื่อมาตรฐานอาชีพ

Of Aircraft Mechanics

2. ประวัติการปรับปรุงมาตรฐาน

1/2021

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 personnal needs.

5. ประวัติการปรับปรุงมาตรฐานในแต่ละครั้ง

1/2021

6. ครั้งที่

- Review of qualifications according to the 8-level professional qualifications framework.
- Review of qualification pathway.

7. คุณวุฒิวิชาชีพที่ครอบคลุม (Professional Qualifications included)

สาขาวิชาชีพการบิน

สาขางานเทคนิคและฝึกอบรม

Aircraft Mechanics : Avionics ช่างอากาศยาน (เอวิโอนิกส์) ระดับ 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.
101320	Inspect and maintain structures and related components of non-pressurized.
101321	Participate in environmentally sustainable work practices.
103301	Remove and install basic aircraft electrical system components.

103302	Remove and install advanced aircraft electrical system components.
103303	Remove and install advanced aircraft instrument system components.
103304	Remove and install aircraft basic radio communication and navigation system.
103305	Remove and install aircraft electronic system components.
103306	Maintain basic light aircraft electrical systems and components.
103307	Maintain basic light aircraft instrument systems and components.
103308	Maintain basic aircraft communication and radio navigation systems and components.

10. ระดับคุณวุฒิ

10.1 สาขาวิชาชีพการบิน สาขางานเทคนิคและฝึกอบรม Aircraft Mechanics : Avionics ช่างอากาศยาน (เอวิโอนิกส์) ระดับ 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.

Characteristics of Outcomes

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)

1. The minimum age for person who wants to qualify this level is 18 years old.
2. Legitimates one of the following:

2.1 Holds a minimum Vocational Certificate or equivalence, and at least four years working experiences in aircraft maintenance with an official verification letter.

2.2 Holds a High Vocational Certificate, completed in aircraft maintenance course

2.3 Holds a High Vocational Certificate or equivalence, and at least two years working experiences in aircraft maintenance with an official verification letter.

2.4 Holds a Bachelor's Degree, completed in aircraft maintenance course or equivalence

2.5 Holds a Bachelor's Degree or equivalence, and at least one year working experience in aircraft maintenance with an official verification letter.

หลักเกณฑ์การต่ออายุหนังสือรับรองมาตรฐานอาชีพ

-

กลุ่มบุคคลในอาชีพ (Target Group)

Aircraft Mechanics: Avionics

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.

101320 Inspect and maintain structures and related components of non-pressurized.

101321 Participate in environmentally sustainable work practices.

103301 Remove and install basic aircraft electrical system components.

103302 Remove and install advanced aircraft electrical system components.

103303 Remove and install advanced aircraft instrument system components.

103304 Remove and install aircraft basic radio communication and navigation system.

103305 Remove and install aircraft electronic system components.

103306 Maintain basic light aircraft electrical systems and components.

103307 Maintain basic light aircraft instrument systems and components.

103308 Maintain basic aircraft communication and radio navigation systems and components.

ตารางแผนผังแสดงหน้าที่

1. ตารางแสดงหน้าที่ 1

ประกาศใช้ ณ 13/08/2564

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

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

คำอธิบาย ตารางแผนผังแสดงหน้าที่เป็นแผนผังที่ใช้วิเคราะห์หน้าที่งานเพื่อให้ได้หน้าที่หลัก (Key Function)

2. ตารางแสดงหน้าที่ 1 (ต่อ)

ประกาศใช้ ณ 13/08/2564

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.	101301.01	Interpret safe work practices , reporting procedures for workplace hazards.
				101301.02	Interpret emergency procedures.
		101302	Apply quality standards applicable to aviation maintenance.	101302.01	Interpret and apply quality standards.
				101302.02	Interpret quality improvement.
		101303	Interpret and use aviation maintenance industry manuals and specifications.	101303.01	Identify, interpret and apply industry manuals, specifications and drawings.
				101303.02	Amend and store manuals, specifications or drawings.
		101304	Complete aviation maintenance industry documentation.	101304.01	Interpret documentation.
				101304.02	Complete, store and distribute documentation.
		101305	Perform basic hand skills, standard trade practices and fundamentals in aviation.	101305.01	Select, use and store tools and/or equipment.
				101305.02	Apply standard trade practices.
		101306	Conduct self in the aviation maintenance environment.	101306.01	Manage self and work effectively with others.
				101306.02	Participate in the process of change and innovation.
		101307	Communicate aviation technical and maintenance management knowledge.	101307.01	Evaluate written technical communication.
				101307.02	Present technical and non-technical briefings.
		101308	Apply mathematics and physics in aviation maintenance.	101308.01	Apply mathematical techniques in aviation maintenance.
				101308.02	Apply physics laws and principles in aviation maintenance.
		101309	Remove and install miscellaneous aircraft electrical hardware/components.	101309.01	Remove aircraft electrical hardware.
				101309.02	Install aircraft electrical hardware.

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 1.01	Select and prepare test equipment.
				101311 .02	Test system or component.
		101312	Perform aircraft flight servicing.	10131 2.01	Inspect aircraft and systems, and prepare for flight.
				101312 .02	Replenish aircraft systems.
		101320	Inspect and maintain structures and related components of non-pressurized.	10132 0.01	Inspect and maintain aircraft structure.
				101320 .02	Prepare and Install components.
		101321	Participate in environmentally sustainable work practices.	10132 1.01	Identify current resource use and environmental issues.
				101321 .02	Comply with environmental regulations and seek opportunities to improve environmental practices and resource efficiency.
103	Aircraft Mechanics Avionics	103301	Remove and install basic aircraft electrical system components.	10330 1.01	Remove DC aircraft electrical system components.
				103301 .02	Install DC aircraft electrical system components.
		103302	Remove and install advanced aircraft electrical system components.	10330 2.01	Remove AC and DC aircraft electrical system components.
				103302 .02	Install AC and DC aircraft electrical system components.
		103303	Remove and install advanced aircraft instrument system components.	10330 3.01	Remove advanced aircraft instrument system components.
				103303 .02	Install advanced aircraft instrument system components.
		103304	Remove and install aircraft basic radio communication and navigation system.	10330 4.01	Remove basic radio communication and navigation system components.
				103304 .02	Install basic radio communication and navigation system components.
		103305	Remove and install aircraft electronic system components.	10330 5.01	Remove aircraft electronic system components.
				103305 .02	Install aircraft electronic system components.
		103306	Maintain basic light aircraft electrical systems and components.	10330 6.01	Inspect, Test/adjust basic aircraft electrical systems.

หน้าที่หลัก Key Function		หน่วยสมรรถนะ Unit of Competence		หน่วยสมรรถนะย่อย Element of Competence	
รหัส	**คำอธิบาย**	**รหัส**	**คำอธิบาย**	**รหัส**	**คำอธิบาย**
103	Aircraft Mechanics Avionics	103306	Maintain basic light aircraft electrical systems and components.	10330 6.02	Troubleshoot, Remove and install basic aircraft electrical systems.
				103306 .03	Basic aircraft electrical system.
		103307	Maintain basic light aircraft instrument systems and components.	10330 7.01	Inspect, test/adjust basic aircraft instrument systems and components.
				103307 .02	Troubleshoot, remove and install basic basic aircraft instrument systems and components.
		103308	Maintain basic aircraft communication and radio navigation systems and components.	10330 8.01	Inspect and test basic communication and radio navigation systems and components.
				103308 .02	Troubleshoot , Remove and install basic communication and radio navigation systems.

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 N/A

4. สร้างใหม่ ☑ **ปรับปรุง** ☐

5. สำหรับชื่ออาชีพและรหัสอาชีพ (Occupational Classification)

7232 Aircraft engine mechanics and fitters

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

1	2	3	4	5	6	7	8
☐	☐	☑	☐	☐	☐	☐	☐

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)
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 the requirements for conduct of safe work, to identify Workplace housekeeping measures in accordance with standard enterprise procedures, to identify and understand the use of personal protective equipment (PPE) and maintenance measures are interpreted and understood according to regulatory and enterprise procedures. 101301.01.02 Able to identify and understand safety signs and symbols, and their directions observed in accordance with enterprise and safety requirements, to identify workplace hazards correctly and able to interpret and understand reporting procedures according to standard enterprise procedures.	ข้อสอบข้อเขียน การสัมภาษณ์ การสาธิตการปฏิบัติงาน

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.	ข้อสอบข้อเขียน การสัมภาษณ์ การสาธิตการปฏิบัติงาน

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)

This part 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.

