

Level 2 Diploma in Aerospace and Aviation Engineering (Military Foundation Competence) (4608-50)

Version 5.0 (July 2020)

Qualification Handbook

Qualification at a glance

Subject area	Mechanical
City & Guilds number	4608
Age group approved	16-19, 19+
Entry requirements	None
Assessment types	Portfolio
Approvals	Fast track approval
Registration and certification	Consult the Walled Garden/Online Catalogue for last dates

Title and level	GLH	TQT	City & Guilds qualification number	Ofqual accreditation number
Level 2 Diploma in Aerospace and Aviation Engineering (Military Foundation Competence)	220	252	4608-50	603/1388/2

Version and date	Change detail	Section
2.0 April 2018	Addition of optional units 265-268 Amendment of total GLH and TQT	Structure Units Qualification
2.1 August 2018	Amendments to unit 259	Units
2.2 September 2018	Amendments to unit 259	Units
3.0 November 2018	Additional units added 269, 270, 271	Units
4.0 July 2019	Amendments to unit 264 Formatting corrections.	Units All
5.0 July 2020	Amendments to unit 269	Units

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1 Introduction

This document tells you what you need to do to deliver the qualification:

Area	Description
Who is the qualification for?	<p>It is aimed at anyone over the age of 16 who has an interest in working and progressing in the Aerospace and Aviation sector.</p> <p>It offers progression to the Level 3 Diploma in Aerospace Manufacturing (Military Development Competence)</p> <p>It is designed to train and qualify the next generation of Aviation maintenance technicians to meet an identified gap in the market and minimise the potential loss of skills and knowledge over the next 5-10 years.</p>
What does the qualification cover?	<p>This qualification allows candidates to learn, develop and practise the skills required for employment and/or career progression in the Aviation Advanced Maintenance and Engineering sector in general.</p>
What opportunities for progression are there?	<p>This qualification will allow candidates to access employment as Aircraft Maintenance Fitters/Technicians and provides a pathway into Higher Education</p>
Who did we develop the qualification with?	<p>The Aerospace and Aviation Employer apprenticeship group which consists of the following organisations:</p> <ul style="list-style-type: none"> • BAE Systems • Airbus • Gama Aviation • Harrods Aviation • Marshall ADG • Inflight MRO Services • Virgin • Rizon Jet UK • MOD <p>Professional Engineering Institutions, SEMTA</p>
Is it part of an apprenticeship framework or initiative?	<p>Yes</p>

Qualification structure

For the **Level 2 Diploma in Aerospace and Aviation Engineering (Military Foundation Competence)** Learners must achieve units (201 - 203) Plus any 3 units from (240, 257 – 259, 262-271)

Unit number	Unit title	GLH
Mandatory		
201	Complying with statutory regulations and organisational safety requirements	18
202	Working efficiently and effectively in an engineering environment	18
203	Using and communicating technical information	18
Optional		
240	Military Aircraft Flight Servicing	36
257	Military Aircraft Electrical Wiring and Interconnection Systems (EWIS) Husbandry	80
258	Basic Fault Finding Techniques for Military Avionic Systems	80
259	Diagnosis, Rectification and Testing of Military Avionic Equipment	90
262	Maintaining (above the neck) Aircrew Equipment Assemblies (AEA)	80
263	Maintaining (below the neck) Aircrew Equipment Assemblies (AEA)	100
264	Maintaining Survival Equipment Systems and Associated Equipment	90
265	Producing Components Using Mechanical Hard Skills for Aircraft Maintenance	100
266	Aircraft Structural Husbandry	65
267	Diagnosis, Rectification and Testing of Military Aircraft Systems	100
268	Installing Military Aircraft Fasteners	65
269	Maintaining Military Aircraft Armament Systems	80
270	Maintaining Aircraft Armament Electrical Installations (AAEI)	100
271	Maintaining Military Aircraft Armament Equipment	100

Total Qualification Time

Total Qualification Time (TQT) is the number of notional hours which represents an estimate of the total amount of time that could reasonably be expected for a learner to achieve and demonstrate the achievement of the level of attainment necessary for the award of a qualification.

TQT is comprised of the following two elements:

- 1) The number of hours which an awarding organisation has assigned to a qualification for Guided Learning, and
- 2) an estimate of the number of hours a Learner will reasonably be likely to spend in preparation, study or any other form of participation in education or training, including assessment, which takes place as directed by - but, unlike Guided Learning, not under the Immediate Guidance or Supervision of - a lecturer, supervisor, tutor or other, appropriate provider of education or training.

Title and level	GLH	TQT
Level 2 Diploma in Aerospace and Aviation Engineering (Military Foundation Competence)	220	252

2 Centre requirements

Approval

The Level 2 Diploma in Aerospace and Aviation Engineering (Military Foundation Competence) is restricted to the Military and those centres working with the Military. If you wish to apply for approval to run this qualification, please contact your City & Guilds regional office.

To offer these qualifications, new centres will need to gain both centre and qualification approval. Please refer to the Centre Manual - Supporting Customer Excellence for further information.

Centre staff should familiarise themselves with the structure, content and assessment requirements of the qualifications before designing a course programme.

Resource requirements

Centre staffing

Staff delivering these qualifications must be able to demonstrate that they meet the following occupational expertise requirements. They should:

- be occupationally competent or technically knowledgeable in the areas for which they are delivering training and/or have experience of providing training. This knowledge must be to the same level as the training being delivered
- have recent relevant experience in the specific area they will be assessing
- have credible experience of providing training..

Learner entry requirements

Individual employers will set the criteria, but most candidates will have four GCSEs C grade (or equivalent) or above on entry (including English, Maths & Science). Employers who recruit candidates without English, Maths and Science at Grade C or above must ensure that the candidate achieves this requirement, or an equivalent at Level 2, prior to completion of the Apprenticeship.

This qualification is a mandatory component of the Foundation Phase of the following Apprenticeship Standards:

- Aircraft Maintenance Fitter/Technician (Fixed and Rotary Wing)

The Standards have been designed by Employers. Centres should make themselves familiar with the Standards, Assessment Plan and Employer Occupational Brief requirements, details of which can be found at:

<https://www.gov.uk/government/collections/apprenticeship-standards>

Age restrictions

City & Guilds cannot accept any registrations for learners under 16 as these qualifications are not approved for learners under 16.

3 Delivering the qualification

Initial assessment and induction

An initial assessment of each candidate should be made before the start of their programme to identify:

- if the candidate has any specific training needs
- support and guidance they may need when working towards their qualifications
- any units they have already completed, or credit they have accumulated which is relevant to the qualifications
- the appropriate type and level of qualification.

Recording documents

Candidates and centres may decide to use a paper-based or electronic method of recording evidence.

City & Guilds endorses several ePortfolio systems, including our own, Learning Assistant, an easy-to-use and secure online tool to support and evidence learners' progress towards achieving qualifications. Further details are available at: www.cityandguilds.com/eportfolios.

City & Guilds has developed a set of recording forms including examples of completed forms, for new and existing centres to use as appropriate. Recording forms are available on the City & Guilds website.

Although new centres are expected to use these forms, centres may devise or customise alternative forms, which must be approved for use by the external verifier, before they are used by candidates and assessors at the centre. Amendable (MS Word) versions of the forms are available on the City & Guilds website.

4 Assessment

Summary of assessment methods

Candidates must: have a completed portfolio of evidence covering mandatory and chosen optional units.

- Although all of the content and assessment requirements must be met in full, employers can tailor the training outcomes to ensure that the content of the programme is specific to their requirements in terms of products, processes, procedures, tools, equipment, materials, documentation and information systems.
- This will allow each organisation to develop their own specific and tailored apprentice training programme whilst meeting their own business requirements whilst at the same time ensuring that the overall generic content is to a high standard in terms of depth and breadth to enable progression and/or transferability to other employers.

Assessment strategy

Access to assessment

There are no entry requirements required for the Units of Competence unless this is a legal requirement of the process or the environment in which the Apprentice is working in.

Assessment is open to any Apprentice who has the potential to reach the assessment requirements set out in the relevant units.

Aids or appliances, which are designed to alleviate disability, may be used during assessment, providing they do not compromise the standard required.

Carrying out assessments

The Units of Competence have been specifically developed to cover a wide range of activities. The evidence produced for the units will, therefore, depend on the skills and knowledge required by employer and specified in the Apprentice's Training Plan. The Skills section of the Units of Competence makes reference to a number of optional items listed (for example 'any three from five'). This is the minimum standard set by employers.

Where the unit requirements gives a choice of optional areas, Assessors should note that Apprentices do not need to provide evidence of the other areas to complete the unit, unless specified by the employer (in this example above, two items) particularly where these additional items may relate to other activities or methods that are not part of the Apprentice's normal workplace activities or required by the employer.

Performance evidence requirements

Performance evidence must be the main form of evidence gathered. Where relevant, specific evidence requirements are listed in the units. Items of performance evidence often contain features that apply to more than one unit, and can be used as evidence in any unit where they are suitable.

Performance evidence must be:

- products of the Apprentice's work, such as items that have been produced or worked on, plans, charts, reports, standard operating procedures, documents produced as part of a work activity, records or photographs of the completed activity
- together with:
- evidence of the way the Apprentice carried out the activities, such as witness testimonies, assessor observations or authenticated Apprentice reports of the activity undertaken.

If there is any doubt as to what constitutes suitable evidence the Internal/External Quality Assurer should be consulted.

Assessing knowledge and understanding requirements

Knowledge and understanding are key components of competent performance, but it is unlikely that performance evidence alone will provide enough evidence in this area. Where the Apprentice's knowledge and understanding is not apparent from performance evidence, it must be assessed by other means and be supported by suitable evidence.

Knowledge and understanding can be demonstrated in a number of different ways. It is recommended that oral questioning and practical demonstrations are used perhaps whilst observing the apprentice undertake specific tasks, as these are considered the most appropriate for these units. Assessors should ask enough questions to make sure that the Apprentice has an appropriate level of knowledge and understanding, as required by the unit.

Evidence of knowledge and understanding will **not** be required for those items in the skills section of the Units of Competence that have not been selected by the employer.

Where oral questioning is used the assessor must retain a record of the questions asked, together with the Apprentice's answers.

Witness testimony

Where observation is used to obtain performance evidence, this must be carried out against the unit assessment criteria. Best practice would require that such observation is carried out by a qualified assessor. If this is not practicable, then alternative sources of evidence may be used.

For example, the observation may be carried out against the assessment criteria by someone else that is in close contact with the Apprentice. This could be a team leader, supervisor, mentor or line manager who may be regarded as a suitable witness to the Apprentice's competency. However, the witness must be technically competent in the process or skills that they are providing testimony for, to at least the same level of expertise as that required of the Apprentice. It will be the responsibility of the assessor to make sure that any witness testimonies accepted as evidence of the Apprentice's competency are reliable, auditable and technically valid.

Maximising opportunities to use assessment evidence

One of the critical factors required in order to make this Assessment Strategy as efficient and effective as possible and to ease the burden of assessment, is the Assessor's ability and expertise to work in partnership with the apprentice and their employer to provide advice and guidance on how to maximise opportunities to cross reference performance and knowledge evidence to all relevant Units of Competence. For example if a knowledge statement is repeated in a number of separate Units of Competence and the expected evidence/response to that statement is the same including the context, then the same piece of evidence should be cross referenced to the appropriate units.

Recognition of Prior Learning (RPL)

Recognition of prior learning means using a person's previous experience, or qualifications which have already been achieved, to contribute to a new qualification.

For this qualification, RPL is allowed and is not sector specific.

<http://www.cityandguilds.com/delivering-our-qualifications/centre-development/centre-document-library/policies-and-procedures/quality-assurance-documents>

5 Units

Structure of the units

These units each have the following:

- City & Guilds reference number
- Title
- Level
- Guided Learning Hours (GLH)
- Learning outcomes, which are comprised of a number of assessment criteria

Centres must deliver the full breadth of the range. Specialist equipment or commodities may not be available to all centres, so centres should ensure that their delivery covers their use. This may be covered by a practical demonstration (eg video). For the practical assessments for this qualification, centres should ensure that there are sufficient resources to complete the task but are not required to use all the equipment or commodities in the range.

Unit 201

Complying with statutory regulations and organisational safety requirements

Unit level:	Level 2
GLH:	18
Unit aim:	<p>This unit of competence has been developed by employers in the Aerospace and Aviation Sector and is part of an overall development programme designed to meet the requirements of the Sector, the published Apprenticeship Standard and Employer Occupational Brief.</p> <p>This unit of competence identifies the training and development required in order that the apprentice can demonstrate that they are competent in being able to deal with statutory regulations and organisational safety requirements, in accordance with approved procedures.</p> <p>They will be required to comply with all relevant regulations that apply to their area of work as well as their general responsibilities as defined in the Health and Safety at Work Act. They will also need to be able to identify the relevant qualified first aiders or appointed person, and must know the location of the first aid facilities. They will have an understanding of the procedures to be adopted in the case of accidents involving injury, and in situations where there are dangerous occurrences or hazardous malfunctions of equipment, processes or machinery.</p> <p>They will also need to be fully conversant with the organisation's procedures for fire alerts and the evacuation of premises. They will be required to identify the hazards and risks that are associated with their job. Typically these will focus on their working environment, the tools and equipment that they use, materials and substances that they use, working practices that do not follow laid-down procedures, and manual lifting and carrying techniques.</p> <p>Their responsibilities will require them to comply with organisational policy and procedures for the statutory regulations and organisational safety activities undertaken, and to report any problems with the safety activities that they cannot personally resolve, or are outside their permitted authority, to the relevant people.</p> <p>They will be expected to work with minimum supervision, taking personal responsibility for their own actions and for the way in which they carry out the required engineering activities. Their underpinning knowledge will provide a good understanding of their work, and will provide an informed approach to applying statutory regulations and organisational safety requirements and procedures. They will understand the safety requirements and their application, in adequate depth to provide a sound basis for carrying out the activities safely and correctly. They will be able to apply the appropriate behaviours required in the workplace to meet the job profile and overall company objectives, such as strong work ethic, positive attitude, team player, dependability, responsibility, honesty, integrity motivation and commitment.</p>
Relationship to NOS:	EUCAEF01

Performance Requirements

The learner can:

- P1 Comply with their duties and obligations as defined in the Health and Safety at Work Act
- P2 Demonstrate the required behaviours in line with the job role and company objectives
- P3 Present themselves in the workplace suitably prepared for the activities to be undertaken
- P4 Follow organisational accident and emergency procedures
- P5 Recognise and control hazards in the workplace
- P6 Use correct manual lifting and carrying techniques
- P7 Apply safe working practices and procedures

Learning outcome

The learner will:

- 1 demonstrate their duties and obligations to health and safety by carrying out all of the following:

Assessment criteria

- 1.1 applying, in principle, their duties and responsibilities as an individual under the Health and Safety at Work Act and other relevant current legislation
- 1.2 identifying, within their working environment, appropriate sources of information and guidance on health and safety issues, to include eye protection and Personal Protective Equipment (PPE), COSHH regulations and risk assessments
- 1.3 identifying the warning signs and labels of the main groups of hazardous or dangerous substances
- 1.4 complying with the appropriate statutory regulations at all times and specified regulations to their work

Learning outcome

The learner will:

- 2 comply with all emergency requirements, to include:

Assessment criteria

- 2.1 identifying the appropriate qualified first aiders or appointed person and the location of first aid facilities
- 2.2 identifying the procedures to be followed in the event of injury to themselves or others
- 2.3 following organisational procedures in the event of fire/fire drills and the evacuation of premises/work area
- 2.4 identifying the procedures to be followed in the event of dangerous occurrences or hazardous malfunctions of equipment, processes or machinery