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.
- Lonizing, 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 N/A

4. สร้างใหม่ ☑ **ปรับปรุง** ☐

5. สำหรับชื่ออาชีพและรหัสอาชีพ (Occupational Classification)

7232 Aircraft engine mechanics and fitters

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

1	2	3	4	5	6	7	8
☐	☐	☑	☐	☐	☐	☐	☐

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.	ข้อสอบข้อเขียน การสัมภาษณ์ การสาธิตการปฏิบัติงาน
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.	ข้อสอบข้อเขียน การสัมภาษณ์ การสาธิตการปฏิบัติงาน

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 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 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 N/A

4. สร้างใหม่ ☑ **ปรับปรุง** ☐

5. สำหรับชื่ออาชีพและรหัสอาชีพ (Occupational Classification)

7232 Aircraft engine mechanics and fitters

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
☐	☐	☑	☐	☐	☐	☐	☐

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 work steps are interpreted and procedures to be followed are accurately determined.	ข้อสอบข้อเขียน การสัมภาษณ์ การสาธิตการปฏิบัติงาน
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.	ข้อสอบข้อเขียน การสัมภาษณ์ การสาธิตการปฏิบัติงาน

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 N/A

4. สร้างใหม่ ☑ **ปรับปรุง** ☐

5. สำหรับชื่ออาชีพและรหัสอาชีพ (Occupational Classification)

7232 Aircraft engine mechanics and fitters

6. คำอธิบายหน่วยสมรรถนะ (Description of Unit of Competency)

His 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 Aeroskills during scheduled or unscheduled maintenance.

7. สำหรับระดับคุณวุฒิ

1	2	3	4	5	6	7	8
☐	☐	☑	☐	☐	☐	☐	☐

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.	ข้อสอบข้อเขียน การสัมภาษณ์ การสาธิตการปฏิบัติงาน
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.	ข้อสอบข้อเขียน การสัมภาษณ์ การสาธิตการปฏิบัติงาน

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 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, 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 N/A

4. สร้างใหม่ ☑ **ปรับปรุง** ☐

5. สำหรับชื่ออาชีพและรหัสอาชีพ (Occupational Classification)

7232 Aircraft engine mechanics and fitters

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

1	2	3	4	5	6	7	8
☐	☐	☑	☐	☐	☐	☐	☐

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.	ข้อสอบข้อเขียน การสัมภาษณ์ การสาธิตการปฏิบัติงาน

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.	ข้อสอบข้อเขียน การสัมภาษณ์ การสาธิตการปฏิบัติงาน

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 satisfiesall 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. 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, 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 N/A

4. สร้างใหม่ ☑ **ปรับปรุง** ☐

5. สำหรับชื่ออาชีพและรหัสอาชีพ (Occupational Classification)

7232 Aircraft engine mechanics and fitters

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

1	2	3	4	5	6	7	8
☐	☐	☑	☐	☐	☐	☐	☐

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)
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.	ข้อสอบข้อเขียน การสัมภาษณ์ การสาธิตการปฏิบัติงาน
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.	ข้อสอบข้อเขียน การสัมภาษณ์ การสาธิตการปฏิบัติงาน

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 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. 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 N/A

4. สร้างใหม่ ☑ **ปรับปรุง** ☐

5. สำหรับชื่ออาชีพและรหัสอาชีพ (Occupational Classification)

7232 Aircraft engine mechanics and fitters

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

1	2	3	4	5	6	7	8
☐	☐	☑	☐	☐	☐	☐	☐

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 skills relation to dealings with others involved in the work.	ข้อสอบข้อเขียน การสัมภาษณ์ การสาธิตการปฏิบัติงาน
101307.02 Present technical and non-technical briefings.	101307.02.01 Briefing is planned and prepared in a well-structured manned information delivered is accurate. 101307.02.02 Audiovisual equipment, where applicable, is used in an effective, professional manner.	ข้อสอบข้อเขียน การสัมภาษณ์ การสาธิตการปฏิบัติงาน

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)

(a) Recommendation

His 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.
• Organizationalfamiliarization.
• Technical knowledge and skills.
• Work procedures.
• Non-technical matters.

(b) Description

N/A

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 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 N/A

4. สร้างใหม่ ☑ **ปรับปรุง** ☐

5. สำหรับชื่ออาชีพและรหัสอาชีพ (Occupational Classification)

7232 Aircraft engine mechanics and fitters

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 66 standards.

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.	ข้อสอบข้อเขียน การสัมภาษณ์ การสาธิตการปฏิบัติงาน
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 sounding aviation maintenance settings are explained.	ข้อสอบข้อเขียน การสัมภาษณ์ การสาธิตการปฏิบัติงาน

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 venture.

• 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. 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.
- 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 N/A

4. สร้างใหม่ ☑ **ปรับปรุง** ☐

5. สำหรับชื่ออาชีพและรหัสอาชีพ (Occupational Classification)

7232 Aircraft engine mechanics and fitters

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)

ICAO Doc 7192 / EASA Part 66

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.	ข้อสอบข้อเขียน การสัมภาษณ์ การสาธิตการปฏิบัติงาน

สมรรถนะย่อย (Element)	เกณฑ์ในการปฏิบัติงาน (Performance Criteria)	วิธีการประเมิน (Assessment)
101309.02 Install aircraft electrical hardware.	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. 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.	ข้อสอบข้อเขียน การสัมภาษณ์ การสาธิตการปฏิบัติงาน

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 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 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 N/A

4. สร้างใหม่ ☑ **ปรับปรุง** ☐

5. สำหรับชื่ออาชีพและรหัสอาชีพ (Occupational Classification)

7232 Aircraft engine mechanics and fitters

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

1	2	3	4	5	6	7	8
☐	☐	☑	☐	☐	☐	☐	☐

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.	ข้อสอบข้อเขียน การสัมภาษณ์ การสาธิตการปฏิบัติงาน
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.	ข้อสอบข้อเขียน การสัมภาษณ์ การสาธิตการปฏิบัติงาน

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).

• 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 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 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 N/A

4. สร้างใหม่ ☑ **ปรับปรุง** ☐

5. สำหรับชื่ออาชีพและรหัสอาชีพ (Occupational Classification)

7232 Aircraft engine mechanics and fitters

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

1	2	3	4	5	6	7	8
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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. Ground locks, 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.	ข้อสอบข้อเขียน การสัมภาษณ์ การสาธิตการปฏิบัติงาน

สมรรถนะย่อย (Element)	เกณฑ์ในการปฏิบัติงาน (Performance Criteria)	วิธีการประเมิน (Assessment)
101312.02 Replenish aircraft systems.	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). 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. 101312.02.03 Required maintenance documentation is completed and processed in accordance with standard enterprise procedures.	ข้อสอบข้อเขียน การสัมภาษณ์ การสาธิตการปฏิบัติงาน

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
ICAO Doc 7192 / EASA Part 66 Module: 4.Electronic Fundamentals
ICAO Doc 7192 / EASA Part 66 Module: 5.Digital Technique/Electronic Instrument Systems

(ข) ความต้องการด้านความรู้
ICAO Doc 7192 / EASA Part 66 Module: 4.Electronic Fundamentals
ICAO Doc 7192 / EASA Part 66 Module: 5.Digital Technique/Electronic Instrument Systems

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. 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 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 101320

2. ชื่อหน่วยสมรรถนะ Inspect and maintain structures and related components of non-pressurized.

3. ทบทวนครั้งที่ N/A

4. สร้างใหม่ ☑ **ปรับปรุง** ☐

5. สำหรับชื่ออาชีพและรหัสอาชีพ (Occupational Classification)

7232 Aircraft engine mechanics and fitters

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.	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 (WHS), including the use of safety data sheets (MSDS) 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. 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.	ข้อสอบข้อเขียน การสัมภาษณ์ การสาธิตการปฏิบัติงาน
101320.02 Prepare and Install components.	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. 101320.02.02 Component extraction is carried out in accordance with the maintenance manual applicable to observe all relevant requirements of the WHS, including the use of MSDS and PPE items. 101320.02.03 Support/safety equipment is removed at an appropriate time to ensure personnel safety and freedom from structural damage.	ข้อสอบข้อเขียน การสัมภาษณ์ การสาธิตการปฏิบัติงาน

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 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 windscreens.
• Aircraft fabric coverings and methods for performance of minor 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 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 surfaces. • 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.

Cmponents 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 based on combination of paper exams, interviewing, and practical demonstrations depending on the assessors' judgement. 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.

• Sstructural 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.

• Ane (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 N/A

4. สร้างใหม่ ☑ **ปรับปรุง** ☐

5. สำหรับชื่ออาชีพและรหัสอาชีพ (Occupational Classification)

7232 Aircraft engine mechanics and fitters

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)

ICAO Doc. 7192 / ICAO Doc 7192 / EASA Part 66

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.	ข้อสอบข้อเขียน การสัมภาษณ์ การสาธิตการปฏิบัติงาน

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.	ข้อสอบข้อเขียน การสัมภาษณ์ การสาธิตการปฏิบัติงาน

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

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 interpretrequired 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 .
Required knowledge
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.

(b) Knowledge Evidence

N/A

(c) Assessment recommendation

N/A

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.

(b) Description

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 personal.
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 103301

2. ชื่อหน่วยสมรรถนะ Remove and install basic aircraft electrical system components.

3. ทบทวนครั้งที่ N/A

4. สร้างใหม่ ☑ **ปรับปรุง** ☐

5. สำหรับชื่ออาชีพและรหัสอาชีพ (Occupational Classification)

7232 Aircraft engine mechanics and fitters

6. คำอธิบายหน่วยสมรรถนะ (Description of Unit of Competency)

This unit of competency requires the application of manual skills and the use of maintenance documentation / publications in the removal and installation of components aircraft direct current (DC) of the rotating electrical system of fixed wing aircraft and only have electrical systems DC 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
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8. กลุ่มอาชีพ (Sector)

10 Aircraft Mechanics

9. ชื่ออาชีพและรหัสอาชีพอื่นที่หน่วยสมรรถนะนี้สามารถใช้ได้ (ถ้ามี)

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)
103301.01 Remove DC aircraft electrical system components.	103301.01.01 Electrical component removal is carried out in accordance with the applicable maintenance manual while observing all relevant. 103301.01.02 work health and safety (WHS) requirements, and required maintenance documentation is completed and processed in accordance with standard enterprise procedures.	ข้อสอบข้อเขียน การสัมภาษณ์ การสาธิตการปฏิบัติงาน
103301.02 Install DC aircraft electrical system components.	103301.02.01 Physical installation of electrical components is performed in accordance with the applicable maintenance manual, ensuring appropriate adjustment/alignment with mechanical interface is carried out. 103301.02.02 Required maintenance documentation is completed and processed in accordance with standard enterprise procedures.	ข้อสอบข้อเขียน การสัมภาษณ์ การสาธิตการปฏิบัติงาน

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, and should include:

- Identifying / location:
- DC power generation systems, regulation, and distribution and control components, ie regulators and busbars systems.
- Poiston ignition engines and components, ie coils, magnetos, auxiliary power (links impulses and / inductors vibrators).
- Ignition.components gas turbine engine and ignition system (if the company) .
- Batteries (acid and nickel cadmium, lead) and associated equipment assembly, including anti-vibration related aid.
- Motors and actuators on basic electrical systems DC.
- Electrical components.
- Specific DC systems, such as flaps and landing gear.
- Correctly connect DC generators and generators alternator / rectifier.
- Applying relevant practices WHS.

It is essential that the cleaning requirements and security measures applicable to the system under maintenance are fully observed, understood and respected, and work practices associated with ESD. Evidence of transferability of skills and knowledge related to the removal and installation is essential. This is to demonstrate for application to a variety of major components of the aircraft electrical power system covering mechanical interface, installations that require alignment and / or adjustment (mechanical or electrical).

(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 basic knowledge of:

- Component attachment methods.
- Connection of hardware and plugs.
- Relevant WHS practices.
- the use of approved maintenance documentation and aircraft publications relating to DC electrical systems.
- properties of permanent magnets.
- precautions for the care and storage of permanent magnets.
- general construction, operating characteristics and applications for:
- aircraft DC generators.
- alternator/rectifier DC generators.
- DC starter/generators.
- DC motors, including starter motors.
- DC rotary and linear actuators.
- Batteries.
- how to locate and identify components of:
- DC power regulation and distribution systems.
- piston engine ignition and starting systems.
- gGs turbine engine igniter systems, includingg specific WHS precautions.
- Gas turbine engine starting systems.
- DC electrical systems, such as flaps and landing gear retraction.
- lighting systems.
- relevant maintenance manuals.
- relevant regulatory requirements and standard procedures.

(c) Assessment recommendation

N/A

Assessmen methods

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.	
Electrical systems and components include:	• DC generators, and alternator/rectifier generators, and components of related single generator regulation and distribution systems. • Motors. • Actuators. • Piston engine ignition and starting system components. • Aircraft batteries. • Specific components of DC electrical systems, such as flaps and landing gear. • Aircraft lighting. • Gas turbine engine igniter and starting systems.
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 based on combination of paper exams, interviewing, and practical demonstrations depending on the assessors' judgement.Competition should be assessed in the workplace or place of work simulated using tools and equipment specified in the maintenance manuals. It is also expected that general purpose tools, test and ground support equipment found in most situations routine maintenance would be used where appropriate.

- An understanding of the methods of fixing, connecting hardware, and the need for adjustment or rigging and operation of the system in relation to the work must be demonstrated before taking any action.
- The work plan should take into account the applicable safety requirements and quality in accordance with industry and regulatory standards.
- The following evaluation conditions represent the regulatory requirements (ADF) and the House and stakeholders maintenance and must be strictly observed.
- A person can not be assessed as competent until they can demonstrate to the satisfaction of the assessor workplace relevant elements and performance criteria of competence unit is carried out under routine supervision at least one (1) component each:
- DC generators and generators alternator / rectifier and control system components single generator and related distribution.
- Motors .
- Actuators.
- System components engine ignition and starting piston.
- Aircraft batteries.
- Specific components of electrical current systems, such as flaps, landing gear.
- Lighting aircraft.
- Lighter gas turbine engine and starting systems (can be omitted when not applicable to the company).
- This is done through the records in the register of industrial experience and achievement or, where appropriate, a guide equivalent Industry Evidence (for details see the companion volume Assessment Guidelines).
- Assessors must meet the requirements of the National Education and Vocational Regulator.
- people who have already reached evaluated Keep MEA274 light aircraft electrical systems and core components have met the requirements of this unit with respect to the common range of varying conditions. The Registry of industry experience and accomplishments related records Keep MEA274 be accepted as meeting the requirements of evidence for this unit in public areas apply the basic light aircraft electrical systems and components.

1. รหัสหน่วยสมรรถนะ 103302

2. ชื่อหน่วยสมรรถนะ Remove and install advanced aircraft electrical system components.

3. ทบทวนครั้งที่ N/A

4. สร้างใหม่ ☑ **ปรับปรุง** ☐

5. สำหรับชื่ออาชีพและรหัสอาชีพ (Occupational Classification)

7232 Aircraft engine mechanics and fitters

6. คำอธิบายหน่วยสมรรถนะ (Description of Unit of Competency)

This skill unit requires the use of workforce skills and use of maintenance documentation / publications in the removal and installation of advanced equipment from alternating current (AC) and direct current (DC) components the direct system of fixed and rotary wing aircraft have both AC and DC electrical systems 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)

ICAO Doc 7192 / EASA Part 66

11. สมรรถนะย่อยและเกณฑ์การปฏิบัติงาน (Elements and Performance Criteria)

สมรรถนะย่อย (Element)	เกณฑ์ในการปฏิบัติงาน (Performance Criteria)	วิธีการประเมิน (Assessment)
103302.01 Remove AC and DC aircraft electrical system components.	103302.01.01 System is rendered safe and prepared in accordance with the applicable maintenance manual and isolation tags are fitted, where necessary, to ensure personnel safety, and electrical component removal is carried out in accordance with the applicable maintenance manual while observing all relevant work health and safety(WHS) requirements. 103302.01.02 Required maintenance documentation is completed and processed in accordance with standard enterprise procedures. Removed components are tagged and packaged in accordance with specified procedures.	ข้อสอบข้อเขียน การสัมภาษณ์ การสาธิตการปฏิบัติงาน