Learning outcome

The learner will:

3 identify the hazards and risks that are associated with all of the following:

Assessment criteria

- 3.1 their working environment (such as working at heights, confined spaces, environmental conditions)
 - 3.2 the tools and equipment that they use (such as machine tools, power tools, cutting tools)
 - 3.3 the materials and substances that they use (such as fluids, oils, fluxes)
 - 3.4 using working practices that do not follow laid-down procedures
-

Learning outcome

The learner will:

4 demonstrate the following method of manual lifting and carrying techniques:

Assessment criteria

4.1 lifting alone

Plus one from:

- 4.2 with assistance of others
 - 4.3 with mechanical assistance
-

Learning outcome

The learner will:

5 apply safe working practices in an industrial environment, to include all of the following:

Assessment criteria

- 5.1 maintaining a tidy workplace with exits and gangways free from obstructions
- 5.2 using tools and equipment safely and only for the purpose intended
- 5.3 observing organisational safety rules, signs and hazard warnings
- 5.4 taking measures to protect others from harm resulting from any work they are carrying out
- 5.5 observe personal protection and hygiene procedures at all times

Knowledge and understanding

- K1. Describe the roles and responsibilities of themselves and others under the Health and Safety at Work Act 1974 and other current legislation (eg, The Management of Health and Safety at Work Regulations; Workplace Health and Safety and Welfare Regulations; Personal Protection at Work Regulations; Manual Handling Operations Regulations; Provision and Use of Work Equipment Regulations; Display Screen at Work Regulations)
- K2. Describe the specific regulations and safe working practices and procedures that apply to their work activities
- K3. Describe the importance of applying the appropriate behaviours in the workplace and the implications for both the apprentice and the business if these are not adhered to
- K4. Identify the warning signs for the seven main groups of hazardous substances defined by Classification, Labelling and packaging of Dangerous Substances and mixtures Regulations
- K5. State the location of relevant health and safety information for their tasks; the sources of expert assistance when help is needed
- K6. Explain what constitutes a hazard in the workplace (eg moving parts of machinery, electricity, slippery and uneven surfaces, dust and fumes, handling and transporting, contaminants and irritants, material ejection, fire, working at height, environment, pressure/stored energy systems, volatile or toxic materials, unshielded processes)
- K7. Describe their responsibilities for dealing with hazards and reducing risks in the workplace (eg Hazard spotting and safety inspections; the use of hazard check lists, carrying out risk assessments, COSHH assessments and safe systems of working)
- K8. The risks associated with their working environment (the tools, materials and equipment that they use, spillages of oil and chemicals, not reporting accidental breakages of tools or equipment and not following laid-down working practices and procedures)
- K9. The processes and procedures that are used to identify and rate the level of risk (such as safety inspections, the use of hazard check lists, carrying out risk and COSHH assessments)
- K10. Control measures that can be used to eliminate/reduce the hazard (such as lock-off and permit to work procedures, provision of safe access and egress, use of guards and fume extraction equipment, use of personal protective equipment)
- K11. The first aid facilities that exist within their work area and within the organisation in general, and the procedures to be followed in the case of accidents involving injury
- K12. What constitutes dangerous occurrences and hazardous malfunctions, and why these must be reported even when no one was injured
- K13. The procedures for sounding the emergency alarms, evacuation procedures and escape routes to be used, and the need to report their presence at the appropriate assembly point
- K14. The organisational policy with regard to fire-fighting procedures; the common causes of fire and what they can do to help prevent them
- K15. The protective clothing and equipment that is available for their areas of activity
- K16. The need to observe personal protection and hygiene procedures at all times (such as skin care (barrier creams, gloves), eye protection (safety glasses, goggles, full face helmets), hearing protection (ear plugs, ear defenders), respiratory protection (fume extraction, face masks, breathing apparatus), head protection (caps with hair restraints,

protective helmets), foot protection (safety footwear), dangers of ingestion and the importance of washing hands)

- K17. How to act responsibly within the working environment (such as observing restricted area notices, complying with warning signs, walking not running, using equipment only for its intended purpose, not interfering with equipment or processes that are not within their job role, following approved safety procedures at all times)
- K18. How to lift and carry loads safely, and the manual and mechanical aids available
- K19. How to prepare and maintain safe working areas; standards and procedures to ensure good housekeeping
- K20. The importance of safe storage of tools, equipment, materials and products
- K21. The extent of their own authority and whom they should report to in the event of problems that they cannot resolve

Unit 202

Working efficiently and effectively in an engineering environment

Unit level:	Level 2
GLH:	18
Unit aim:	<p>This unit of competence has been developed by employers in the Aerospace and Aviation Sector and is part of an overall development programme designed to meet the requirements of the Sector, the published Apprenticeship Standard and Employer Occupational Brief.</p> <p>This unit of competence identifies the training and development required in order that the apprentice can demonstrate that they are competent in being able to carry out all necessary preparations; within the scope of their responsibility prior to undertaking the engineering activity. This will include preparing the work area and ensuring that it is in a safe condition to carry out the intended activities, obtain the appropriate job documentation, work instructions, tools, equipment and materials required for the work activities undertaken, and to check they are in a safe and usable condition. Planning their work activities before they start them will also form part of this unit.</p> <p>On completion of the engineering activity, they will be required to return their immediate work area to an acceptable condition before undertaking further work. This may involve placing part-completed or completed work in the correct location, returning and/or storing any tools and equipment in the correct area, removing any waste and/or scrapped materials, and reporting any defects or damage to the tools and equipment used.</p> <p>In order to be efficient and effective in the workplace, they will also be required to demonstrate that they can create and maintain effective working relationships with colleagues and supervisors. They will be expected to review objectives and targets for their personal development and to contribute to, and communicate any opportunities for, improvements that could be made to working practices and procedures.</p> <p>Fundamental to this unit is the apprentice's ability to be able to apply the appropriate behaviours required in the workplace to meet the job profile and overall company objectives, such as strong work ethic, positive attitude, team player, dependability, responsibility, honesty, integrity motivation and commitment.</p> <p>Their responsibilities will require them to comply with health and safety requirements, environmental and organisational policy and procedures for the activities undertaken. They will need to take account of any potential difficulties or problems that may arise with the activities, and to seek appropriate help and advice in determining and implementing a suitable solution. They will work under a high level of supervision, whilst taking responsibility for their own actions and for the quality and accuracy of the work that they carry out, working efficiently and effectively in an engineering environment. They will understand the need</p>

to work efficiently and effectively, and will know about the areas they need to consider when preparing and tidying up the work area. They will know how to contribute to improvements, deal with problems, maintain effective working relationships, understand the behaviours that are required in the workplace and agree their development objectives and targets, in adequate depth to provide a sound basis for carrying out the activities safely and correctly.

They will understand the safety precautions required when carrying out the specific engineering activities and will be required to demonstrate safe working practices throughout, and will understand the responsibility that they you owe to themselves and others in the workplace.

**Relationship
to NOS:**

EUCAEF 02

Performance Requirements

The learner can:

- P1 Work safely at all times, complying with health and safety and environmental legislation, regulations and other relevant guidelines
- P2 Demonstrate the required behaviours in line with the job role and company objectives/values
- P3 Plan the engineering activities before they start them
- P4 Prepare the work area for carrying out the engineering activity
- P5 Obtain all necessary tools and equipment and check that they are in a safe and usable condition
- P6 Deal promptly and effectively with problems within their control, and seek help and guidance from the relevant people if they have problems that they cannot resolve
- P7 Maintain effective working relationships with colleagues and supervisors
- P8 Review personal training and development, as appropriate to the job role
- P9 Clean, tidy up and restore the work area on completion of the engineering activity

Learning outcome

The learner will:

- 1 ensure that they apply all of the following checks and practices at all times during the engineering activities:

Assessment criteria

- 1.1 adhere to procedures or systems in place for risk assessment, COSHH, Personal Protective Equipment (PPE) and other relevant safety regulations
- 1.2 wear the appropriate personal protective equipment for the work area and specific activity being carried out
- 1.3 use all tools and equipment safely and correctly, and only for their intended purpose including adherence to the Control of Vibration at Work Regulations (Hand and Arm) where applicable
- 1.4 ensure that the work area is maintained and left in a safe and tidy condition

Learning outcome

The learner will:

- 2 create and maintain effective working relationships and behaviours, to include carrying out and demonstrating all of the following:

Assessment criteria

- 2.1 maintains a consistently good record of punctuality and attendance in accordance with company policy
- 2.2 always suitably dressed for the activities to be undertaken.
- 2.3 follows both verbal and written instructions provided, seeking additional information, clarification or assistance where necessary in a courteous and polite manner.
- 2.4 able take advice from others in a positive way
- 2.5 makes a positive contribution to any discussions
- 2.6 flexible in their approach to work, responding positively to any agreed amendments or changes
- 2.7 communicates with others using clear, accurate and appropriate language.
- 2.8 demonstrates an open and honest approach, showing respect for the views, rights and property of others including the values of diversity and equality
- 2.9 demonstrates a willingness to help others when working towards a common team objective.

Learning outcome

The learner will:

- 3 prepare for the specific engineering activity, by producing work plans which includes all of the following:

Assessment criteria

- 3.1 documentation required (such as drawings, technical/reference documents - such as tapping drill sizes, imperial to metric conversion books, component specifications, quality documentation)
- 3.2 materials required (such as stock material, components, part-machined components, cables/wire, welding consumables)
- 3.3 equipment required (such as machine tools to be used, lifting and handling equipment, bending and forming equipment, anti-static equipment, test equipment)
- 3.4 workholding methods and equipment (such as machine or bench vice, clamps, special workholding arrangements), where appropriate
- 3.5 tools required (such as hand tools, portable power tools, cutting tools, soldering irons)
- 3.6 measuring equipment required (such as mechanical, electrical, pressure, flow, level, speed, sound)
- 3.7 the operating sequence to be followed
- 3.8 timescale required to complete the engineering operations

Learning outcome

The learner will:

- 4 prepare to carry out the engineering activity, ensuring all of the following, as applicable to the work to be undertaken:

Assessment criteria

- 4.1 the work area is free from hazards and is suitably prepared for the activities to be undertaken
 - 4.2 any required safety procedures are implemented
 - 4.3 any necessary personal protection equipment is obtained, and is in a usable condition
 - 4.4 all necessary drawings, specifications and associated documents are obtained
 - 4.5 job instructions are obtained and understood
 - 4.6 the correct materials or components are obtained
 - 4.7 appropriate authorisation to carry out the work is obtained
-

Learning outcome

The learner will:

- 5 complete the work activities, to include all of the following:

Assessment criteria

- 5.1 returning tools and equipment to the designated location
 - 5.2 returning drawings and work instructions
 - 5.3 disposing of waste materials, in line with organisational and environmental requirements
 - 5.4 completing all necessary documentation accurately and legibly
 - 5.5 identifying, where appropriate, any damaged or unusable tools or equipment
-

Learning outcome

The learner will:

- 6 deal with problems affecting the engineering activity, to include two of the following:

Assessment criteria

- 6.1 materials
- 6.2 job specification
- 6.3 timescales
- 6.4 tools and equipment
- 6.5 quality
- 6.6 safety
- 6.7 drawings
- 6.8 people
- 6.9 work activities or procedures

Learning outcome

The learner will:

- 7 contribute to developing their own engineering competence, to include all of the following:

Assessment criteria

- 7.1 describing the levels of skill, knowledge and understanding needed for competence in the areas of work expected of them
- 7.2 describing their development objectives/program, and how these were identified
- 7.3 providing information on their expectations and progress towards their identified objectives
- 7.4 using feedback and advice to improve their personal performance

Knowledge and understanding

- K1. The safe working practices and procedures to be followed whilst preparing and tidying up your work area
- K2. The importance of applying the appropriate behaviours in the workplace and the implications for both the apprentice and the business if these are not adhered to
- K3. How to present themselves in the workplace suitably dressed for the activities to be undertaken (such as being neat, clean and dressed in clothes appropriate to the area of activity)
- K4. The importance of reporting to work on time and returning from breaks on time and the potential consequences if this is not adhered to
- K5. The types of attitudes and behaviours that are likely to create conflict or negative responses
- K6. The benefits of team working and understanding of team objectives
- K7. The roles of individual team members and the strengths they bring to the team
- K8. The importance of clear communication both oral and written, using appropriate language and format
- K9. The need to change communication styles to meet the needs of the target audience
- K10. The need to adhere to timescales set for work, whilst maintaining appropriate quality standards and the implications if these are not adhered to
- K11. The importance of seeking additional support and guidance when required
- K12. Why it is important to be open and honest and admit to any errors and/or mistakes
- K13. The need to be flexible in their approach to work, responding positively to changes or amendments required by the business
- K14. The importance of taking an active and positive part in the implementation of any amendments or changes to work requirements
- K15. Their individual responsibility to work in an ethical manner and the organisations policies relating to ethical working and behaviours
- K16. The importance of respecting others, including an awareness of diversity and inclusion
- K17. The personal protective equipment (ppe) to be worn for the engineering activities undertaken (such as correctly fitting overalls, safety shoes, eye protection, ear protection)

- K18. The correct use of any equipment used to protect the health and safety of yourself and your colleagues
- K19. Planning and preparing to carry out the engineering activity (such as obtaining the appropriate drawings/documentation to be used, determining the materials required, determining the tools and equipment required, determining a suitable sequence of operations, determining the quality checks to be made and equipment to be used)
- K20. The procedure for ensuring that all documentation relating to the work being carried out is available, prior to starting the activity
- K21. The procedure for ensuring that all tools and equipment are available prior to undertaking the activity
- K22. The checks to be carried out to ensure that tools and equipment are in full working order, prior to undertaking the activity
- K23. The checks to be carried out to ensure that all materials required are correct and complete, prior to undertaking the activity
- K24. The action that should be taken if documentation, tools and equipment or materials are incomplete or do not meet the requirements of the activity
- K25. Their role in helping to develop their own skills and knowledge (such as checking with your supervisor about the work they are expected to carry out and the standard you need to achieve; the safety points to be aware of and the skills and knowledge you will need to develop)
- K26. The benefits of continuous personal development, and the training opportunities that are available in the workplace
- K27. The importance of reviewing their training and development with trainers and supervisors, of comparing the skills, setting objectives to overcome any shortfall or address any development needs
- K28. Their responsibilities for providing evidence of their performance and progress (such as submitting work for assessment or the completion of assignments or tests)
- K29. The importance of maintaining effective working relationships within the workplace (such as listening attentively to instructions from their supervisor, making sure they ask for help and advice in a polite and courteous manner, responding positively to requests for help from others)
- K30. The reason for informing others of their activities which may have impact on their work (such as the need to temporarily disconnect a shared resource like electricity or compressed air supply; making undue noise or creating sparks, fumes or arc flashes from welding)
- K31. Dealing with disagreements with others in ways which will help to resolve difficulties and maintain long term relationships
- K32. The organisational procedures to deal with and report any problems that can affect working relationships
- K33. The difficulties that can occur in working relationships, and how to resolve them
- K34. The regulations that affect how individuals should be treated at work (such as equal opportunities and equal pay, race relations and sex discrimination, working time directive, disabled persons acts)
- K35. The need to dispose of waste materials and consumables (such as oils and chemicals) in a safe and environmentally friendly way

- K36. Where tools and equipment should be stored and located, and the importance of returning all tools and documentation to their designated area on completion of your work activities
- K37. When to act on their own initiative and when to seek help and advice from others
- K38. The importance of leaving the work area in a safe condition on completion of your activities (such as equipment correctly isolated, cleaning the work area and removing and disposing of waste)