สมรรถนะย่อย (Element)	เกณฑ์ในการปฏิบัติงาน (Performance Criteria)	วิธีการประเมิน (Assessment)
103302.02 Install AC and DC aircraft electrical system components.	103302.02.01 Electrical components to be installed are checked to confirm correct part numbers, modification status, serviceability and shelf life. Physical installation of electrical components is performed in accordance with the applicable maintenance manual, ensuring appropriate adjustment/alignment with mechanical interface is carried out. 103302.02.02 System is reinstated to correct operational condition in preparation for testing, as necessary. Required maintenance documentation is completed and processed in accordance with standard enterprise procedures.	ข้อสอบข้อเขียน การสัมภาษณ์ การสาธิตการปฏิบัติงาน

12. ความรู้และทักษะก่อนหน้าที่จำเป็น (Pre-requisite Skill & Knowledge)

101309Remove and install miscellaneous aircraft electrical hardware/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 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 include:

• Identifying/locating:

• DC power regulation, distribution and control systems and components, i.e. regulators and bus bars.

• AC power regulation, distribution and control systems and components, i.e. generator control units.

• Various types of inverters and transformer rectifier units.

• Gas turbine and piston engine ignition and starting systems and components (where applicable to the enterprise).

• Batteries (lead acid and nickel cadmium) and associated mounting equipment including related anti-vibration aids and battery temperature monitoring systems.

• Flight control servo actuating devices, i.e. AC and DC electro-mechanical, electro-pneumatic, electro-hydraulic, duplex servomotors, power control units and trim control devices.

• Electrical components of aircraft systems, such as air cycle air conditioning, anti-icing and de-icing, landing gear, anti-skid, flight control, master and central warning, fuel storage and distribution, external and internal lighting, fire warning and extinguishing, and engine/propeller control (where applicable to the enterprise).

• Correctly connecting.

• DC generators.

• Star or delta alternators to star and delta loads.

• Starter generators.

• AC motors.

• Polyphase motors.

• Applying relevant WHS practices. 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 major electrical system components encompassing electrical with mechanical interface and installations that require alignment and/or adjustment (mechanical or electrical).

(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:

• Component attachment methods.

• Connection of hardware and plugs.

• Relevant WHS practices.

• The use of approved maintenance documentation and aircraft publications relating. to AC and DC electrical systems.

• Properties of permanent magnets.

• Precautions for the care and storage of permanent magnets.

• Bonding of aircraft components and lightning protection.

• General construction, operating characteristics and applications for aircraft:.

• GGenerators.

• Fartheerlternators.

• AC and DC motors.

• Transformer rectifier units

• Rotary and static inverters.

• Batteries.

• Linear and rotary actuators.

• Relevant maintenance manuals.

• Relevant regulatory requirements and standard procedures.

• Environmental protection requirements relating to Halon fire extinguishers (e.g. Bromochlorodifluoromethane (BCF)).

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.

Electrical system components include:

• DC and AC power generation and distribution system components, including generators and related multi-sourced DC power generation, starter generators alternators and regulation, and control and distribution system components.

• Transformer rectifier units and/or inverters.

• Batteries and related bus tie or interlock system components and battery temperature monitoring systems.

• Motors and actuators.

• Components of gas turbine and/or piston engine ignition and starting systems (where applicable to the enterprise).

• External/internal lights.

• Electrical components of specific electrical systems, such as air cycle air conditioning, combustion heaters, equipment cooling, anti-icing and de-icing, landing gear, anti-skid, flight control, master and central warning, fuel storage and distribution, fire warning and extinguishing, and engine/propeller control (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 based on combination of paper exams, interviewing, and practical demonstrations depending on the assessors' judgement.

• 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 maintenance situations would be used where appropriate.

• An understanding of the attachment methods, connection of hardware, and the need for adjustment or rigging 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.

• 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) component from:

• DC and AC power generation and distribution system components, including generators and related multi-sourced DC power generation, starter generators alternators and regulation, and control and distribution system components.

• Transformer rectifier units and/or inverters.

• Batteries and related bus tie or interlock system components and battery temperature monitoring systems.

• Motors and actuators.

• Components of gas turbine and/or piston engine ignition and starting systems (may be omitted where not applicable to the enterprise).

• External/internal lights.

• And on three (3) components that are applicable to the enterprise from:

• Electrical components of specific electrical systems, such as air cycle air conditioning, combustion heaters, equipment cooling, anti-icing and de-icing, landing gear, anti-skid, flight control, master and central warning, fuel storage and distribution, fire warning and extinguishing and engine/propeller control.

• This shall be established via 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 103303

2. ชื่อหน่วยสมรรถนะ Remove and install advanced aircraft instrument system components.

3. ทบทวนครั้งที่ N/A

4. สร้างใหม่ ☑ **ปรับปรุง** ☐

5. สำหรับชื่ออาชีพและรหัสอาชีพ (Occupational Classification)

7232 Aircraft engine mechanics and fitters

6. คำอธิบายหน่วยสมรรถนะ (Description of Unit of Competency)

This unit of competency requires application of hand skills and the use of maintenance documentation/publications in the removal and installation of components of advanced instrument systems of fixed and rotary wing aircraft during scheduled or unscheduled maintenance. Work may be completed individually or as part of a team. It covers the skills and basic knowledge required for the removal and installation of general instrument system components in the more advanced types of both fixed and rotary wing aircraft.

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)
103303.01 Remove advanced aircraft instrument system components.	103303.01.01 Able to render safe and prepare system in accordance with the applicable maintenance manual and isolation tags are fitted, where necessary, to ensure personnel safety and able to carried out instrument component removal in accordance with the applicable maintenance manual while observing all relevant work health and safety (WHS) requirements. 103303.01.02 Able to complete and process required maintenance documentation in accordance with standard enterprise procedures and able to tag and package removed components in accordance with specified procedures.	ข้อสอบข้อเขียน การสัมภาษณ์ การสาธิตการปฏิบัติงาน

สมรรถนะย่อย (Element)	เกณฑ์ในการปฏิบัติงาน (Performance Criteria)	วิธีการประเมิน (Assessment)
103303.02 Install advanced aircraft instrument system components.	103303.02.01 Able to check instrument components to be installed to confirm correct part numbers, modification status, serviceability and shelf life and perform physical installation of instrument components in accordance with the applicable maintenance manual and regulatory requirements, ensuring appropriate adjustment/alignment is carried out. 103303.02.02 Able to reinstate system to correct operational condition in preparation for testing, as necessary and able to complete and processes required maintenance documentation in accordance with standard enterprise procedures.	ข้อสอบข้อเขียน การสัมภาษณ์ การสาธิตการปฏิบัติงาน

12. ความรู้และทักษะก่อนหน้าที่จำเป็น (Pre-requisite Skill & Knowledge)

101309 Remove and install miscellaneous aircraft electrical hardware/component

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:

- Locating and identifying flight instrument system components comprising:
- Engine system temperature, pressure (including thermocouples, sensor units and transmitters), speed (including mechanical and electrical tachometers), thrust (fan, propeller and jet), torque, fuel flow and vibration.
- Auxiliary systems, including hydraulic pressure and temperature, transmission pressure and temperature, fuel storage quantities, fuel remaining/used, component position, i.e. flaps, landing gear, speed brakes and door/pylon locking.
- Flight systems, including attitude, altitude, air speed, OAT and GPWS (where applicable to the enterprise).
- Locating and identifying direct reading compasses, remote compass system components (flux valve, gyro, amplifier and indicator), and AHRS components.
- Locating and identifying FDR system components (where applicable to the enterprise).
- Correct handling procedures and maintenance precautions relating to gyroscopes, gimbals, pitot/static systems (connections, heating and protrusions).
- Applying relevant WHS practices.

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 instrument system components as listed in the Assessment Description and Procedure.

(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:

- Component attachment methods.
- Connection of hardware and plugs.
- Handling precautions for electrostatic sensitive devices.
- Relevant WHS practices.

The use of approved maintenance documentation and aircraft publications relating to basic and advanced instrument systems.