Unit 203

Using and communicating technical information

Unit level:	Level 2
GLH:	18
Unit aim:	<p>This unit of competence has been developed by employers in the Aerospace and Aviation Sector and is part of an overall development programme designed to meet the requirements of the Sector, the published Apprenticeship Standard and Employer Occupational Brief.</p> <p>This unit of competence identifies the training and development required in order that the apprentice can demonstrate that they are competent in being able to make full use of text, numeric and graphical information, by interpreting and using technical information extracted from a range of documentation such as engineering drawings, technical manuals, technical specifications, reference tables and charts, electronic displays, planning and quality control documentation, which will prepare them for entry into the engineering or manufacturing sectors, creating a progression between education and employment, or will act as a basis for the development of additional skills and occupational competences in the working environment.</p> <p>They will be required to extract the necessary data from the various specifications and related documentation, in order to establish and carry out the work requirements, and to make valid decisions about the quality and accuracy of the work carried out. They will also need to be able to communicate and record technical information, using a range of different methods such as producing detailed sketches, preparing work planning documentation, producing technical reports and recording data from testing activities.</p> <p>Their responsibilities will require them to comply with organisational policy and procedures for obtaining, using and communicating the technical information applicable to the activity. They will need to take account of any potential difficulties or problems that may arise with the activities, and to seek appropriate help and advice in determining and implementing a suitable solution. They will work under a high level of supervision, whilst taking responsibility for their own actions and for the quality and accuracy of the work that they carry out.</p> <p>Their underpinning knowledge will provide a good understanding of the types of documentation available for use, and will provide an informed approach to applying and communicating engineering instructions and procedures. They will be able to read and interpret the documentation available, and will know about the conventions, symbols and abbreviations to the required depth to provide a sound basis for carrying out the activities to the required specification.</p> <p>They will be able to apply the appropriate behaviours required in the workplace to meet the job profile and overall company objectives, such</p>

as strong work ethic, positive attitude, team player, dependability, responsibility, honesty, integrity motivation and commitment

**Relationship
to NOS:**

EUCAEF03

Performance Requirements

The learner can:

- P1 Use the approved source to obtain the required data, documentation or specifications
 - P2 Demonstrate the required behaviours in line with the job role and company objectives
 - P3 Extract and interpret information from engineering drawings and other related documentation
 - P4 Report any inaccuracies or discrepancies in the drawings and specifications
 - P5 Use the information obtained to establish work requirements
 - P6 Record and communicate the technical information by appropriate means
 - P7 Deal promptly and effectively with problems within their control, and seek help and guidance from the relevant people if they have problems that they cannot resolve
-

Learning outcome

The learner will:

- 1 use approved sources to obtain the necessary data and related specifications, and carry out all of the following:

Assessment criteria

- 1.1 check the currency and validity of the data and documentation used
 - 1.2 exercise care and control over the documents at all times
 - 1.3 correctly extract all necessary data in order to carry out the required tasks
 - 1.4 seek out additional information where there are gaps or deficiencies in the information obtained
 - 1.5 deal with or report any problems found with the data
 - 1.6 make valid decisions based on the evaluation of the engineering information
 - 1.7 return all documentation to the approved location on completion of the work
 - 1.8 complete all necessary production documentation
-

Learning outcome

The learner will:

- 2 use information extracted from engineering documentation, to include one or more of the following:

Assessment criteria

- 2.1 detailed component drawings
- 2.2 illustrations

- 2.3 welding drawings
 - 2.4 general assembly drawings
 - 2.5 visual display screens
 - 2.6 casting drawings
 - 2.7 repair drawings
 - 2.8 modification drawings
 - 2.9 operational diagrams
 - 2.10 fluid power drawings
 - 2.11 sub-assembly drawings
 - 2.12 physical layouts
 - 2.13 wiring/circuit diagrams
 - 2.14 schematic diagrams
 - 2.15 manufacturers' manuals/drawings
 - 2.16 installation drawings
 - 2.17 fabrication drawings
 - 2.18 photographic representations
 - 2.19 approved sketches
 - 2.20 pattern drawings
 - 2.21 contractual specifications
-

Learning outcome

The learner will:

- 3 use information extracted from related documentation, to include two from the following:

Assessment criteria

- 3.1 job instructions
- 3.2 material specifications
- 3.3 planning documentation
- 3.4 drawing instructions
- 3.5 finishing specifications
- 3.6 quality control documents
- 3.7 test schedules
- 3.8 reference tables/charts
- 3.9 operation sheets
- 3.10 manufacturers' instructions
- 3.11 national, international and organisational standards
- 3.12 process specifications
- 3.13 welding procedure specifications

Learning outcome

The learner will:

4 extract information that includes three of the following:

Assessment criteria

- 4.1 materials or components required
 - 4.2 surface texture requirements
 - 4.3 surface finish required
 - 4.4 dimensions
 - 4.5 location/orientation of parts
 - 4.6 weld type and size
 - 4.7 tolerances
 - 4.8 process or treatments required
 - 4.9 operations required
 - 4.10 build quality
 - 4.11 assembly sequence
 - 4.12 shape or profiles
 - 4.13 installation requirements
 - 4.14 inspection requirements
 - 4.15 test points to be used
 - 4.16 connections to be made
 - 4.17 part numbers for replacement parts
 - 4.18 circuit characteristics (such as pressure, flow, current, voltage, speed)
-

Learning outcome

The learner will:

5 record and communicate technical information, using three of the following methods:

Assessment criteria

- 5.1 producing fully detailed sketches of work/circuits completed or required
- 5.2 preparing work planning documentation
- 5.3 recording data from testing activities
- 5.4 producing technical reports on activities they have completed
- 5.5 completing material and tool requisition documentation
- 5.6 producing a list of replacement parts required for a maintenance activity
- 5.7 completing training records or portfolio references

Knowledge and understanding

- K1. Describe the importance of applying the appropriate behaviours in the workplace and the implications for both the apprentice and the business if these are not adhered to
- K2. Describe the information sources used for the data and documentation that they use in their work activities (eg Verbal, written, electronic)
- K3. Explain why technical information is presented in different forms (eg Drawings, data sheets, and national and international standards)
- K4. State where to obtain the various documents that they will be using (eg Safety hand outs, drawings, planning documentation, work instructions, maintenance records, technical manuals and reference tables/charts),
- K5. Outline the types of engineering drawings used and describe how they interrelate (eg Isometric and orthographic drawings; assembly, sub-assembly and general arrangement drawings; circuit and wiring diagrams, block and schematic diagrams; fluid power and instrumentation and control diagrams)
- K6. The meaning of the different symbols and abbreviations found on the documents that they use (such as surface finish to be achieved, linear and geometric tolerances, electronic components, weld symbols and profiles, pressure and flow characteristics, torque values, imperial and metric systems of measurement, tolerancing and fixed reference points)
- K7. How to use other sources of information to support the data (such as electronic component pin configuration specifications, standard reference charts for limits and fits, tapping drill reference charts, bend allowances required for material thickness, electrical conditions required for specific welding electrodes, mixing ratios for bonding and finishing materials, metal finishing specifications and inspection requirements)
- K8. Outline the procedures for reporting discrepancies in the data or documents and for reporting lost or damaged drawings and documents
- K9. Outline the care and control procedures for the documents; state how damage or graffiti on drawings can lead to scrapped work
- K10. State typical ways of communicating technical information (eg Sketches, test and inspection reports, work planning documents) and the amount of detail that should be included
- K11. Explain the importance of ensuring that sketches are of a suitable size, use appropriate drawing conventions, are in proportion and are legible to others
- K12. Explain the importance of using a fixed common reference point for dimensioning of drawings and sketches
- K13. State when to act on their own initiative to find, clarify and evaluate information and when to seek help and advice from others
- K14. Explain why they should always seek clarification if they are in any doubt as to the validity or suitability of the information they have gathered
- K15. Identify who they should report to in the event of problems that they cannot resolve

Unit 240

Military Aircraft Flight Servicing

Unit level:	Level 2
GLH:	36
Unit aim:	<p>This unit of competence has been developed by employers in the Aerospace and Aviation Sector and is part of an overall development programme designed to meet the requirements of the Sector, the published Apprenticeship Standard and Employer Occupational Brief.</p> <p>This unit of competence identifies the training and development required in order that the apprentice can demonstrate that they are competent in being able to cover flight line servicing activities that will prepare them for entry into military aircraft related trades, creating a progression between education and employment, or providing a basis for the development of additional skills and occupational competences in the working environment.</p> <p>They will be expected to prepare for the flight servicing activities by obtaining all necessary information, documentation, tools and equipment required, and to plan how they intend to carry out the required maintenance activities and the sequence of operations they intend to use.</p> <p>The apprentice will be required to select the appropriate equipment to use, based on the flight servicing operations to be carried out and the type of aircraft being serviced. This will include equipment such as gas, hydraulic, oil and grease replenishment trolleys, inspection aids, standard tool kits, and other organisation-specific equipment. They will be expected to use a variety of maintenance inspection techniques and procedures, such as gathering information from fault reports, and inspecting and operating the equipment. They will also be expected to carry out aircraft handling duties, including pre-and post-taxi visual checks for damage and loose articles.</p> <p>The apprentice's knowledge will provide an understanding of their work, and will enable them to apply appropriate flight servicing techniques and procedures safely. They will understand the flight servicing process, and its application, and will know about the aircraft equipment being serviced, the equipment components, tools and consumables used, to the required depth to provide a sound basis for carrying out the activities to the required specification.</p> <p>They will understand the safety precautions required when carrying out the flight servicing activities, and when using relevant tools and equipment; and will also be required to demonstrate safe working practices throughout, and will understand the responsibility they owe to themselves and others in the workplace.</p> <p>They will be able to apply the appropriate behaviours required in the</p>

workplace to meet the job profile and overall company objectives, such as strong work ethic, positive attitude, team player, dependability, responsibility, honesty, integrity motivation and commitment.

Relationship to NOS:

EUCAEF40

Performance Requirements

The learner can:

- P1 demonstrate the required behaviours in line with the job role and organisational objectives
 - P2 work safely at all times, complying with health and safety legislation, regulations and other relevant guidelines
 - P3 follow the relevant maintenance schedules to carry out the required work
 - P4 carry out the maintenance activities within the limits of their personal authority
 - P5 carry out the maintenance activities in the specified sequence and in an agreed timescale
 - P6 report any instances where the maintenance activities cannot be fully met or where there are identified defects outside the planned schedule
 - P7 complete relevant maintenance records accurately and pass them on to the appropriate person
 - P8 dispose of waste materials in accordance with safe working practices and approved procedures
-

Learning outcome

The learner will:

- 1 carry out all of the following during the flight servicing activity:

Assessment criteria

- 1.1 adhere to procedures or systems in place for risk assessment, COSHH, Personal Protective Equipment (PPE) and other relevant safety regulations
- 1.2 ensure the safe isolation of equipment (such as mechanical, electrical, gas, air or fluids), where appropriate
- 1.3 follow job instructions, maintenance drawings and procedures
- 1.4 check that the tools and test instruments are within calibration date, and are in a safe and usable condition
- 1.5 ensure that the system is kept free from foreign objects, dirt or other contamination
- 1.6 return all tools and equipment to the correct location on completion of the flight servicing activities
- 1.7 deal promptly and effectively with problems within their control and seek help and guidance from the relevant people if they have problems that they cannot resolve
- 1.8 the work area in a safe and tidy condition on completion of the maintenance activities

Learning outcome

The learner will:

- 2 Carry out flight servicing activities to include an After Flight (AF), a Before Flight (BF) or a Turn-round (TR) servicing, covering at least 18 of the following:

Assessment criteria

- 2.1 flight servicing of an aircraft assisted escape system (AAES)
- 2.2 apply external electrical power to an aircraft
- 2.3 assist with the ground handling of aircraft
- 2.4 refuel and defuel an aircraft, if required
- 2.5 check, and replenish if required, an aircraft gaseous oxygen system
- 2.6 check, and adjust if required, aircraft tyre pressures
- 2.7 visually check aircraft landing gear assemblies and retraction bays
- 2.8 visually check aircraft wheels and tyres
- 2.9 check aircraft brake units for wear
- 2.10 check aircraft brake system foot motor reservoirs
- 2.11 check, and replenish if required, aircraft hydraulic system fluid levels
- 2.12 check aircraft hydraulic accumulator pressures
- 2.13 read and record aircraft fatigue meter indications
- 2.14 read and reset an aircraft indicating accelerometer
- 2.15 test an aircraft centralised warning system (CWS) using the test facility for audio and lamp function
- 2.16 functionally check aircraft internal and external lighting systems
- 2.17 check and replenish a gas turbine engine oil system
- 2.18 flight line examinations of gas turbine engine intakes, compressor and turbine blades, jet pipe, nozzles and reheat burner rings
- 2.19 examine aircraft fire detection and suppression systems, checking the condition of manually and electrically operated aircraft fire extinguishers
- 2.20 identify and report damage to aircraft metallic and composite materials, including Barely Visible Impact Damage (BVID)
- 2.21 visually check inflatable and non-inflatable seals and sealing strips for faults
- 2.22 clean and visually check aircraft transparencies for faults
- 2.23 check the condition of desiccants
- 2.24 clean and visually check aerials, dielectric panels and static dischargers.

Learning outcome

The learner will:

- 3 carry out eight of the following flight servicing-related activities:

Assessment criteria

- 3.1 plan the flight servicing activities before they start them
- 3.2 obtain all the information they need for the checking and replenishment operations

- 3.3 obtain and prepare the appropriate tools, equipment and consumables
 - 3.4 apply appropriate flight servicing techniques and procedures
 - 3.5 pre-use checks on ground support equipment (GSE)
 - 3.6 fit and remove aircraft covers, bungs and blanks
 - 3.7 select and use access equipment
 - 3.8 park aircraft
 - 3.9 carry out the duties of each member of a seeing off/seeing in team, including marshalling
 - 3.10 move and work safely in an aircraft operating environment
-

Learning outcome

The learner will:

- 4 use three of the following maintenance diagnostic techniques, tools and aids:

Assessment criteria

- 4.1 fault finding techniques (such as half-split, input/output, unit substitution)
 - 4.2 diagnostic aids (such as manuals, flowcharts, troubleshooting guides, maintenance records)
 - 4.3 information gathered from fault reports
 - 4.4 visual checks (such as signs of leakage, damage, missing parts, wear/deterioration)
 - 4.5 alignment checks
 - 4.6 movement checks (such as excessive movement or clearance, loose fittings and connections)
 - 4.7 force/pressure checks (such as spring pressure, belt or chain tension)
 - 4.8 overheating checks (such as bearings, friction surfaces)
 - 4.9 sensory input (such as sight, sound, smell, touch)
 - 4.10 information from monitoring equipment or gauges
 - 4.11 operating (such as manual operation, timing and sequencing)
 - 4.12 test instrumentation measurement (such as pressure, flow, timing, sequence, movement)
 - 4.13 measuring instruments (such as dial test indicators, torque measuring devices, feeler gauges)
-

Learning outcome

The learner will:

- 5 carry out flight servicing in compliance with one or more of the following:

Assessment criteria

- 5.1 organisational guidelines and codes of practice
- 5.2 equipment manufacturers' operation range
- 5.3 BS and/or ISO standards

Knowledge and understanding

- K1. The health and safety requirements, and safe working practices and procedures required for the flight servicing activities undertaken
- K2. The importance of wearing appropriate protective clothing and equipment (PPE), and of keeping the work area safe and tidy
- K3. The hazards associated with carrying out mechanical maintenance activities (such as handling oils, greases, stored energy/force, misuse of tools, using damaged or badly maintained tools and equipment, not following laid-down maintenance procedures), and how to minimise them
- K4. The importance of applying the appropriate behaviours in the workplace and the implications for both the apprentice and the organisation if these are not adhered to
- K5. The system isolation procedures or permit-to-work procedure that applies
- K6. How to obtain and interpret drawings, specifications, manufacturers' manuals and other documents needed in the maintenance process
- K7. The procedure for obtaining drawings, job instructions, related specifications, replacement parts, materials and other consumables necessary for the maintenance activities
- K8. The basic principles of how the equipment functions, its operating sequence, the working purpose of individual units/components and how they interact
- K9. The various flight servicing inspection techniques and aids that can be used (such as fault reports, visual checks, measuring, movement and alignment checks, testing)
- K10. How to evaluate sensory information (sight, sound, smell, touch)
- K11. The methods of checking that components are fit for purpose, and how to identify defects and wear characteristics
- K12. How to check that tools and equipment are free from damage or defect, are in a safe and usable condition, are within calibration, and are configured correctly for the intended purpose
- K13. How to check and operate a risbrider replenishment gun
- K14. How to replenish gaseous oxygen (including safety precautions, hose couplings, the importance of purging the delivery line and obtaining accurate contents readings)
- K15. How to replace a lox container (including safety precautions for liquid oxygen, the importance of securing the container properly, and the importance of inspecting the electrical connections for damage)
- K16. The importance of completing maintenance documentation and/or reports following the maintenance activity
- K17. How to use lifting and handling equipment in the maintenance activity
- K18. The problems associated with the flight servicing activity, and how they can be overcome
- K19. When to act on their own initiative and when to seek help and advice from others
- K20. The importance of leaving the work area and equipment in a safe and clean condition on completion of the maintenance activities (such as returning hand tools and test equipment to the designated locations, cleaning the work area, and removing and disposing of waste)

Unit 257

Military Aircraft Electrical Wiring and Interconnection Systems (EWIS) Husbandry

Unit level: Level 2

GLH: 80

Unit aim:

This unit of competence has been developed by employers in the Aerospace and Aviation Sector and is part of an overall development programme designed to meet the requirements of the Sector, the published Apprenticeship Standard and Employer Occupational Brief.