Basic instrument system and component operating principles:

- Atmospherics and barometry.
- Terminology and unit of measurement conversion.
- Aircraft instrumentation requirements.
- Instrument panel layout.
- Pressure sensing elements.
- Pitot static systems and testing requirements.
- Gyroscopic principles.
- Direct reading compasses.
- Temperature sensors.
- Fluid quantity indication systems.
- General layout and components of the following systems:
  - Flight systems, including:
    - Altitude (direct reading, servo and encoding altimeters).
    - Attitude, including DG and AH (both air and electrically driven) and turn and slip, and AHRS.
    - Airspeed, including ASI, machmeters and air data systems.
    - VSI.
    - Angle of attack and stall warning/avoidance.
    - OAT.
    - GPWS.
  - Engine indication systems, including:
    - Temperature and pressure, including thermocouples, sensors and transmitters.
    - Speed, including mechanical and electric tachometers.
    - Thrust, including fan, propeller and jet.
    - Torque.
    - Fuel flow.
    - vibration.
  - Auxiliary transmitter/indicator measuring systems, including:
    - Hydraulic pressure and temperature.
    - Pneumatic pressure.
    - Transmission oil pressure and temperature.
    - Fuel remaining/used.
    - Fuel quantity indication.
    - Component position.
  - Remote compass systems.
  - FDR systems.
  - Application of relevant WHS practices.

15. ขอบเขต (Range Statement)

This part 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.

Instrument components include:

• Pitot/static system components, airspeed indicators (ASIs), vertical speed indicators (VSIs), air data system components, machmeters, altimeters including servo and encoding altimeters, outside air temperature gauge (OAT) angle of attack and stall warning/avoidance systems.

•Turn and slip, directional gyros (DGs), artificial horizons (AHs), attitude and heading reference system (AHRS) components (where applicable to enterprise), remote reading gyro compass system components and direct reading compasses.

• Turbine engine indication systems.

• Transmitter/indicator measuring instrument systems (pressure, temperature and position).

• Fuel quantity indication and flow systems components.

• Ground proximity warning system (GPWS) (where applicable to the enterprise).

• Flight data recorder (FDR) (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 based on combination of paper exams, interviewing, and practical demonstrations depending on the assessors' judgement. 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 the need for adjustment or calibration 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. An individual cannot be evaluated 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) component from each of:

Pitot/static system components, ASIs, VSIs, air data system components, machmeters, altimeters, including servo and encoding altimeters, angle of attack and stall warning/avoidance systems.

Turn and slip, DGs, AHs, AHRS components (where applicable to enterprise), remote reading gyro compass system components and direct reading compasses.

• Turbine engine indication systems.

• Transmitter/indicator measuring instrument systems (pressure, temperature, position).

• Fuel quantity indication and flow systems components.

• GPWS (may be omitted where not applicable to the enterprise).

• FDR (may be omitted where not applicable to the enterprise).

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

1. รหัสหน่วยสมรรถนะ 103304

2. ชื่อหน่วยสมรรถนะ Remove and install aircraft basic radio communication and navigation system.

3. ทบทวนครั้งที่ N/A

4. สร้างใหม่ ☑ **ปรับปรุง** ☐

5. สำหรับชื่ออาชีพและรหัสอาชีพ (Occupational Classification)

7232 Aircraft engine mechanics and fitters

6. คำอธิบายหน่วยสมรรถนะ (Description of Unit of Competency)

This unit of competency requires application of hand skills and the use of maintenance documentation/publications in the removal and installation of basic radio communication and navigation system components of fixed and rotary wing aircraft that have basic radio communication and navigation systems, during scheduled or unscheduled maintenance. Work may be completed individually or as part of a team.

7. สำหรับระดับคุณวุฒิ

1	2	3	4	5	6	7	8
☐	☐	☑	☐	☐	☐	☐	☐

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)
103304.01 Remove basic radio communication and navigation system components.	103304.01.01 Able to render safe and prepare system in accordance with the applicable maintenance manual and isolation tags are fitted, where necessary, to ensure personnel safety, carry out communication and navigation system component removal in accordance with the applicable maintenance manual while observing all relevant work health and safety (WHS) requirements. 103304.01.02 Able to completed and process required maintenance documentation in accordance with standard enterprise procedures, tag and package removed components in accordance with specified procedures.	ข้อสอบข้อเขียน การสัมภาษณ์ การสาธิตการปฏิบัติงาน

สมรรถนะย่อย (Element)	เกณฑ์ในการปฏิบัติงาน (Performance Criteria)	วิธีการประเมิน (Assessment)
103304.02 Install basic radio communication and navigation system components.	103304.02.01 Able to check communication and navigation system components to be installed to confirm correct part numbers, modification status, serviceability and shelf life and perform physical installation of components in accordance with the applicable maintenance manual and regulatory requirements, ensuring appropriate adjustment/alignment is carried out. 103304.02.02 Able to reinstate system to correct operational condition in preparation for testing, as necessary, complete and process required maintenance documentation in accordance with standard enterprise procedures.	ข้อสอบข้อเขียน การสัมภาษณ์ การสาธิตการปฏิบัติงาน

12. ความรู้และทักษะก่อนหน้าที่จำเป็น (Pre-requisite Skill & Knowledge)

101309 Remove and install miscellaneous aircraft electrical hardware/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 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 radio communication and navigation system components comprising:
- HF and VHF communications.
- VOR and ADF navigation systems.
- ELT systems.
- Locating and identifying applicable radio system antennas.
- Removing and installing communication and navigation system components including antennas.
- Applying relevant WHS practices.

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 radio communication and navigation system components as listed in the Assessment Description and Procedure.

(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:

- Component attachment methods.
- Connection of hardware and plugs.
- Handling precautions for electrostatic sensitive devices.
- Relevant WHS practices.
- The use of approved maintenance documentation and aircraft publications relating to radio communication and navigation systems and components.
- Basic layout and working principles to block diagram level of:
  - HF communication systems.
  - VHF communication systems.
  - ADF navigation systems.
  - VOR navigation systems.
  - ELT systems.
- Relevant regulatory requirements and standard procedures.

15. ขอบเขต (Range Statement)

This part 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.

Communication and navigation system components include:

- High frequency (HF) and very high frequency (VHF) communication and applicable antennas.
- Automatic direction finding (ADF) and very high frequency Omni-directional range (VOR) navigation and applicable antennas.
- Emergency location transmitter (ELT).

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 based on combination of paper exams, interviewing, and practical demonstrations depending on the assessors' judgement.

- 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 maintenance situations would be used where appropriate.
- An understanding of the attachment methods, connection of hardware, and the need for adjustment or calibration 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.
- An individual cannot be evaluated 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:
- HF and VHF communication and applicable antennas.
- ADF and VOR navigation and applicable antennas.
- ELT.
- This shall be established via the records in the Log of Industrial Experience and Achievement or, where appropriate, an equivalent Industry Evidence Guide.

1. รหัสหน่วยสมรรถนะ 103305

2. ชื่อหน่วยสมรรถนะ Remove and install aircraft electronic system components.

3. ทบทวนครั้งที่ N/A

4. สร้างใหม่ ☑ **ปรับปรุง** ☐

5. สำหรับชื่ออาชีพและรหัสอาชีพ (Occupational Classification)

7232 Aircraft engine mechanics and fitters

6. คำอธิบายหน่วยสมรรถนะ (Description of Unit of Competency)

This unit of competency requires application of hand skills and the use of maintenance documentation/publications in the removal and installation of electronic system components and line replaceable units (LRUs) of fixed and rotary wing aircraft that are fitted with electronic systems, during scheduled or unscheduled maintenance. Work may be completed 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)
103305.01 Remove aircraft electronic system components.	103305.01.01 Able to render safe and prepare system in accordance with the applicable maintenance manual and isolation tags are fitted, where necessary, to ensure personnel safety and able to carry out electronic system component removal in accordance with the applicable maintenance manual while observing all relevant work health and safety (WHS) requirements. 103305.01.02 Able to complete and process required maintenance documentation in accordance with standard enterprise procedures, tag and package removed components in accordance with specified procedures.	ข้อสอบข้อเขียน การสัมภาษณ์ การสาธิตการปฏิบัติงาน

สมรรถนะย่อย (Element)	เกณฑ์ในการปฏิบัติงาน (Performance Criteria)	วิธีการประเมิน (Assessment)
103305.02 Install aircraft electronic system components.	103305.02.01 Able to check electronic system components to be installed to confirm correct part numbers, modification status, serviceability and shelf life and perform physical installation of electronic components in accordance with the applicable maintenance manual and regulatory requirements, ensuring appropriate adjustment/alignment is carried out. 103305.02.02 Able to reinstate system to correct operational condition in preparation for testing, as necessary and complete and process required maintenance documentation in accordance with standard enterprise procedures.	ข้อสอบข้อเขียน การสัมภาษณ์ การสาธิตการปฏิบัติงาน

12. ความรู้และทักษะก่อนหน้าที่จำเป็น (Pre-requisite Skill & Knowledge)

101309 Remove and install miscellaneous aircraft electrical hardware/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 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 electronic navigational system components, including altitude reporting systems (transponder, encoder and control unit), remote attitude displays and Inertial Navigation and Reference Systems.
- Locating and identifying multi-function electronic displays, including electronic flight instrument system (EFIS), engine indicating and crew alerting system (EICAS), electronic central aircraftmonitor system (ECAM), flight management computer system (FMCS) and head-up display (HUD).
- Locating and identifying radio communication and navigation system components comprising ultra-high frequency (UHF); satellite communications (SATCOM); distance measuring equipment (DME); instrument landing system (ILS); global navigation system (GNS); radio navigation; traffic collision avoidance system (TCAS); radio altimeter (RADALT); and radio system antennas, including half dipole, slotted, loop and Marconi.
- Locating and identifying primary and secondary radar system components, including transmission lines, waveguide and antennas.
- Locating and identifying cockpit voice recorder system components, internal communications and passenger/cockpit audio/visual components.
- Applying relevant WHS practices.

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.

(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:

- Component attachment methods.
- Connection of components and plugs.
- Printed circuit boards.
- Panel and rack mounting systems for electronic system components and LRUs.
- Relevant WHS practices.
- The use of approved maintenance documentation and aircraft publications relating to the avionics systems and components being maintained.
- Handling and maintenance precautions relating to gyroscopes, gimbals, electronic displays, airborne radar systems (including pressurized waveguides), electrostatic sensitive devices and radio installations.
- Electromagnetic environment.
- Relevant regulatory requirements and standard procedures.

15. ขอบเขต (Range Statement)

This part 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.

Electronic system components include:

- Panel and rack mounted electronic system components and LRUs of:
- Instrument navigation systems.
- Communication systems.
- Radio navigation systems.
- Pulse operated systems.
- Antennas.
- Electronic instrument displays (where applicable to the enterprise).
- Automatic flight control systems (where applicable to the enterprise).
- Cabin entertainment equipment (where applicable to the enterprise).
- On-board maintenance systems (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 based on combination of paper exams, interviewing, and practical demonstrations depending on the assessors' judgement.

- 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 situations would be used where appropriate.
- An understanding of the attachment methods, connection of hardware, and the need for adjustment or calibration 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.
- 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 electronic system components as listed in the range of conditions.
- An individual cannot be evaluated 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 sufficient components/LRUs of systems (at least five (5) including their antennas) to establish competency, as follows:
- Instrument navigation systems.
- Communication systems.
- Radio navigation systems.
- Pulse operated systems.
- Antennas.
- Electronic instrument displays (may be omitted where not applicable to the enterprise).
- Automatic flight control systems (may be omitted where not applicable to the enterprise) .
- Cabin entertainment equipment (may be omitted where not applicable to the enterprise) .
- On-board maintenance systems (may be omitted where not applicable to the enterprise).
- This shall be established via the records in the Log of Industrial Experience and Achievement or, where appropriate, an equivalent Industry Evidence Guide.

1. รหัสหน่วยสมรรถนะ 103306

2. ชื่อหน่วยสมรรถนะ Maintain basic light aircraft electrical systems and components.

3. ทบทวนครั้งที่ N/A

4. สร้างใหม่ ☑ **ปรับปรุง** ☐

5. สำหรับชื่ออาชีพและรหัสอาชีพ (Occupational Classification)

7232 Aircraft engine mechanics and fitters

6. คำอธิบายหน่วยสมรรถนะ (Description of Unit of Competency)

This unit of competency requires the application of manual skills and the use of maintenance documentation / publications in maintaining systems and related inspection, limited testing and troubleshooting components, and removal of electrical components and installation of aircraft Basic during scheduled or unscheduled maintenance. The work can be done individually or as part of a team.

Applications include fixed wing aircraft rotorcraft and fixed train basic landing skids or floats and no flight controls motor powered by a piston engine normally aspirated or gas turbine small.

7. สำหรับระดับคุณวุฒิ

1	2	3	4	5	6	7	8
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8. กลุ่มอาชีพ (Sector)

10 Aircraft Mechanics

9. ชื่ออาชีพและรหัสอาชีพอื่นที่หน่วยสมรรถนะนี้สามารถใช้ได้ (ถ้ามี)

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)
103306.01 Inspect, Test/adjust basic aircraft electrical systems.	103306.01.01 Direct current (DC) electrical system visually or physically checked for external signs of defects in accordance with the maintenance manual applicable to observe all safety requirements (WHS) and the relevant occupational health. 103306.01.02 Electrical system is functionally tested in accordance with maintenance manual for evidence of serviceability or malfunction, system calibration or adjustments are performed in accordance with maintenance manual, as appropriate.	ข้อสอบข้อเขียน การสัมภาษณ์ การสาธิตการปฏิบัติงาน

สมรรถนะย่อย (Element)	เกณฑ์ในการปฏิบัติงาน (Performance Criteria)	วิธีการประเมิน (Assessment)
103306.02 Troubleshoot, Remove and install basic aircraft electrical systems.	103306.02.01 Maintenance manual fault diagnosis guides and logic processes are used to ensure efficient and accurate troubleshooting to line replacement level. 103306.02.02 Specialist advice is obtained, where required, to assist with the troubleshooting process, and the causes of faults are clearly identified and recorded properly in the maintenance documentation.	ข้อสอบข้อเขียน การสัมภาษณ์ การสาธิตการปฏิบัติงาน
103306.03 Basic aircraft electrical system.	103306.03.01 The physical installation of the electrical components is performed in accordance with applicable maintenance manual, ensuring proper adjustment / alignment with mechanical interface is performed. 103306.03.02 Required maintenance documentation is completed and processed in accordance with standard enterprise procedures.	ข้อสอบข้อเขียน การสัมภาษณ์ การสาธิตการปฏิบัติงาน

12. ความรู้และทักษะก่อนหน้าที่จำเป็น (Pre-requisite Skill & Knowledge)

101403 Minor repair for aircraft electrical components or parts.

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 relevant WHS practices, including those relating to gas turbine engine high energy ignition units.
- Using approved maintenance documentation and aircraft publications relating to DC electrical systems .
- Identifying/locating:
- DC power generation, regulation, distribution and control systems and components:
- Generators and starter/generators .
- Regulators .
- Bus bars .
- Circuit breakers and fuses .
- Wiring .
- Piston engine ignition and starting systems and components .
- Magnetos or coils .
- Starter motors .
- Ignition switches/start switches .
- Ignition harnesses .
- Low tension wiring .
- Spark plugs .
- Auxiliary starting devices .
- Gas turbine engine ignition and starting systems (where applicable to the enterprise):
- Starter motors and starter/generators .
- High energy ignition units .
- Control units .
- Switches .
- Batteries and associated mounting equipment, including related anti-vibration aids .
- Motors and actuators in basic DC electrical systems .
- Correctly connecting DC generators, alternator/rectifier generators and starter/generators .
- Recognising system and component defects/external damage, correct installation, connection of plugs, terminations, attaching hardware (including cabling/harnesses) and security in:
- DC power generation systems including regulation, distribution and control .
- Battery installations .
- Piston engine ignition and starting systems .
- Gas turbine engine ignition and starting systems (where applicable to the enterprise) .
- Internal/external lighting systems, including controls .
- Motors and actuators in basic DC electrical systems .
- Applying logic processes, taking and interpreting electrical measurements, using test equipment and appropriate wiring diagrams and manuals to isolate malfunctions in the above systems .
- Performing system functional tests and checks to isolate system faults and assess post-maintenance serviceability. It is essential that system testing procedures, cleanliness requirements and safety precautions applicable to the electrical system being maintained are fully observed, understood and complied with.
- Ability to interpret inspection procedures and specifications (allowable limits) and apply them in practice across a range of inspection, testing and troubleshooting applications (including the timely involvement of supervisors or other trades) is critical.