This unit of competence identifies the training and development required in order that the apprentice can demonstrate that they are competent in being able to undertake Electrical Wiring and Interconnection Systems (EWIS) husbandry that will prepare them for entry into military aircraft related trades, creating a progression between education and employment, or providing a basis for the development of additional skills and occupational competences in the working environment.

They will be expected to prepare for the EWIS activities by obtaining all necessary information, documentation, tools and equipment required, and to plan how they intend to carry out the required activities and the sequence of operations they intend to use.

The apprentice will be required to select the appropriate equipment to use, based on the EWIS activity to be carried out. These activities will include: precision termination processes, soldering operations, testing of completed work, using equipment such as crimping tools, wire strippers, solder stations, digital volt meters, and other organisation-specific equipment. They will be expected to use a variety of skills and procedures, such as identifying the different types of aircraft cables and their application, the associated termination process applicable to each type and how to identify the unsatisfactory electrical termination of components from inspection and operating the appropriate test equipment.

The apprentice's knowledge will provide an understanding of their work, and will enable them to apply electrical hand skill techniques, inspection and procedures safely. They will understand the purpose, function and different application of these electrical hand skills utilised within aerospace, along with the process, equipment, components, tools and consumables used, to the required depth to provide a sound basis for carrying out the EWIS activities to the required specification.

They will understand the safety precautions required when carrying out EWIS activities, and when using relevant tools and equipment; and will also be required to demonstrate safe working practices throughout, and will understand the responsibility they owe to themselves and others in the workplace.

They will be able to apply the appropriate behaviours required in the workplace to meet the job profile and overall company objectives, such as strong work

ethic, positive attitude, team player, dependability, responsibility, honesty, integrity motivation and commitment.

**Relationship
to NOS:**

EUCAEF57

Performance Requirements

The learner can:

- P1 work safely at all times, complying with health and safety legislation, regulations and other relevant guidelines
 - P2 demonstrate the required behaviours in line with the job role and organisational objectives
 - P3 demonstrate aircraft electrical wiring interconnection system husbandry
 - P4 identify the different types of aircraft cable used and their application
 - P5 obtain the correct tools and equipment for the EWIS activity and check that they are in a serviceable condition
 - P6 carry out the precision termination process using approved materials and methods
 - P7 carry out the precision termination process in the specified sequence and in an agreed timescale
 - P8 carry out soldering operations of electrical components using approved materials and methods
 - P9 use appropriate test methods and equipment to check the EWIS activity meets all aspects of the specification
 - P10 complete all relevant records accurately and pass them on to the appropriate person
 - P11 dispose of waste materials in accordance with safe working practices and approved procedures
-

Learning outcome

The learner will:

- 1 carry out all of the following during the EWIS husbandry activities:

Assessment criteria

- 1.1 adhere to procedures or systems in place for risk assessment, COSHH, Personal Protective Equipment (PPE) and other relevant safety regulations
- 1.2 follow job instructions, maintenance drawings and procedures
- 1.3 check that the tools, equipment and test instruments are within calibration date, and are in a safe and usable condition
- 1.4 ensure that the system is kept free from foreign objects, dirt or other contamination
- 1.5 return all tools, equipment and test instruments to the correct location on completion of the precision termination activities
- 1.6 leave the work area in a safe and tidy condition on completion of the maintenance activities

Learning outcome

The learner will:

- 2 determine the condition of EWIS installations for all of the following:

Assessment criteria

- 2.1 serviceability
 - 2.2 corrosion/erosion
 - 2.3 damage
 - 2.4 correct cable support/protection
-

Learning outcome

The learner will:

- 3 carry out precision termination crimping procedure to include all the following:

Assessment criteria

- 3.1 correct selection of the appropriate termination for the cable being utilised
- 3.2 selection and use of the correct tools/equipment for the precision termination process
- 3.3 equipment and tooling pre-use checks
- 3.4 correct setting up of tooling for the task
- 3.5 correct cable preparation

Plus the correct looming/securing of cables to include two of the following:

- 3.6 Lacing
 - 3.7 Cable Ties (eg Ty-wraps)
 - 3.8 Heat shrink/thermofit
-

Learning outcome

The learner will:

- 4 carry out five of the following types of precision termination:

Assessment criteria

- 4.1 pre-insulated diamond grip ring terminations
- 4.2 pins and sockets (eg 602 pattern/CECC series)
- 4.3 BNC connector
- 4.4 Data Bus connector
- 4.5 in-line splice
- 4.6 fibre optic single way connector (eg HAR/HAP)
- 4.7 fibre optic multi-way connector (eg. MC5)

Including two of the following types of cable:

- 4.8 aircraft general purpose cable
- 4.9 heavy duty cable
- 4.10 fibre optic cable
- 4.11 coaxial cable

- 4.12 databus cable
 - and two of the following:
 - 4.13 aircraft terminal block
 - 4.14 solder sleeve
 - 4.15 knitmesh installation
-

Learning outcome

The learner will:

- 5 use four of the following types of precision termination tooling:

Assessment criteria

- 5.1 semi-automatic wire strippers
 - 5.2 standard crimping tool (eg AMP/Raychem)
 - 5.3 hydraulic crimping tool
 - 5.4 co-axial cable crimping tool
 - 5.5 crimping tool kit
 - 5.6 ring and splitting tool
 - 5.7 tri-axial databus cable crimping tool
-

Learning outcome

The learner will:

- 6 carry out two of the following types of test of the precision termination:

Assessment criteria

- 6.1 continuity testing
 - 6.2 insertion loss measurements
 - 6.3 return loss measurements
 - 6.4 termination specific
-

Learning outcome

- 7 utilise two of the following types of test equipment:

Assessment criteria

- 7.1 DMM (Digital Multi Meter)
- 7.2 light source and power meter
- 7.3 inspection microscope
- 7.4 other test equipment to measure insertion loss
- 7.5 other test equipment to measure return loss

Learning outcome

The learner will:

8 carry out soldering operations to include all of the following:

Assessment criteria

- 8.1 pre-use checks of solder station
 - 8.2 soldering iron preparation
 - 8.3 correct stripping of wire
 - 8.4 correct tinning of wire
 - 8.5 component preparation
 - 8.6 correct soldering methods
 - 8.7 component alignment
 - 8.8 de-soldering
 - 8.9 cleaning of the finished product
 - 8.10 inspection and testing of the finished product
-

Learning outcome

The learner will:

9 carry out both of the following soldering joint formations:

Assessment criteria

- 9.1 bucket joints
 - 9.2 post/Oxley barb
-

Learning outcome

The learner will:

10 carry out the electrical hand skill activities in compliance with one or more of the following:

Assessment criteria

- 10.1 regulatory articles
 - 10.2 circuit/schematic diagrams
 - 10.3 manufacturers work instructions
 - 10.4 organisational standards/publications
-

Knowledge and understanding

- K1. The health and safety requirements, and safe working practices and procedures to be observed whilst carrying out activities associated with Electrical Wiring and Interconnection Systems including any specific legislation, regulations or codes of practice relating to the activities, equipment or materials
- K2. The importance of wearing appropriate protective clothing and equipment (PPE), and of keeping the work area safe and tidy

- K3. The hazards associated with carrying out EWIS activities (such as handling solvents, soldering, sharp tools for stripping cable insulation, misuse of tools, using damaged or badly maintained tools and equipment, not following laid-down maintenance procedures), and how to minimise them
- K4. The importance of applying the appropriate behaviours in the workplace and the implications for both the apprentice and the organisation if these are not adhered to
- K5. How to obtain and interpret schematics, circuit diagrams, specifications, manufacturers' manuals and other documents needed in relation to the EWIS activity undertaken
- K6. The basic principles of how the equipment functions, its operating sequence, the working purpose of individual units/components and how they interact
- K7. How to prepare the materials and components in readiness for the EWIS activity
- K8. The different types of cabling, their construction and application (such as multicore cables, single core cables, solid and multi-stranded cables, screened cables, data/communications cables, fibre-optics)
- K9. The methods of checking that components are fit for purpose, and how to identify defects and wear characteristics
- K10. How to check that tools and equipment are free from damage or defect, are in a safe and usable condition, are within calibration, and are configured correctly for the intended purpose
- K11. Methods of laying or drawing cables, the need to ensure the minimum bend radius is not exceeded, that cables are supported, secured and protected, not twisted or plaited, and the importance of removing a cable from a cable drum correctly
- K12. The techniques used to terminate electrical equipment (such as plugs and sockets; soldering; screwed, clamped and crimped connections, glands and sealed connectors), and the implications on the TEMPEST profile if carried out incorrectly
- K13. Methods of identifying/labelling aircraft cables to include a basic cable coding system (such as manufacturer devised, ATA 100 devised, or in accordance with military air publications)
- K14. The importance of completing maintenance documentation and/or reports following the EWIS activity
- K15. The tools and equipment used during EWIS activities (including the use of cable stripping tools, crimping tools, and soldering irons)
- K16. How to check that tools and equipment are free from damage or defects, and are in a safe, PAT tested, calibrated and usable condition
- K17. The problems associated with EWIS activity, and how they can be overcome
- K18. Applying approved test procedures; the safe working practices and procedures required when carrying out the various tests
- K19. The importance of leaving the work area in a safe and clean condition on completion of the activities (such as returning tools and equipment to its designated location, correct storage of any solvents used, cleaning the work area, along with removing and disposing of waste)

Unit 258

Basic Fault Finding Techniques for Military Avionic Systems

Unit level:	Level 2
GLH:	80
Unit aim:	<p>This unit of competence has been developed by employers in the Aerospace and Aviation Sector and is part of an overall development programme designed to meet the requirements of the Sector, the published Apprenticeship Standard and Employer Occupational Brief.</p> <p>This unit of competence identifies the training and development required in order that the apprentice can demonstrate that they are competent in being able to cover basic fault finding activities that will prepare them for entry into military aircraft related trades, creating a progression between education and employment, or providing a basis for the development of additional skills and occupational competences in the working environment.</p> <p>They will be expected to prepare for the basic fault finding activities by obtaining all necessary information, documentation, tools and equipment required, and to plan how they intend to carry out the required maintenance activities and the sequence of operations they intend to use.</p> <p>The apprentice will be required to select the appropriate equipment to use, based on the basic fault finding to be carried out and the type of aircraft system being maintained. This may include equipment such as inspection aids, test equipment, standard tool kits, and other organisation-specific equipment. They will be expected to use a variety of maintenance inspection techniques and procedures, such as gathering information from fault reports, aircrew debriefs and inspecting and operating the equipment.</p> <p>The apprentice's knowledge will provide an understanding of their work, and will enable them to apply appropriate basic fault finding techniques and procedures safely. They will understand the maintenance process, and its application, and will know about the aircraft equipment being maintained, the equipment components, tools and consumables used, to the required depth to provide a sound basis for carrying out the activities to the required specification.</p> <p>They will understand the safety precautions required when carrying out the basic fault finding activities, and when using relevant tools and equipment; and will also be required to demonstrate safe working practices throughout, and will understand the responsibility they owe to themselves and others in the workplace.</p> <p>They will be able to apply the appropriate behaviours required in the workplace to meet the job profile and overall company objectives, such as strong work ethic, positive attitude, team player, dependability, responsibility, honesty, integrity motivation and commitment.</p>

Performance Requirements

The learner can:

- P1 demonstrate the required behaviours in line with the job role and organisational objectives
 - P2 work safely at all times, complying with health and safety legislation, static handling, configuration control, lethal voltages and other relevant guidelines
 - P3 follow the relevant maintenance schedules to carry out the required work
 - P4 carry out the basic fault finding activities within the limits of their personal authority
 - P5 carry out the maintenance activities in the specified sequence and in an agreed timescale
 - P6 report any instances where the maintenance activities cannot be fully met or where there are identified defects outside the planned schedule
 - P7 complete relevant maintenance records accurately and pass them on to the appropriate person
 - P8 dispose of waste materials in accordance with safe working practices and approved procedures
-

Learning outcome

The learner will:

- 1 carry out all of the following during the diagnosis, rectification and testing activity:

Assessment criteria

- 1.1 adhere to procedures or systems in place for risk assessment, Personal Protective Equipment (PPE) and other relevant safety regulations including lethal voltages, correct static handling and hazardous items
- 1.2 ensure the safe isolation of equipment, where appropriate, including correct static handling procedures
- 1.3 follow job instructions, maintenance drawings and procedures
- 1.4 check that the tools and test instruments are within calibration date, and are in a safe, PAT tested and usable condition
- 1.5 ensure that the system is kept free from foreign objects, dirt or other contamination
- 1.6 return all tools and equipment to the correct location on completion of the basic fault finding activities
- 1.7 deal promptly and effectively with problems within their control and seek help and guidance from the relevant people if they have problems that they cannot resolve
- 1.8 the work area in a safe and tidy condition on completion of the basic fault finding activities.

Learning outcome

The learner will:

2 carry out basic fault finding activities to find all the following types of faults:

Assessment criteria

- 2.1 open circuit
- 2.2 high resistance
- 2.3 short circuit to earth
- 2.4 line to line short circuit
- 2.5 cross connection

On five of the following individual basic systems:

- 2.6 canopy
- 2.7 strobe
- 2.8 air brake
- 2.9 timing circuit
- 2.10 lighting
- 2.11 fire protection.

Learning outcome

The learner will:

3 carry out basic fault finding activities on the all of the following power supply systems:

Assessment criteria

- 3.1 battery power only
- 3.2 Ground Power Unit (GPU) power
- 3.3 Auxiliary Power Unit (APU) power
- 3.4 generator power.