Evidence of transferability of skills and related inspection, testing and troubleshooting and removal of components and installation is essential knowledge. This is to be demonstrated through the application in a wide range of aircraft electrical systems and components listed in the Conditions for Evaluation.

(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 basic knowledge of:

- Component attachment methods .
- Connection of hardware and plugs .
- DC electrical principles: .
- Properties of permanent magnets .
- Precautions for the care and storage of permanent magnets .
- Properties of electromagnets .
- Primary and secondary cells .
- Aircraft battery types, construction, car.e and safety .
- Resistor characteristics .
- Fuses and circuit breakers .
- Fundamental DC circuits .
- Inductive circuits .
- Capacitive circuits .
- Basic fault-finding principles .
- General construction, operating characteristics and applications for aircraft:
- DC generators .
- Alternator/rectifier generators .
- DC motors including starter motors .
- Starter/generators .
- DC actuators (linear and rotary) .
- Gas turbine high energy ignition system components and related safety precautions .
- Lighting systems .
- The basic layout (block diagram level), function and operation of the systems listed in the Range of Conditions
- Electrical system maintenance requirements and troubleshooting procedures
- Relevant WHS practices, including those relating to gas turbine engine high energy ignition units
- Relevant maintenance manuals
- Relevant regulatory requirements and standard procedures.

(c) Assessment recommendation

N/A

Assessmen methods

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.	
Applicable electrical systems include:	• DC power generation, regulation and distribution systems . • Piston engine and gas turbine engine ignition and starting systems (where applicable to the enterprise) . • DC electrical systems, such as flaps, including related motors and actuators . • Aircraft lighting. • Aircraft main battery .
Applicable electrical components include:	• DC generators, and alternator/rectifier generators, and components of related single generator regulation and distribution systems . • Motors . • Actuators. • Piston engine and gas turbine engine ignition and starting system components . • Aircraft batteries . • Aircraft lighting components, such as bulbs, lenses, switches and rheostats .
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 based on combination of paper exams, interviewing, and practical demonstrations depending on the assessors' judgement.
- 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 application of the test procedures should clearly indicate the knowledge of system operation, the relationship of the individual components and linkages with other systems (if applicable) within the limits of the aircraft / guidance system troubleshooting before taking any action. The work plan should take into account the applicable safety requirements and quality in accordance with industry and regulatory standards.
- The following evaluation conditions represent the requirements of regulators and stakeholders maintenance and must be strictly observed.
- A person can not be assessed as competent until they can demonstrate to the satisfaction of the assessor workplace relevant elements and performance criteria of competence unit is carried out under routine monitoring in power looms, cables and connecting hardware, and in each of the following systems and at least one (1) replaceable unit main component / line (LRU) in each case: power generation systems, regulation and distribution of DC piston engine and ignition engine and gas turbine starting systems (gas turbine may be omitted if not applicable to the company) DC electrical systems, such as fins, including motors and actuators related aircraft lighting aircraft main battery (competition can be demonstrated by performing a battery check). competencies removal and installation of components must be demonstrated with at least one (1) component of each of: DC generators and generators alternator / rectifier, and components of control systems and related distribution single generator.
- Motors .
- Actuators .
- Piston engine and gas turbine engine ignition and starting system components (gas turbine may be omitted where not applicable to the enterprise) .
- Aircraft batteries .
- Aircraft lighting components such as bulbs, lenses, switches and rheostats .
- This shall be established via the records in the Log of Industrial Experience and Achievement or, where appropriate, an equivalent Industry Evidence Guide.

1. รหัสหน่วยสมรรถนะ 103307

2. ชื่อหน่วยสมรรถนะ Maintain basic light aircraft instrument systems and components.

3. ทบทวนครั้งที่ N/A

4. สร้างใหม่ ☑ **ปรับปรุง** ☐

5. สำหรับชื่ออาชีพและรหัสอาชีพ (Occupational Classification)

7232 Aircraft engine mechanics and fitters

6. คำอธิบายหน่วยสมรรถนะ (Description of Unit of Competency)

This unit of competency requires the application of manual skills and the use of the knowledge system / components and equipment applicable to inspect, test and troubleshoot basic systems of aircraft instruments and to remove and install the components during maintenance test scheduled or unscheduled. The work can be done individually or as part of a team.

Applications include fixed-wing aircraft with light rotorcraft and fixed train basic landing skids or floats and no flight controls motor powered by a piston engine normally aspirated or gas turbine small.

7. สำหรับระดับคุณวุฒิ

1	2	3	4	5	6	7	8
☐	☐	☑	☐	☐	☐	☐	☐

8. กลุ่มอาชีพ (Sector)

10 Aircraft Mechanics

9. ชื่ออาชีพและรหัสอาชีพอื่นที่หน่วยสมรรถนะนี้สามารถใช้ได้ (ถ้ามี)

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)
103307.01 Inspect, test/adjust basic aircraft instrument systems and components.	103307.01.01 Instrument system components are visually or physically checked for external signs of defects in accordance with applicable maintenance manual. 103307.01.02 Instrument system is functionally tested in accordance with maintenance manual for evidence of serviceability or malfunction.	ข้อสอบข้อเขียน การสัมภาษณ์ การสาธิตการปฏิบัติงาน
103307.02 Troubleshoot, remove and install basic basic aircraft instrument systems and components.	103307.02.01 Basic aircraft instruments causes of faults are clearly identified and recorded properly in the maintenance documentation, as necessary, in according to standard procedures for companies. 103307.02.02 The physical removal and installation of the components of the instrument was performed in accordance with the maintenance manual and applicable regulatory requirements, ensuring proper adjustment / adaptation is performed.	ข้อสอบข้อเขียน การสัมภาษณ์ การสาธิตการปฏิบัติงาน

12. ความรู้และทักษะก่อนหน้าที่จำเป็น (Pre-requisite Skill & Knowledge)

101403 Minor repair for aircraft electrical components or parts

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:

- Using approved maintenance documentation and aircraft publications relating to basic instrument systems .
- Locating and identifying flight instrument system components comprising:
- Engine system temperature and speed, including mechanical and electrical tachometers .
- Auxiliary direct reading systems, including vacuum, fuel storage quantities .
- Flight systems, including attitude, altitude, air speed and OAT .
- Locating and identifying direct reading compasses .
- Correct handling and observance of maintenance precautions relating to gyroscopes, gimbals and pitot/static systems (connections, heating and protrusions) .
- Recognising system and component defects/external damage, correct installation, connection of plugs, terminations, attaching hardware, including cabling/harnesses, and security in:
- Flight instruments .
- Pitot/static systems .
- Direct reading compasses .
- Piston engine and gas turbine engine indication systems .
- Electrical systems indication .
- Basic fuel quantity indication systems .
- Vacuum indication systems .
- Applying logic processes, taking and interpreting system measurements, using test equipment and appropriate wiring diagrams and manuals to isolate malfunctions in the above systems .
- Performing system functional tests and checks to isolate system faults and assess post-maintenance serviceability .
- Applying WHS requirements relevant to instrument system maintenance.

Where relevant to the enterprise:

- Locating and identifying:
- Electronic flight instrument system (EFIS) .
- Engine indicating and crew alerting system (EICAS) .
- Electronic central aircraft monitoring (ECAM) .
- Data linkage and transmission systems .
- Recognising system and component defects/external damage, correct installation, connection of plugs, terminations, attaching hardware (including cabling/harnesses) .
- Interpreting the information presented on instrument display systems .
- Performing system functional tests and checks to confirm post-maintenance serviceability .

It is essential that the system test procedures, cleaning requirements and security measures applicable to the system being maintained instruments are fully observed, understood and respected. Ability to interpret procedures and specifications (allowable limits) inspection and apply them in practice through a series of inspections, testing and troubleshooting applications (including the appropriate involvement of supervisors and other trades) is critical. Evidence of transferability of skills and knowledge related to the inspection, testing and troubleshooting is essential. This is to be demonstrated by the application in a wide range of aircraft systems and instruments basic components contained in the evaluation 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:

- Component attachment methods .
- Connection of hardware and plugs .
- Handling precautions for electrostatic sensitive devices .
- Relevant WHS practices .
- The basic layout (block diagram level), function and operation of the following systems as listed in the Range of Conditions:
- Pitot/static systems .
- Piston engine and gas turbine engine direct reading indication systems .
- Basic fuel quantity measurement systems .
- The operating principles of the above systems and associated with:
- Atmospheric conditions; properties and effects on aircraft instruments and systems .
- Pressure and temperature sensing elements and their use in aircraft instruments .
- Gyroscopes and their use in aircraft instrument systems .
- Electrical fundamentals .
- Instrument construction and operation:
- Instrument groupings, panel layout and construction .
- Pitot static instruments (ASI, VSI and counter-pointer altimeters), their operation, calibration, safe handling and related terminology .
- Pitot pressure .
- Static pressure .
- Altimeter Q code settings:
- QNH .
- QNE .
- QFE .
- Indicated airspeed (IAS) .
- True airspeed (TAS) .
- Vacuum system indication component construction and operation .
- Air and electrically powered artificial horizon construction and operation .
- DG construction and operation .
- Construction and operation of direct reading engine instruments .
- Turn and bank and slip/turn coordinator construction and operation .
- Direct reading compass construction and compass calibration .
- Piston and gas turbine engine direct reading measuring instruments and temperature indication instruments construction and operation .
- Voltage and current measuring instrument construction and operation .
- Volumetric fluid quantity system components, construction and operation .

Instrument system maintenance requirements and troubleshooting procedures, including pitot/static system leak testing .

- Relevant maintenance documentation and maintenance publications
- Relevant regulatory requirements and standard procedures
- For electronic flight and engine instrument systems:
- The layout and operation (to block diagram level) of EFIS, EICAS and ECAM systems and related data linkage and transmission systems
- Interpretation of display data
- Component removal and installation procedures
- Testing of system operation using on-board testing procedures and/or simple external test equipment with a go or no go outcome
- Software management control requirements.

(c) Assessment recommendation

N/A

Assessmen methods

15. ขอบเขต (Range Statement)

(a) Recommendation

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.

Applicable instrument systems and components include:	• Pitot/static systems and components, airspeed indicators (ASI), vertical speed indicators (VSI), outside air temperature gauges (OAT) and counter-pointer altimeters . • Directional gyros (DGs) and artificial horizons (AHs) (air and electrically driven) . • Turn and bank and slip/turn coordinators . • Direct reading compasses . • Piston engine and gas turbine engine indication system components (direct reading measuring instruments and temperature indication) . • Electrical systems indication (voltage and current). • Basic fuel quantity indication systems and components. • Vacuum indication components • Electronic flight and engine instruments (where applicable to the enterprise) .
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 based on combination of paper exams, interviewing, and practical demonstrations depending on the assessors' judgement.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 applicable general-purpose tools and test equipment found in most routine situations would be used where appropriate.

The application of the test procedures should clearly indicate the knowledge of system operation, the relationship of the individual components and linkages with other systems (if applicable) within the limits of the aircraft / guidance system troubleshooting before taking any action. The work plan should take into account the applicable safety requirements and quality in accordance with 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 can not be assessed as competent until they can demonstrate to the satisfaction of the assessor workplace relevant elements and performance criteria of competence unit is carried out under the supervision of routine in a system and at least one important system component / line replaceable unit (LRU) for each of the following groups:
- Pitot/static systems and components, ASI, VSI and counter-pointer altimeters .
- DGs and AHs (air and electrically driven) .
- Turn and bank and slip/turn coordinators .
- Direct reading compasses .
- Piston engine and gas turbine engine indication system components (direct reading measuring instruments and temperature indication) .
- Electronic flight and engine instrument system components (may be omitted if not relevant to the enterprise) .
- Electrical systems indication (voltage and current) .
- Basic fuel quantity indication systems and components .
- Vacuum indication components.
- 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.

1. รหัสหน่วยสมรรถนะ 103308

2. ชื่อหน่วยสมรรถนะ Maintain basic aircraft communication and radio navigation systems and components.

3. ทบทวนครั้งที่ N/A

4. สร้างใหม่ ☑ **ปรับปรุง** ☐

5. สำหรับชื่ออาชีพและรหัสอาชีพ (Occupational Classification)

7232 Aircraft engine mechanics and fitters

6. คำอธิบายหน่วยสมรรถนะ (Description of Unit of Competency)

This unit of competency requires the application of manual skills and the use of maintenance publications applicable knowledge system / components and testing equipment and inspect, functionally test and troubleshoot communication systems and navigation essential radio and to remove and installing components during scheduled or unscheduled maintenance. The work can be done individually or as part of a team. Applications include communications systems and radio navigation of fixed-wing aircraft with fixed landing gear and aircraft basic rotary wing with skids or floats and no controls flight powered by a piston engine normally aspirated engine or small gas turbine.

7. สำหรับระดับคุณวุฒิ

1	2	3	4	5	6	7	8
☐	☐	☑	☐	☐	☐	☐	☐

8. กลุ่มอาชีพ (Sector)

10 Aircraft Mechanics

9. ชื่ออาชีพและรหัสอาชีพอื่นที่หน่วยสมรรถนะนี้สามารถใช้ได้ (ถ้ามี)

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)
103308.01 Inspect and test basic communication and radio navigation systems and components.	103308.01.01 Systems and components of radio communication and navigation visually or physically checked for external signs of defects in accordance with the applicable maintenance manual. 103308.01.02 Communications systems and radio navigation functionally tested according to the maintenance manual for testing serviceability or malfunction.	ข้อสอบข้อเขียน การสัมภาษณ์ การสาธิตการปฏิบัติงาน

สมรรถนะย่อย (Element)	เกณฑ์ในการปฏิบัติงาน (Performance Criteria)	วิธีการประเมิน (Assessment)
103308.02 Troubleshoot , Remove and install basic communication and radio navigation systems.	103308.02.01 communication and radio navigation systems causes of faults are clearly identified and recorded properly in the maintenance documentation, as necessary, in according to standard procedures for companies. 103308.02.02 The physical removal and installation of the components of the communication and radio navigation systems was performed in accordance with the maintenance manual and applicable regulatory requirements, ensuring proper adjustment / adaptation is performed.	ข้อสอบข้อเขียน การสัมภาษณ์ การสาธิตการปฏิบัติงาน

12. ความรู้และทักษะก่อนหน้าที่จำเป็น (Pre-requisite Skill & Knowledge)

101403 Minor repair for aircraft electrical components or parts

13. ทักษะและความรู้ที่ต้องการ (Required Skills and Knowledge)

(ก) ความต้องการด้านทักษะ

See Appendix A

(ข) ความต้องการด้านความรู้

See Appendix A

14. หลักฐานที่ต้องการ (Evidence Guide)

(a) Performance Evidence

software management control requirements.

(b) Knowledge Evidence

-

(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.

Applicable instrument systems and components include:	• Pitot/static systems and components, airspeed indicators (ASI), vertical speed indicators (VSI), outside air temperature gauges (OAT) and counter-pointer altimeters. • Directional gyros (DGs) and artificial horizons (AHs) (air and electrically driven) . • Turn and bank and slip/turn coordinators. • Direct reading compasses . • Piston engine and gas turbine .engine indication system components (direct reading measuring instruments and temperature indication) . • Electrical systems indication (voltage and current). • Basic fuel quantity indication systems and components. • Vacuum indication components. • Electronic flight and engine instruments (where applicable to the enterprise).
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 based on combination of paper exams, interviewing, and practical demonstrations depending on the assessors' judgement.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 application of the test procedures should clearly indicate the knowledge of system operation, the relationship of the individual components and linkages with other systems (if applicable) within the limits of the aircraft / guidance system troubleshooting before taking any action. The work plan should take into account the applicable safety requirements and quality in accordance with 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 a system and at least one (1) major system component/LRU from each of the following groups:
- HF and VHF communication LRUs, transmission lines and antennas .
- ADF, VOR and GNS navigation system LRUs, transmission lines and antennas .
- ATC transponders, transmission lines and antennas .
- ELT .
- ADS-B.
- 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.