Learning outcome

The learner will:

4 carry out basic fault finding, rectification and testing to module level on four of the following Line Replacement Items (LRIs):

Assessment criteria

- 4.1 advanced avionic LRI
- 4.2 Air Data Computer (ADC)
- 4.3 Frequency Agile Radio (FAR)
- 4.4 RADAR altimeter
- 4.5 waveform generator.

Learning outcome

The learner will:

- 5 use four of the following maintenance diagnostic techniques, tools and aids:

Assessment criteria

- 5.1 fault finding techniques (such as half-split, input/output, unit substitution)
 - 5.2 3 point check
 - 5.3 voltage checks
 - 5.4 resistance checks
 - 5.5 system isolation
 - 5.6 sensory input (such as sight, sound, smell, touch)
-

Learning outcome

The learner will:

- 6 complete the relevant servicing records, to include one from the following, and pass it to the appropriate people:

Assessment criteria

- 6.1 servicing/maintenance schedule/log
 - 6.2 job cards
 - 6.3 aircraft service/flight log.
-

Knowledge and understanding

- K1. The health and safety requirements, and safe working practices and procedures required for the basic fault finding activities undertaken
- K2. The importance of wearing appropriate protective clothing and equipment (PPE), and of keeping the work area safe and tidy
- K3. The hazards associated with carrying out maintenance activities (such as handling static sensitive devices, dealing with lethal voltages, misuse of tools or test equipment, not following laid-down maintenance procedures), and how to minimise them
- K4. The importance of applying the appropriate behaviours in the workplace and the implications for both the apprentice and the organisation if these are not adhered to
- K5. The system isolation procedures or permit-to-work procedure that applies
- K6. How to obtain and interpret drawings, specifications, manufacturers' manuals and other documents needed in the maintenance process
- K7. The procedure for obtaining drawings, job instructions, related specifications, replacement parts, materials and other consumables necessary for the fault finding activities
- K8. The basic principles of how the equipment functions, its operating sequence, the working purpose of individual units/components and how they interact
- K9. The various basic fault finding techniques and aids that can be used (such as fault reports, aircrew debriefs, visual checks, measuring, testing)
- K10. How to evaluate sensory information (sight, sound, smell, touch)

- K11. How to check that systems meet the required specification/operating conditions (such as values, tolerance, voltage rating, power rating, working temperature range)
- K12. How to check that tools and equipment are free from damage or defect, are in a safe and usable condition, are within calibration, and are configured correctly for the intended purpose
- K13. The application and use of circuit protection equipment (such as fuses and other overload protection devices)
- K14. The techniques used to dismantle/assemble electrical equipment (such as unplugging, de-soldering, removal of screwed, clamped and crimped connections)
- K15. Methods of attaching markers/labels to components or cables to assist with identification (such as colour coding conductors, using coded tabs)
- K16. The importance of completing maintenance documentation and/or reports following the maintenance activity
- K17. The problems associated with the fault finding activity, and how they can be overcome
- K18. When to act on their own initiative and when to seek help and advice from others
- K19. The importance of leaving the work area and equipment in a safe and clean condition on completion of the maintenance activities (such as returning hand tools and test equipment to the designated locations, cleaning the work area, and removing and disposing of waste)

Unit 259

Diagnosis, Rectification and Testing of Military Avionic Equipment

Unit level:	Level 2
GLH:	90
Unit aim:	<p>This unit of competence has been developed by employers in the Aerospace and Aviation Sector and is part of an overall development programme designed to meet the requirements of the Sector, the published Apprenticeship Standard and Employer Occupational Brief.</p> <p>This unit of competence identifies the training and development required in order that the apprentice can demonstrate that they are competent in being able to cover diagnosis, rectification and testing activities on integrated avionic systems that will prepare them for entry into military aircraft related trades, creating a progression between education and employment, or providing a basis for the development of additional skills and occupational competences in the working environment.</p> <p>They will be expected to prepare for the diagnosis, rectification and testing activities by obtaining all necessary information, documentation, tools and equipment required, and to plan how they intend to carry out the required maintenance activities and the sequence of operations they intend to use.</p> <p>The apprentice will be required to select the appropriate equipment to use, based on the diagnosis, rectification and testing finding to be carried out and the type of aircraft being maintained. This may include equipment such as inspection aids, test equipment, standard tool kits, and other organisation-specific equipment. They will be expected to use a variety of maintenance inspection techniques and procedures, such as gathering information from fault reports, aircrew debriefs and inspecting and operating the equipment.</p> <p>The apprentice's knowledge will provide an understanding of their work, and will enable them to apply appropriate diagnosis, rectification and testing techniques and procedures safely. They will understand the maintenance process, and its application, and will know about the aircraft equipment being maintained, the equipment components, tools and consumables used, to the required depth to provide a sound basis for carrying out the activities to the required specification.</p> <p>They will understand the safety precautions required when carrying out the diagnosis, rectification and testing activities, and when using relevant tools and equipment; and will also be required to demonstrate safe working practices throughout, and will understand the responsibility they owe to themselves and others in the workplace.</p> <p>They will be able to apply the appropriate behaviours required in the workplace to meet the job profile and overall company objectives, such as strong work ethic, positive attitude, team player, dependability, responsibility, honesty, integrity motivation and commitment.</p>

Performance Requirements

The learner can:

- P1 demonstrate the required behaviours in line with the job role and organisational objectives
 - P2 work safely at all times, complying with health and safety legislation, regulations and other relevant guidelines
 - P3 follow the relevant maintenance schedules to carry out the required diagnosis, rectification and testing activities
 - P4 carry out the diagnosis, rectification and testing activities within the limits of their personal authority
 - P5 carry out the diagnosis, rectification and testing activities in the specified sequence and in an agreed timescale
 - P6 report any instances where the diagnosis, rectification and testing activities cannot be fully met or where there are identified defects outside the planned schedule
 - P7 complete relevant maintenance records accurately and pass them on to the appropriate person
 - P8 dispose of waste materials in accordance with safe working practices and approved procedures.
-

Learning outcome

The learner will:

- 1 carry out all of the following during the diagnosis, rectification and testing activity:

Assessment criteria

- 1.1 adhere to procedures or systems in place for risk assessment, Personal Protective Equipment (PPE) and other relevant safety regulations including static sensitive device handling, lethal voltages and hazardous items
- 1.2 ensure the safe isolation of equipment, where appropriate, including correct static handling procedures
- 1.3 follow job instructions, maintenance drawings and procedures
- 1.4 check that the tools and test instruments are within calibration date, and are in a safe, PAT tested and usable condition
- 1.5 ensure that the system is kept free from foreign objects, dirt or other contamination
- 1.6 return all tools and equipment to the correct location on completion of the diagnosis, rectification and testing activities
- 1.7 deal promptly and effectively with problems within their control and seek help and guidance from the relevant people if they have problems that they cannot resolve
- 1.8 the work area in a safe and tidy condition on completion of the maintenance activities.

Learning outcome

The learner will:

- 2 carry out military avionics equipment functional checks and tests, on four of the following:

Assessment criteria

- 2.1 Navigation and weapon aiming sub-system
- 2.2 Global Positioning System
- 2.3 Horizontal Situation Indicator System
- 2.4 Data Bus
- 2.5 Communications
- 2.6 Air Data sub system
- 2.7 HUD and HEU
- 2.8 Inertial Navigation System
- 2.9 RADAR Altimeter
- 2.10 Flight Control System
- 2.11 TACAN
- 2.12 Aircraft Multi-function display
- 2.13 Standby instruments
- 2.14 doppler system
- 2.15 Gyro compass
- 2.16 VOR/ILS
- 2.17 IFF/SSR
- 2.18 Crash protection system

And three of the following:

- 2.19 Anti-ice system
- 2.20 Internal Lighting
- 2.21 Engine instruments
- 2.21 External power distribution
- 2.22 Emergency power distribution
- 2.23 External lighting system
- 2.24 Centralised warning system (CWS)
- 2.25 Fire Detection System
- 2.26 Landing Gear.

Learning outcome

The learner will:

- 3 use three of the following maintenance diagnostic documentation:

Assessment criteria

- 3.1 aircraft maintenance manuals

- 3.2 digital publications
 - 3.3 maintenance records
 - 3.4 diagnostic flowcharts
 - 3.5 information gathered from fault reports
 - 3.6 information gathered from aircrew debriefs
 - 3.7 F700 documentation
 - 3.8 Shift handover
 - 3.9 Shift diaries.
-

Learning outcome

The learner will:

- 4 use four of the following maintenance diagnostic techniques, tools and aids:

Assessment criteria

- 4.1 fault finding techniques (such as half-split, input/output, unit substitution)
 - 4.2 3 point check
 - 4.3 voltage checks
 - 4.4 resistance checks
 - 4.5 BITE/ATE
 - 4.6 system manipulation
 - 4.7 sensory input (such as sight, sound, smell, touch)
 - 4.8 information from monitoring equipment or gauges.
-

Learning outcome

The learner will:

- 5 carry out all of the following during the diagnosis, rectification and testing activity:

Assessment criteria

- 5.1 determine and remove the cause of the fault
- 5.2 raise the requirement for system independent checks such as pilot static sense and leak check
- 5.3 rectify the fault
- 5.4 update aircraft component cards
- 5.5 undertake post-rectification functional checks and ensure aircraft system is serviceable.

Learning outcome

The learner will:

- 6 complete the relevant servicing records, to include one from the following, and pass it to the appropriate people:

Assessment criteria

- 6.1 servicing/maintenance schedule/log
- 6.2 job cards
- 6.3 aircraft service/flight log.

Knowledge and understanding

- K1. The health and safety requirements, and safe working practices and procedures required for the diagnosis, rectification and testing activities undertaken
- K2. The importance of wearing appropriate protective clothing and equipment (PPE), and of keeping the work area safe and tidy
- K3. The hazards associated with carrying out maintenance activities (such as handling static sensitive devices, dealing with lethal voltages, misuse of tools or test equipment, not following laid-down maintenance procedures), and how to minimise them
- K4. The importance of applying the appropriate behaviours in the workplace and the implications for both the apprentice and the organisation if these are not adhered to
- K5. The system isolation procedures or permit-to-work procedure that applies
- K6. How to obtain and interpret drawings, specifications, manufacturers' manuals and other documents needed in the maintenance process
- K7. The procedure for obtaining drawings, job instructions, related specifications, replacement parts, materials and other consumables necessary for the maintenance activities
- K8. The basic principles of how the equipment functions, its operating sequence, the working purpose of individual units/components and how they interact
- K9. The various basic fault finding techniques and aids that can be used (such as fault reports, aircrew debriefs, visual checks, measuring, testing)
- K10. How to evaluate sensory information (sight, sound, smell, touch)
- K11. How to check that systems meet the required specification/operating conditions (such as values, tolerance, voltage rating, power rating, working temperature range)
- K12. How to check that tools and equipment are free from damage or defect, are in a safe and usable condition, are within calibration, and are configured correctly for the intended purpose
- K13. The application and use of circuit protection equipment (such as fuses and other overload protection devices)
- K14. The techniques used to dismantle/assemble electrical equipment (such as unplugging, de-soldering, removal of screwed, clamped and crimped connections)
- K15. Methods of attaching markers/labels to components or cables to assist with identification (such as colour coding conductors, using coded tabs)
- K16. The importance of completing maintenance documentation and/or reports following the maintenance activity

- K17. The problems associated with the diagnostic maintenance activity, and how they can be overcome
- K18. When to act on their own initiative and when to seek help and advice from others
- K19. The importance of leaving the work area and equipment in a safe and clean condition on completion of the maintenance activities (such as returning hand tools and test equipment to the designated locations, cleaning the work area, and removing and disposing of waste).

Unit 262

Maintaining (above the neck) Aircrew Equipment Assemblies (AEA)

Unit level:	Level 2
GLH:	80
Unit aim:	<p>This Employer Unit of Competence (EUC) has been developed by employers in the Aerospace and Aviation Sector and is part of an overall development programme designed to meet the requirements of the Sector, the published Apprenticeship Standard and Employer Occupational Brief.</p> <p>This EUC identifies the training and development required in order that the apprentice can demonstrate that they are competent in being able to carry out maintenance activities on 'above the neck' AEA, that will prepare them for entry into military aircraft related trades, creating a progression between education and employment, or providing a basis for the development of additional skills and occupational competences in the working environment. They will be expected to prepare for the AEA activities by obtaining all necessary information, documentation, tools and equipment required, and to plan how they intend to carry out the required activities and the sequence of operations they intend to use. They will be required to select the appropriate tools and equipment to use, based on the (above the neck) AEA activity to be carried out. These activities will include: dismantling above the neck aircrew equipment assemblies to the appropriate level, and cleaning the various parts using suitable solutions.</p> <p>They will be expected to use a variety of skills and procedures, such as a thorough examination of the equipment and its associated parts, in line with the relevant schedule, identifying and replacing any 'lived' items, damaged, worn or defective parts. They will then reassemble above the neck aircrew equipment assemblies, make any required adjustments and where appropriate, check and test the equipment operation and performance.</p> <p>The apprentice's knowledge will provide an understanding of their work, and will provide an informed approach to applying the appropriate maintenance skills, techniques and procedures. They will have a basic understanding of the equipment being maintained, and its application, and will know about the maintenance requirements and equipment used, in adequate depth to provide a sound basis for carrying out the activities to the required specification.</p> <p>They will understand the safety precautions required when carrying out the maintenance operations. They will be required to demonstrate safe working practices throughout, and will understand the responsibility they owe to themselves and others in the workplace.</p>

	They will be able to apply the appropriate behaviours required in the workplace to meet the job profile and overall company objectives, such as strong work ethic, positive attitude, team player, dependability, responsibility, honesty, integrity, motivation and commitment.
Relationship to NOS:	EUCAEF62

Performance Requirements

The learner can:

- P1 work safely at all times, complying with health and safety legislation, regulations and other relevant guidelines
- P2 demonstrate the required behaviours in line with the job role and organisational objectives
- P3 demonstrate the maintaining of 'above the neck' AEA
- P4 identify the different types of 'above the neck' AEA
- P5 obtain the correct tools and equipment for the 'above the neck' Aircrew Equipment Assemblies activity and check that they are in a serviceable condition
- P6 carry out the maintenance activities within the limits of their personal authority
- P7 follow the relevant maintenance schedules to carry out the required work
- P8 use appropriate test methods and equipment to check the AEA activity meets all aspects of the specification
- P9 report any instances where the AEA activity cannot be fully met or where there are identified defects outside the planned schedule
- P10 complete relevant maintenance records accurately and pass them on to the appropriate person
- P11 dispose of waste materials in accordance with safe working practices and approved procedures

Learning outcome

The learner will:

1. carry out all of the following during the 'above the neck' Aircrew Equipment Assemblies maintenance activity:

Assessment criteria

- 1.1 adhere to procedures or systems in place for risk assessment, COSHH, Personal Protective Equipment (PPE) and other relevant safety regulations
- 1.2 follow job instructions and maintenance procedures to carry out the required activity
- 1.3 check that the tools, equipment and test instruments are within calibration date, and are in a safe and usable condition
- 1.4 ensure that the assembly is kept free from foreign objects, dirt or other contamination
- 1.5 return all tools and equipment to the correct location on completion of the activities
- 1.6 leave the work area in a safe and tidy

Learning outcome

The learner will:

2. carry out all of the following maintenance activities, using appropriate methods and techniques:

Assessment criteria

- 2.1 dismantling equipment to an appropriate level (such as removal of oxygen mask expiratory valve, visor, NVG lenses and NVG Image intensifier tube)
- 2.2 cleaning the equipment using solutions and lubricate where applicable (such as visor, protective shell, NVG lenses and oxygen masks)
- 2.3 reassembling the equipment

Plus four more from the following:

- 2.4 replacing all 'lived' components
- 2.5 replacing all damaged or defective components
- 2.6 carrying out adjustments to components and connections (friction settings, etc)
- 2.7 examining the condition of components
- 2.8 checking the equipment operation and performance

Learning outcome

The learner will:

3. carry out a thorough examination of the 'above the neck' Aircrew Equipment Assemblies, to include checking ten of the following:

Assessment criteria

- 3.1 protective shell for damage and softness of shell
- 3.2 all of the protective shell for screws/fasteners for security
- 3.3 visors for scratches, abrasions and cracks
- 3.4 lenses for scratches, abrasions and cracks
- 3.5 image intensifier tubes for scratches, abrasions and cracks
- 3.6 hinge mechanisms for corrosion, damage, security, and adjust friction settings as required (such as visor)
- 3.7 mounting assemblies for corrosion, damage, completeness, security
- 3.8 battery and battery housing condition (such as NVG)
- 3.9 ear capsules for damage, wear, hardening, discoloration and security
- 3.10 'Mic/Tel' leads for deterioration or fraying
- 3.11 chin and neck strap for wear, damage, fraying and deterioration
- 3.12 oxygen mask hooks for damage, security and bending/distortion
- 3.13 electrical headsets for signs of damage and deterioration
- 3.14 ear pads and headbands for hardening or cracking
- 3.15 ear shells for free movement in their stirrups
- 3.16 microphone switches moves freely
- 3.17 optical adjustment controls move freely without undue slackness

3.18 boom microphone (if fitted) for insecurity and damage

Learning outcome

The learner will:

4. replace a range of components, to include twelve of the following:

Assessment criteria

- 4.1 visor (clear or tinted)
 - 4.2 pads (such as crown, brow or neck)
 - 4.3 side arm (outer and inner)
 - 4.4 ice guard filter
 - 4.5 base assembly oxygen mask hook
 - 4.6 ear capsule tensioning webbing
 - 4.7 strap assembly cable retaining
 - 4.8 transducer
 - 4.9 strap assembly (chin or neck)
 - 4.10 microphone switch
 - 4.11 headset electrical
 - 4.12 microphone boom
 - 4.13 ear capsule
 - 4.14 earphone
 - 4.15 down lead assembly
 - 4.16 fabric cover
 - 4.17 lining assembly (brow or neck)
 - 4.18 headband
 - 4.19 visor cover assembly
 - 4.20 earphone shell
 - 4.21 'Mic/Tel' lead (down lead and jack plug connector)
 - 4.22 image intensifier tube (IIT)
 - 4.23 object lens assembly (OLA)
 - 4.24 eye piece lens assembly (ELA)
 - 4.25 inspiratory Valve
 - 4.26 compensated Expiratory Valve
 - 4.27 anti-Suffocation Valve
 - 4.28 wire toggle harness assembly
-

Learning outcome

The learner will:

5. carry out maintenance requirements, in accordance with one of the following types of instructions

Assessment criteria

- 5.1 Urgent Technical Instructions (UTI)

- 5.2 Routine Technical Instructions (RTI)
 - 5.3 Maintenance Instructions (MI)
 - 5.4 Special Instructions (SI)
 - 5.5 Digital Air Publications (DAP)
-

Learning outcome

The learner will:

- 6. carry out maintenance work which complies with one or more of the following standards:

Assessment criteria

- 6.1 Civil Aviation Authority (CAA)
 - 6.2 Ministry of Defence (MoD)
 - 6.3 Federal Aviation Authority (FAA)
 - 6.4 ISO 9000 standards and procedures
 - 6.5 customer standards and requirements
 - 6.6 the organisations standards and procedures
-

Learning outcome

The learner will:

- 7. complete relevant maintenance records, to include one from the following, and pass it to the appropriate people:

Assessment criteria

- 7.1 service/maintenance schedule/log
 - 7.2 job cards
 - 7.3 record cards
-

Knowledge and understanding

- K1. The specific safety precautions and procedures to be observed whilst carrying out maintenance activities of the 'above the neck' Aircrew Equipment Assemblies (including any specific legislation, regulations or codes of practice relating to the activities, equipment or materials)
- K2. The importance of wearing appropriate protective clothing and equipment (PPE), and of keeping the work area safe and tidy
- K3. The hazards associated with carrying out activities on 'above the neck' Aircrew Equipment Assemblies, (such as handling solvents, equipment contamination, misuse of tools, using damaged or badly maintained tools and equipment, not following laid-down maintenance procedures), and how to minimise them
- K4. The importance of applying the appropriate behaviours in the workplace and the implications for both the apprentice and the organisation if these are not adhered to
- K5. The importance of tool segregation from tools used for other purposes when working with oxygen components

- K6. The servicing/maintenance schedules and specifications that are used during the maintenance activities, and the importance of following these
- K7. The basic principles of how the equipment functions, its operating sequence, the working purpose of individual units/components and how they interact
- K8. The types of faults, defects or wear characteristics that are likely to occur with 'above the neck' Aircrew Equipment Assemblies
- K9. How to determine when components require adjustment, repair or replacement
- K10. The components to be replaced and the method of replacement
- K11. The importance of the correct securing and locking of connections/components
- K12. How to identify the components to be used for the various types of 'above the neck' Aircrew Equipment Assemblies being maintained,
- K13. Applying approved test procedures; the safe working practices and procedures required when carrying out the various tests
- K14. Problems that can occur with the servicing procedures, and the importance of informing appropriate people of any defects
- K15. The importance of tool control, and the organisational tool control procedures to be used
- K16. The tools and equipment used in the maintenance activities, and their calibration/care and control procedures
- K17. The importance of ensuring that, when the servicing is completed, the equipment is free from dirt, swarf and foreign objects
- K18. The importance of leaving the work area in a safe and clean condition on completion of the activities (such as returning tools and equipment to its designated location, correct storage of any solvents used, cleaning the work area, along with removing and disposing of waste)
- K19. The recording documentation to be completed for the activities undertaken and, where appropriate, the importance of marking and identifying specific pieces of work in relation to the documentation
- K20. The extent of their own responsibility, and whom they should report to if they have problems that they cannot resolve

Unit 262

Maintaining (above the neck) Aircrew Equipment Assemblies (AEA)

Supporting Information

Unit guidance

Although all of the content and assessment requirements must be met in full employers can tailor the training outcomes to ensure that the content of the programme is specific to their requirements in terms of products, processes, procedures, tools, equipment, materials, documentation and information systems.

This will allow each organisation to develop their own specific and tailored apprentice training programme whilst meeting their own requirements whilst at the same time ensuring that the overall generic content is to a high standard in terms of depth and breadth to enable progression and/or transferability to other employers.

Unit 263

Maintaining (below the neck) Aircrew Equipment Assemblies (AEA)

Unit level:	Level 2
GLH:	100
Unit aim:	<p>This Employer Unit of Competence (EUC) has been developed by employers in the Aerospace and Aviation Sector and is part of an overall development programme designed to meet the requirements of the Sector, the published Apprenticeship Standard and Employer Occupational Brief.</p> <p>This EUC identifies the training and development required in order that the apprentice can demonstrate that they are competent in being able to carry out maintenance activities on 'below the neck' AEA, that will prepare them for entry into military aircraft related trades, creating a progression between education and employment, or providing a basis for the development of additional skills and occupational competences in the working environment. They will be expected to prepare for the AEA activities by obtaining all necessary information, documentation, tools and equipment required, and to plan how they intend to carry out the required activities and the sequence of operations they intend to use.</p> <p>They will be required to select the appropriate tools and equipment to use, based on the 'below the neck' AEA activity to be carried out. These activities will include: dismantling 'below the neck' aircrew equipment assemblies to the appropriate level, carrying out repairs and cleaning the various parts using suitable solutions. They will be expected to use a variety of skills and procedures, such as a thorough examination of the equipment and its associated parts, in line with the relevant schedule, identifying and replacing/repairing any 'lived' items, damaged, worn or defective parts. They will then reassemble below the neck aircrew equipment assemblies, make any required adjustments and where appropriate, check and test the equipment operation and performance.</p> <p>The apprentice's knowledge will provide an understanding of their work, and will provide an informed approach to applying the appropriate maintenance skills, techniques and procedures. They will have a basic understanding of the equipment being maintained, and its application, and will know about the maintenance requirements and equipment used, in adequate depth to provide a sound basis for carrying out the activities to the required specification.</p> <p>They will understand the safety precautions required when carrying out the maintenance operations. They will be required to demonstrate safe working practices throughout, and will understand the responsibility they owe to themselves and others in the workplace.</p>

They will be able to apply the appropriate behaviours required in the workplace to meet the job profile and overall company objectives, such as strong work ethic, positive attitude, team player, dependability, responsibility, honesty, integrity, motivation and commitment.

Relationship to NOS:

EUCAEF63

Performance Requirements

The learner can:

- P1 work safely at all times, complying with health and safety legislation, regulations and other relevant guidelines
- P2 demonstrate the required behaviours in line with the job role and organisational objectives
- P3 demonstrate the maintaining of 'below the neck' Aircrew Equipment Assemblies
- P4 identify the different types of 'below the neck' Aircrew Equipment Assemblies
- P5 obtain the correct tools and equipment for the 'below the neck' Aircrew Equipment Assemblies activity and check that they are in a serviceable condition
- P6 carry out the maintenance activities within the limits of their personal authority
- P6 carry out the maintenance activities within the limits of their personal authority
- P7 follow the relevant maintenance schedules to carry out the required work
- P8 use appropriate test methods and equipment to check the AEA activity meets all aspects of the specification
- P9 report any instances where the AEA activity cannot be fully met or where there are identified defects outside the planned schedule
- P10 complete relevant maintenance records accurately and pass them on to the appropriate person
- P11 dispose of waste materials in accordance with safe working practices and approved procedures

Learning outcome

The learner will:

1. carry out all of the following during the 'below the neck' Aircrew Equipment Assemblies maintenance activity:

Assessment criteria

- 1.1 adhere to procedures or systems in place for risk assessment, COSHH, Personal Protective Equipment (PPE) and other relevant safety regulations
- 1.2 follow job instructions and maintenance procedures to carry out the required activity
- 1.3 check that the tools, equipment and test instruments are within calibration date, and are in a safe and usable condition
- 1.4 ensure that the assembly is kept free from foreign objects, dirt or other contamination

- 1.5 return all tools and equipment to the correct location on completion of the activities
 - 1.6 leave the work area in a safe and tidy condition
-

Learning outcome

The learner will:

2. carry out all of the following maintenance activities, using appropriate methods and techniques:

Assessment criteria

- 2.1 dismantling equipment to an appropriate level (LSJ, PSTASS, PLB)
 - 2.2 cleaning the equipment (such as IPG, LSJ, Aircrew clothing) using appropriate solutions
 - 2.3 equipment repairs (such as IPG seals)
 - 2.4 reassembling the equipment
- Plus four more from the following:
- 2.5 replacing all `lived' components
 - 2.6 replacing all damaged or defective components
 - 2.7 carrying out adjustments to components and connections (such as, IPG, LSJ, PLB)
 - 2.8 examining the condition of components
 - 2.9 checking the equipment operation and performance
 - 2.10 testing equipment in accordance with the relevant air publication (AP)
-

Learning outcome

The learner will:

3. carry out a thorough examination of the 'below the neck' Aircrew Equipment Assemblies, to include checking ten of the following:

Assessment criteria

- 3.1 Personal Locator Beacon (PLB)
- 3.2 Automatic Life Preserver Inflation Unit (ALPIU)
- 3.3 gas cylinders
- 3.4 pyrotechnic signal kit
- 3.5 Future Aircrew Clothing (FAC's)
- 3.6 immersion coveralls (such as Mk20A and IPG)
- 3.7 anti G clothing (such as trousers)
- 3.8 pressure demand oxygen systems (such as, Personal equipment connector)
- 3.9 emergency oxygen system (such as, PSTASS)
- 3.10 garters/leg restraints
- 3.11 LSJ's (such as BALCS and modular LSJ types)
- 3.12 quick don passenger coverall
- 3.13 light marker distress (LMD)
- 3.14 aircrew cutter

- 3.15 aircrew survival aids
 - 3.16 sea light
 - 3.17 sea activated battery
-

Learning outcome

The learner will:

- 4. replace a range of components, to include sixteen of the following:

Assessment criteria

- 4.1 neck seal on IPG
- 4.2 anti G connectors
- 4.3 lacing cord
- 4.4 PLB O-ring seal
- 4.5 PLB Battery
- 4.6 signal distress day and night
- 4.7 LMD
- 4.8 personal survival aids
- 4.9 sea light
- 4.10 sea activated battery
- 4.11 stole
- 4.12 PLB Arial
- 4.13 PLB cable
- 4.14 modular survival aid pockets
- 4.15 cylinders
- 4.16 ALPIU
- 4.17 manual Op head
- 4.18 aircrew cutter
- 4.19 cleat
- 4.20 cutter lanyard
- 4.21 quick don
- 4.22 PSTASS Circlip
- 4.23 O-ring
- 4.24 second stage assembly
- 4.25 hose assembly
- 4.26 pressure gauge
- 4.27 charging cap
- 4.28 valve indent
- 4.29 port plug
- 4.30 spring clip
- 4.31 first stage assembly
- 4.32 cylinder assembly

Learning outcome

The learner will:

5. carry out maintenance repairs on 'below the neck' Aircrew Equipment Assemblies, to include three of the following types of repair:

Assessment criteria

- 5.1 hand sewn repair
 - 5.2 machine sewn repair
 - 5.3 adhesive repair
 - 5.4 heat repair
-

Learning outcome

The learner will:

6. carry out maintenance requirements, in accordance with one of the following types of instructions:

Assessment criteria

- 6.1 Urgent Technical Instructions (UTI)
 - 6.2 Routine Technical Instructions (RTI)
 - 6.3 Maintenance Instructions (MI)
 - 6.4 Special Instructions (SI)
 - 6.5 Digital Air Publications (DAP)
-

Learning outcome

The learner will:

7. carry out maintenance work which complies with one or more of the following standards:

Assessment criteria

- 7.1 Civil Aviation Authority (CAA)
 - 7.2 Ministry of Defence (MoD)
 - 7.3 Federal Aviation Authority (FAA)
 - 7.4 ISO 9000 standards and procedures
 - 7.5 customer standards and requirements
 - 7.6 the organisations standards and procedures
-

Learning outcome

The learner will:

8. complete relevant maintenance records, to include one from the following, and pass it to the appropriate people:

Assessment criteria

- 8.1 service/maintenance schedule/log
 - 8.2 job cards
 - 8.3 record cards
-

Knowledge and understanding

- K1. The specific safety precautions and procedures to be observed whilst carrying out maintenance activities of the 'below the neck' Aircrew Equipment Assemblies (including any specific legislation, regulations or codes of practice relating to the activities, equipment or materials)
- K2. The importance of wearing appropriate protective clothing and equipment (PPE), and of keeping the work area safe and tidy
- K3. The hazards associated with carrying out activities on 'below the neck' Aircrew Equipment Assemblies, (such as handling solvents, equipment contamination, misuse of tools, using damaged or badly maintained tools and equipment, not following laid-down maintenance procedures), and how to minimise them
- K4. The importance of applying the appropriate behaviours in the workplace and the implications for both the apprentice and the organisation if these are not adhered to
- K5. The servicing/maintenance schedules and specifications that are used during the maintenance activities, and the importance of following these
- K6. The basic principles of how the equipment functions, its operating sequence, the working purpose of individual units/components and how they interact
- K7. The types of faults, defects or wear characteristics that are likely to occur with 'below the neck' Aircrew Equipment Assemblies
- K8. How to determine when components require adjustment, repair or replacement
- K9. The components to be replaced and the method of replacement
- K10. The importance of the correct securing and locking of connections/components
- K11. How to identify the components to be used for the various types of 'below the neck' Aircrew Equipment Assemblies being maintained
- K12. Applying approved test procedures; the safe working practices and procedures required when carrying out the various tests
- K13. Problems that can occur during the maintenance of 'below the neck' Aircrew Equipment Assemblies, and the importance of informing appropriate people of any defects
- K14. The importance of tool control, and the organisational tool control procedures to be used
- K15. The tools and equipment used in the maintenance activities, and their calibration/care and control procedures
- K16. The importance of ensuring that, when the maintenance activity is completed, the equipment is free from dirt, swarf and foreign objects
- K17. The importance of leaving the work area in a safe and clean condition on completion of the activities (such as returning tools and equipment to its designated location, correct storage of any solvents used, cleaning the work area, along with removing and disposing of waste)
- K18. The recording documentation to be completed for the activities undertaken and, where appropriate, the importance of marking and identifying specific pieces of work in relation to the documentation

K19. The extent of their own responsibility, and whom they should report to if they have problems that they cannot resolve

Unit 263

Maintaining (below the neck) Aircrew Equipment Assemblies (AEA)

Supporting Information

Unit guidance

Although all of the content and assessment requirements must be met in full employers can tailor the training outcomes to ensure that the content of the programme is specific to their requirements in terms of products, processes, procedures, tools, equipment, materials, documentation and information systems.

This will allow each organisation to develop their own specific and tailored apprentice training programme whilst meeting their own requirements whilst at the same time ensuring that the overall generic content is to a high standard in terms of depth and breadth to enable progression and/or transferability to other employers.

Unit 264

Maintaining Survival Equipment Systems and Associated Equipment

Unit level:	Level 2
GLH:	90
Unit aim:	<p>This Employer Unit of Competence (EUC) has been developed by employers in the Aerospace and Aviation Sector and is part of an overall development programme designed to meet the requirements of the Sector, the published Apprenticeship Standard and Employer Occupational Brief.</p> <p>This EUC identifies the training and development required in order that the apprentice can demonstrate that they are competent in being able to carry out maintenance activities on survival equipment systems and associated equipment, that will prepare them for entry into military aircraft related trades, creating a progression between education and employment, or providing a basis for the development of additional skills and occupational competences in the working environment. They will be expected to prepare for the survival equipment systems and associated equipment activities by obtaining all necessary information, documentation, tools and equipment required, and to plan how they intend to carry out the required activities and the sequence of operations they intend to use.</p> <p>They will be required to select the appropriate tools and equipment to use, based on the survival equipment systems and associated equipment activity to be carried out. These activities will include: dismantling the equipment to the appropriate level, gas charging, survival equipment packing and component cleaning. They will be expected to use a variety of skills and procedures, such as a thorough examination of the equipment and its associated parts, in line with the relevant schedule, identifying and replacing any 'lived' items, damaged, worn or defective parts. They will then reassemble the equipment and where appropriate, check and test the equipment operation and performance.</p> <p>The apprentice's knowledge will provide an understanding of their work, and will enable them to apply appropriate maintenance skills, techniques and procedures. They will understand the maintenance process, and its application, and will know about the aircraft survival equipment being maintained, the equipment components, tools and consumables used to the required depth to provide a sound basis for carrying out the activities to the required specification.</p> <p>Their responsibilities will require them to comply with organisational policy and procedures for the servicing activities undertaken, and to report any problems with these activities that they cannot personally resolve, or that are outside their permitted authority, to the relevant</p>

people. They will understand the safety precautions required when carrying out the servicing operations.

They will be required to demonstrate safe working practices throughout, and will understand the responsibility they owe to themselves and others in the workplace.

They will be able to apply the appropriate behaviours required in the workplace to meet the job profile and overall company objectives, such as strong work ethic, positive attitude, team player, dependability, responsibility, honesty, integrity, motivation and commitment.

**Relationship
to NOS:**

EUCAE64

Performance Requirements

The learner can:

- P1 work safely at all times, complying with health and safety legislation, regulations and other relevant guidelines
- P2 demonstrate the required behaviours in line with the job role and organisational objectives
- P3 demonstrate the maintaining of survival equipment systems and associated equipment
- P4 identify the different types of survival equipment systems and associated equipment
- P5 obtain the correct tools and equipment for the survival equipment systems and associated equipment activity and check that they are in a serviceable condition
- P6 carry out the maintenance activities within the limits of their personal authority
- P7 follow the relevant maintenance schedules to carry out the required work
- P8 use appropriate test methods and equipment to check the survival equipment systems and associated equipment activity meets all aspects of the specification
- P9 report any instances where the survival equipment systems and associated equipment activities cannot be fully met or where there are identified defects outside the planned schedule
- P10 complete relevant maintenance records accurately and pass them on to the appropriate person
- P11 dispose of waste materials in accordance with safe working practices and approved procedures,

Learning outcome

The learner will:

1. carry out all of the following during the survival equipment systems and associated equipment activity:

Assessment criteria

- 1.1 adhere to procedures or systems in place for risk assessment, COSHH, Personal Protective Equipment (PPE) and other relevant safety regulations

- 1.2 follow job instructions and maintenance procedures to carry out the required activity
 - 1.3 check that the tools, equipment and test instruments are within calibration date, and are in a safe and usable condition
 - 1.4 ensure that the assembly is kept free from foreign objects, dirt or other contamination
 - 1.5 return all tools and equipment to the correct location on completion of the activities
 - 1.6 leave the work area in a safe and tidy condition
-

Learning outcome

The learner will:

2. carry out all of the following maintenance activities, using appropriate methods and techniques:

Assessment criteria

- 2.1 Dismantling equipment to an appropriate level (such as PSP, QRF and inertia reel)
 - 2.2 cleaning the equipment and lubricate where applicable
 - 2.3 re-assembling the equipment
- Plus four more from the following:
- 2.4 replacing any 'lived' components
 - 2.5 replacing any damaged or defective components
 - 2.6 examining the condition of components
 - 2.7 gas charging
 - 2.8 packing of survival equipment
 - 2.9 testing the equipment in accordance with the relevant air publication (AP)
-

Learning outcome

The learner will:

3. carry out a thorough examination of the survival equipment system and associated equipment, to include checking ten of the following:

Assessment criteria

- 3.1 Reverse Osmosis Pump
- 3.2 Automatic Liferaft Inflation Unit (ALIU)
- 3.3 operating head
- 3.4 gaseous cylinders
- 3.5 single seat liferafts
- 3.6 multi seat liferafts
- 3.7 liferaft containers/stowages (such as F type, G Type)
- 3.8 Personal Survival Packs
- 3.9 QRF
- 3.10 grabbit Hook
- 3.11 hi line assembly
- 3.12 passenger restraint harness (such as type AB)

- 3.13 inertia reel
 - 3.14 aircrew restraint harness
-

Learning outcome

The learner will:

- 4. replace a range survival equipment system components, to include twenty of the following:

Assessment criteria

- 4.1 springs, washers, circlips, screws
- 4.2 drive shaft & damper assemblies
- 4.3 aircrew harness straps
- 4.4 aircrew harness buckles
- 4.5 knob screw
- 4.6 cover plate
- 4.7 compression spring
- 4.8 knob locking ring
- 4.9 locking screw sleeve
- 4.10 lockwire, half round
- 4.11 locking pin
- 4.12 locking pin spring
- 4.13 locking screw
- 4.14 retaining pin, locking screw sleeve
- 4.15 guide bush
- 4.16 static locking plunger
- 4.17 locking plunger spring
- 4.18 combined torsion and compression spring RH and LH
- 4.19 locking plunger RH and LH
- 4.20 lifting plate
- 4.21 operating plunger
- 4.22 body sub assembly
- 4.23 catch pin
- 4.24 self-lock pin
- 4.25 bearing block
- 4.26 signal distress day and night
- 4.27 lamp and sea activated battery
- 4.28 personal survival aids
- 4.29 bellows
- 4.30 CO2 cylinder disc bushes and bursting disc
- 4.31 painter line
- 4.32 drogue
- 4.33 pack opening cable
- 4.34 seal washer

- 4.35 cutter spindle
 - 4.36 o-seal
 - 4.37 steel balls
 - 4.38 main spring
 - 4.39 spring retainer
 - 4.40 firing pin
 - 4.41 cap nut
 - 4.42 manual operating cable
 - 4.43 operating lever
 - 4.44 operating lever pivot bolt
 - 4.45 piston sleeve
 - 4.46 piston
 - 4.47 ALIU sea activated battery
 - 4.48 two pin plug
 - 4.49 squib holder
-

Learning outcome

The learner will:

- 5. carry out servicing requirements, in accordance with one of the following types of instructions:

Assessment criteria

- 5.1 Urgent Technical Instructions (UTI)
 - 5.2 Routine Technical Instructions (RTI)
 - 5.3 Maintenance Instructions (MI)
 - 5.4 Special Instructions (SI)
 - 5.5 Digital Air Publications (DAP)
-

Learning outcome

The learner will:

- 6. carry out servicing work which complies with one or more of the following standards:

Assessment criteria

- 6.1 Civil Aviation Authority (CAA)
- 6.2 Ministry of Defence (MoD)
- 6.3 Federal Aviation Authority (FAA)
- 6.4 ISO 9000 standards and procedures
- 6.5 customer standards and requirements
- 6.6 the organisations standards and procedures

Learning outcome

The learner will:

7. complete the relevant servicing records, to include one from the following, and pass it to the appropriate people:

Assessment criteria

- 7.1 servicing/maintenance schedule/log
- 7.2 job cards
- 7.3 record cards

Knowledge and understanding

- K1. The specific safety precautions and procedures to be observed whilst carrying out the servicing of the survival equipment systems and associated equipment (including any specific legislation regulations or codes of practice relating to the activities, equipment or materials)
- K2. The health and safety requirements of the work area in which they are carrying out the servicing activities, and the responsibility these requirements place on them
- K3. The hazards associated with servicing survival equipment systems and associated equipment, and how they can be minimised
- K4. The importance of applying the appropriate behaviours in the workplace and the implications for both the apprentice and the organisation if these are not adhered to
- K5. The personal protective equipment that they need to use during the servicing activities, and where it can be obtained
- K6. The servicing/maintenance schedules and specifications that are used during the servicing activities, and the importance of following the procedures listed in these documents (to include Urgent Technical Instructions (UTI), satisfying Routine Technical Instructions (RTI), Maintenance Instructions (MI), Special Instructions (SI))
- K7. The types of faults, defects or wear characteristics that are likely to occur with the survival equipment systems and associated equipment
- K8. How to determine when components require adjustment, repair or replacement
- K9. The components to be replaced in the survival equipment systems and associated equipment, and the method of replacement
- K10. The importance of the correct securing and locking of connections
- K11. How to identify the components to be used for the survival equipment systems and associated equipment being serviced
- K12. The quality control procedures to be followed during the servicing procedures
- K13. How to conduct any necessary checks to ensure that the equipment functions to specification
- K14. The problems that can occur with the servicing of the survival equipment systems and associated equipment, and the importance of informing appropriate people of any defects
- K15. The importance of tool control, and the organisational tool control procedures to be used
- K16. The tools and equipment used in the servicing activities, and their calibration/care and control procedures

- K17. The importance of ensuring that, when the servicing is completed, the equipment is free from dirt, swarf and foreign objects
- K18. The disposal methods for waste and petrol, oil and lubricants (pol)
- K19. The recording documentation to be completed for the activities undertaken and where appropriate, the importance of marking and identifying specific pieces of work in relation to the documentation
- K20. The extent of their own responsibility, and whom they should report to if they have problems that they cannot resolve

Unit 264

Maintaining Survival Equipment Systems and Associated Equipment

Supporting Information

Unit guidance

Although all of the content and assessment requirements must be met in full employers can tailor the training outcomes to ensure that the content of the programme is specific to their requirements in terms of products, processes, procedures, tools, equipment, materials, documentation and information systems.

This will allow each organisation to develop their own specific and tailored apprentice training programme whilst meeting their own requirements whilst at the same time ensuring that the overall generic content is to a high standard in terms of depth and breadth to enable progression and/or transferability to other employers.

Unit 265

Producing Components using Mechanical Hand Skills for Aircraft Maintenance Technicians

Unit level:	Level 2
GLH:	100
Unit aim:	<p>This Employer Unit of Competence (EUC) has been developed by employers in the Aerospace and Aviation Sector and is part of an overall development programme designed to meet the requirements of the Sector, the published Apprenticeship Standard and Employer Occupational Brief.</p> <p>This EUC identifies the training and development required in order that the apprentice can demonstrate that they are competent in being able to cover a range of hand skill activities that will prepare them for entry into aircraft related trades, creating a progression between education and employment, or providing a basis for the development of additional skills and occupational competences in the working environment.</p> <p>They will be expected to prepare for the mechanical hand skill activities by obtaining all necessary information, documentation, tools and equipment required, and to plan how they intend to carry out the required activities and the sequence of operations they intend to use. The apprentice will be required to select the appropriate tools equipment to use, based on the operations to be carried out and the accuracy required. In undertaking the hand skill activity the apprentice will be expected to use appropriate tools and equipment to mark out the material for a range of features to be produced, and then use hand tools, along with shaping and fitting techniques appropriate to the type of material and operation being performed. These activities will include hand sawing, filing and drilling. The components produced will have features that include flat, square, parallel and angular faces, radii and curved profiles, drilled holes, internal and external threads.</p> <p>During and on completion of the hand skills activity, the apprentice will be expected to check the quality of their work using measuring equipment appropriate to the aspects being checked and the tolerances to be achieved. The apprentice will need to recognise defects, to take appropriate action to remedy any faults that occur and to ensure that the finished product is within the drawing requirements. They will work under a high level of supervision, whilst taking responsibility for their own actions and for the quality and accuracy of the work that they carry out. On completion of the activities the apprentice will be expected to return all tools and equipment to the correct locations and to leave the work area in a safe and tidy condition.</p> <p>The apprentice's knowledge will provide an understanding of their work, and will enable them to apply appropriate hand skill techniques safely. They will understand the hand skills, and their application, and will know about the equipment materials and consumables, to the required depth to provide a sound basis for carrying out the activities to the required specification. The apprentice's responsibilities will require them to comply with health and safety requirements and organisational policy and procedures for the activities undertaken. They will understand the safety precautions required when</p>

	<p>carrying out the mechanical hand skill activities, and when using relevant tools and equipment; and will also be required to demonstrate safe working practices throughout, and will understand the responsibility they owe to themselves and others in the workplace.</p> <p>They will be able to apply the appropriate behaviours required in the workplace to meet the job profile and overall organization objectives, such as strong work ethic, positive attitude, team player, dependability, responsibility, honesty, integrity, motivation and commitment.</p>
Relationship to NOS:	EUCAE65

Performance Requirements

The learner can:

- P1 demonstrate the required behaviours in line with the job role and organisational objectives
- P2 work safely at all times, complying with health and safety legislation, regulations and other relevant guidelines
- P3 produce components using mechanical hand skills/fabrication techniques
- P4 plan the hand skill activities before they start them, obtaining the relevant publications and technical instructions
- P5 obtain the appropriate tools and equipment for the hand skill activities, and check that they are in a safe and usable condition
- P6 mark out the components for the required activity, using appropriate tools and techniques
- P7 cut and shape the materials to the required specification, using appropriate tools and techniques
- P8 measure and check that all dimensional and geometric aspects of the component are to specification
- P9 dispose of waste materials in accordance with safe working practices and approved procedures

Learning outcome

The learner will:

- 1 carry out all of the following during the hand skill activity:

Assessment criteria

- 1.1 adhere to procedures or systems in place for risk assessment, COSHH, personal protective equipment (PPE) and other relevant safety regulations
- 1.2 follow job instructions, engineering drawings and procedures
- 1.3 ensure that all tools and equipment to be utilised are in a safe, usable condition and within calibration date where appropriate
- 1.4 ensure that the system is kept free from foreign objects, dirt or other contamination

- 1.5 pre-use checks and where appropriate zero checks on precision measuring instruments/equipment
 - 1.6 return all tools and equipment to the correct location on completion of the hand skill activity
 - 1.7 leave the work area in a safe and tidy condition on completion of the hand skill activity
-

Learning outcome

The learner will:

- 2 use a range of marking out equipment, to include all of the following:

Assessment criteria

- 2.1 rules/tapes
 - 2.2 dividers/trammels
 - 2.3 scribes
 - 2.4 punches
 - 2.5 scribing blocks
 - 2.6 squares
 - 2.7 protractor
 - 2.8 vernier instruments
-

Learning outcome

The learner will:

- 3 mark out a range of material forms, to include two of the following:

Assessment criteria

- 3.1 square/rectangular (such as bar stock, sheet material, machined components)
 - 3.2 circular/cylindrical (such as bar stock, tubes, turned components, flat discs)
 - 3.3 sections (such as angles, channel, tee section, joists, extrusions)
 - 3.4 irregular shapes (such as castings, forgings, odd shaped components)
-

Learning outcome

The learner will:

- 4 mark out accurate dimensions and profiles on one of the following types of material during the hand skill activity:

Assessment criteria

- 4.1 aluminium/aluminium alloy
- 4.2 low carbon/mild steel
- 4.3 composite
- 4.4 plastic/nylon/synthetic
- 4.5 other specific material

Using two of the following marking out methods:

- 4.6 direct marking using instruments
- 4.7 use of templates
- 4.8 tracing/transfer methods

To include all of the following features:

- 4.9 datum/centre lines
- 4.10 square/rectangular profiles
- 4.11 circles
- 4.12 radial profiles
- 4.13 linear hole positions

Plus one more from the following:

- 4.14 angles/angular profiles
 - 4.15 radial hole positions
 - 4.16 allowances for bending
 - 4.17 simple pattern development
-

Learning outcome

The learner will:

- 5 cut and shape the material to the required specification, using appropriate tools and techniques using both of the following techniques:

Assessment criteria

- 5.1 filing
 - 5.2 hand sawing
-

Learning outcome

The learner will:

- 6 produce components which combine different operations and have features that cover all of the following:

Assessment criteria

- 6.1 flat datum faces
- 6.2 faces which are square to each other
- 6.3 curved profiles
- 6.4 drilled through holes
- 6.5 reamed holes
- 6.6 internal threads
- 6.7 external threads

Plus two from the following:

- 6.8 faces that are parallel to each other
- 6.9 faces angled to each other
- 6.10 holes drilled to a depth

- 6.11 chamfers and radii
 - 6.12 counterbore, countersink or spotface
 - 6.13 sliding or mating parts
-

Learning outcome

The learner will:

- 7 using the correct tools and equipment carry out the necessary checks for accuracy, as appropriate from the following:

Assessment criteria

- 7.1 linear dimensions
 - 7.2 flatness
 - 7.3 squareness
 - 7.4 angles
 - 7.5 profiles
 - 7.6 hole position
 - 7.7 hole size/fit
 - 7.8 depths
 - 7.9 thread size and fi
 - 7.10 surface finish
-

Learning outcome

The learner will:

- 8 use seven of the following types of precision measuring instruments/measuring equipment during the hand skill activities:

Assessment criteria

- 8.1 engineers rule
- 8.2 micrometers
- 8.3 vernier calipers
- 8.4 vernier bevel protractor
- 8.5 vernier height gauges
- 8.6 vernier depth gauges
- 8.7 optical depth micrometer
- 8.8 Dial Test indicators (DTI)
- 8.9 cylinder gauge
- 8.10 bore/hole gauges
- 8.11 squares
- 8.12 feeler gauges
- 8.13 thread gauges
- 8.14 non-adjustable gauges such as: Plug, Calliper and Profile
- 8.15 protractors

Learning outcome

The learner will:

9 produce components to all the following standards as applicable to the process:

Assessment criteria

- 9.1 components to be free from false tool cuts, burrs and sharp edges
- 9.2 components conform to the design requirements e.g. BS 4500, ISO system of limits or to a general dimensional tolerance as stated in the engineering/assembly drawing, typically +/- 0.4mm or +/- 0.015"
- 9.3 angles tolerance as stated in the engineering/assembly drawing typically +/- 1 degree
- 9.4 screw threads to a recognized engineering standard as identified in the engineering/assembly drawing such as: BSF, UNC, UNF
- 9.5 hole finishing tolerance as stated in the engineering/assembly drawing e.g. ISO 286-2 H8
- 9.6 flatness and squareness as stated in the engineering/assembly drawing e.g. 0.05mm per 25mm or 0.002"

Knowledge and understanding

- K1 the health and safety requirements, and safe working practices and procedures required for the work area in which the hand skills activity is taking place
- K2 the importance of wearing appropriate protective clothing and equipment (PPE), and of keeping the work area safe and tidy
- K3 the hazards associated with carrying out the hand skill activities (such as correct tool and equipment selection and handling, component protection during fabrication, not following laid-down procedures), and how to minimise them
- K4 the importance of applying the appropriate behaviours in the workplace and the implications for both the apprentice and the organisation if these are not adhered to
- K5 the need for accurate measurement in the production and maintenance of aircraft components using imperial and metric systems of measurement
- K6 the construction, safe storage and use, including pre-use, zero and calibration checks of precision measuring instruments (
- K7 explain how to set and adjust tools (such as squares, protractors and verniers)
- K8 the common system of fits and clearances to include the types of fits used for aircraft and engines (Clearance Fit, Interference Fit and Transition Fit) and the association with unilateral and bilateral tolerances
- K9 how to interpret engineering drawings, specifications, and their utilisation in aircraft related environments
- K10 how to interpret first and third angle drawings and associated views
- K11 the procedure for obtaining drawings, job instructions, related specifications, replacement parts, materials and other consumables necessary for the activities
- K12 how the composition and quality of metals are controlled by various authorities, including the various methods of identification e.g. colour scheme, specification markings and gauge

- K13 how to preserve metal identification markings when cutting metal including bars and tubes for fabrication activities
- K14 the purpose of selected fabrication tools and equipment e.g. Clamps, Vee Blocks, Scribing tools, Surface table/plates, Vices, Hammers, Punches, Cutting tools, File types, Combination sets,
- K15 the importance of using tools only for the purpose intended; the care that is required when using the equipment and tools; the proper way of storing tools and equipment between operations
- K16 the cutting and shaping methods to be used, and the sequence in which the operations are to be carried out
- K17 the importance of ensuring file handles are secure and free from embedded foreign bodies or splits
- K18 the various types of file that are available, and the cut of files for different applications
- K19 How to file flat, square and curved faces, and how to achieve a smooth surface finish (such as draw filing, the use of abrasive cloth, lapping using abrasive pastes)
- K20 how to correctly identify twist drills: size and grade
- K21 the correct procedure for drilling holes including: material preparation, centre punch, pilot holes and the need for lubrication
- K22 how to determine the drill size for tapped holes, and the importance of using taps in the correct sequence
- K23 the purpose and identification of parallel and taper reamers
- K24 the three basic types of taper pin, how they are identified, their purpose and how to prepare a tapered hole for taper pin insertion
- K25 the procedures for fitting, locking and removing the three basic types of taper pin
- K26 how to cut and repair internal and external screw threads, including the procedure to follow when cutting matching internal and external threads
- K27 the use of jaw plates to protect the work-piece from damage
- K28 how to carry out pre-use checks that tools and equipment are free from damage or defect, are in a safe and usable condition, are within calibration, and are configured correctly for the intended purpose
- K29 the different types of common non-adjustable gauges available, the purpose, application and the importance of safe handling and storage
- K30 the precautions to be taken to maintain the protective finish during fabrication, to include the safe removal of swarf
- K31 the problems associated with the Hand skills activities, and how they can be overcome
- K32 when to act on their own initiative and when to seek help and advice from others
- K33 the importance of leaving the work area and equipment in a safe and clean condition on completion of the maintenance activities (such as returning hand tools and test equipment to the designated locations, cleaning the work area, and removing and disposing of waste).

Unit 265

Producing Components using Mechanical Hand Skills for Aircraft Maintenance Technicians

Supporting Information

Unit guidance

Assessment requirements for this have been developed by employers for the occupational competency units and qualifications for the Aerospace and Aviation Sector. These assessment requirements are set down in the Aerospace Engineering Employer Occupational Unit Assessment Strategy

Although all of the content and assessment requirements must be met in full employers can tailor the training outcomes to ensure that the content of the programme is specific to their requirements in terms of products, processes, procedures, tools, equipment, materials, documentation and information systems.

This will allow each organisation to develop their own specific and tailored apprentice training programme whilst meeting their own requirements whilst at the same time ensuring that the overall generic content is to a high standard in terms of depth and breadth to enable progression and/or transferability to other employers.

Unit 266

Aircraft Structural Husbandry

Unit level:	Level 2
GLH:	65
Unit aim:	<p>This Employer Unit of Competence (EUC) has been developed by employers in the Aerospace and Aviation Sector and is part of an overall development programme designed to meet the requirements of the Sector, the published Apprenticeship Standard and Employer Occupational Brief.</p> <p>This EUC identifies the training and development required in order that the apprentice can demonstrate that they are competent in being able to undertake structural husbandry activities on aircraft that will prepare them for entry into military aircraft related trades, creating a progression between education and employment, or providing a basis for the development of additional skills and occupational competences in the working environment.</p> <p>They will be expected to prepare for structural husbandry activities by obtaining all necessary information, documentation, tools and equipment required, and to plan how they intend to carry out the required activities and the sequence of operations they intend to use. The apprentice will be required to select the appropriate equipment to use for the type of aircraft being maintained and the structural husbandry activity to be carried out.</p> <p>They will work under a high level of supervision, whilst taking responsibility for their own actions and for the quality and accuracy of the work that they carry out. On completion of the activities, the apprentice will be expected to return all tools and equipment to the correct locations and to leave the work area in a safe and tidy condition.</p> <p>The apprentice's responsibilities will require them to comply with health and safety requirements and organisational policy and procedures for the activities undertaken. They will understand the safety precautions required when carrying out structural husbandry activities, and when using relevant tools and equipment; and will also be required to demonstrate safe working practices throughout, and will understand the responsibility they owe to themselves and others in the workplace.</p> <p>The apprentice's knowledge will provide an understanding of their work, and will enable them to apply appropriate techniques and procedures safely. They will understand the process, and its application, and will know about the aircraft equipment being maintained, the equipment components, tools and consumables used, to the required depth to provide a sound basis for carrying out the activities to the required specification. They will be able to apply the appropriate behaviours required in the workplace to meet the job profile and overall</p>

organization objectives, such as strong work ethic, positive attitude, team player, dependability, responsibility, honesty, integrity, motivation and commitment.

**Relationship
to NOS:**

EUCAEF66

Performance Requirements

The learner can:

- P1 demonstrate the required behaviours in line with the job role and organisational objectives
 - P2 work safely at all times, complying with health and safety legislation, regulations and other relevant guidelines
 - P3 follow the relevant maintenance schedules to carry out the required examination of aircraft structure/components
 - P4 plan and prepare all necessary tools and equipment before they start the activity
 - P5 prepare and configure the aircraft for the structural husbandry activities within the limits of their personal authority
 - P6 carry out the structural husbandry activities in the specified sequence and in an agreed timescale
 - P7 complete relevant maintenance records accurately reporting any instances where the structural husbandry activities cannot be fully met or where there are identified defects outside the planned schedule
 - P8 dispose of any waste materials in accordance with safe working practices and approved procedures.
-

Learning outcome

The learner will:

- 1 carry out all of the following during the activity:

Assessment criteria

- 1.1 adhere to procedures or systems in place for risk assessment, COSHH, personal protective equipment (PPE) and other relevant safety regulations
- 1.2 ensure the safe isolation of equipment, where appropriate, (such as mechanical, electrical, gas, air or fluids),
- 1.3 follow job instructions, maintenance drawings or procedures
- 1.4 carry out pre-use checks and examinations on the tools and equipment to be utilised ensuring they are in a safe and usable condition
- 1.5 return all tools and equipment to the correct location on completion of the activities
- 1.6 deal promptly and effectively with problems within their control and seek help and guidance from the relevant people if they have problems that they cannot resolve
- 1.7 leave the work area in a safe and tidy condition on completion of the Structural Husbandry activities.

Learning outcome

The learner will:

- 2 examine aircraft structure/components ensuring:

Assessment criteria

- 2.1 an accurate assessment of damage is made
 - 2.2 defects are correctly identified and classified in relation to the aircraft document set
-

Learning outcome

The learner will:

- 3 ensure that the lifting and trestling/shoring equipment to be used is correct for the aircraft being lifted and is in a safe and usable condition, by establishing all of the following as appropriate:

Assessment criteria

- 3.1 the lifting and trestling/shoring equipment selected is complete and as specified for the aircraft being lifted (such as type, lifting capacity, (SWL))
 - 3.2 ensure all adjustable legs, locking rings, screw jacks, ratchets and release valves are free to move
 - 3.3 ensure any attachment bolts are tight
 - 3.4 ensure no fluid leaks are present and the fluid level is correct
 - 3.5 functional check to ensure correct operation
-

Learning outcome

The learner will:

- 4 ensure aircraft is safe for jacking operations by carrying out all of the following as appropriate to type:

Assessment criteria

During raising operations:

- 4.1 aircraft documentation checked
- 4.2 aircraft on hard level ground
- 4.3 aircraft fuelled in accordance with aircraft document set for jacking
- 4.4 adequate clearance around and above aircraft
- 4.5 correct equipment selected, pre-use checks carried out, positioned
- 4.6 aircraft is clear of personnel
- 4.7 wheel brakes off and chocks removed
- 4.8 ground locks fitted

During lowering operations:

- 4.9 aircraft documentation checked
- 4.10 landing gear down and locked

- 4.11 ground locks fitted
 - 4.12 tyres inflated to correct pressure
 - 4.13 shock absorbers inflated to correct pressure
 - 4.14 wheel brakes off and FOD check beneath tyres carried out (Lowering operations)
 - 4.15 aircraft is clear of personnel
 - 4.16 area below aircraft is clear of obstructions e.g. ground equipment.
-

Learning outcome

The learner will:

- 5 carry out all of the following aircraft lifting operations:

Assessment criteria

- 5.1 determining the correct lifting/jacking points on the aircraft
 - 5.2 positioning the lifting/jacking equipment correctly on the aircraft including jack leg orientation
 - 5.3 raise an aircraft off the ground using aircraft lifting jacks
 - 5.4 aircraft trestling operation
 - 5.5 lower an aircraft to the ground using aircraft lifting jacks
-

Learning outcome

The learner will:

- 6 carry out aircraft symmetry checks ensuring all of the following:

Assessment criteria

- 6.1 aircraft documentation checked
- 6.2 correct equipment selected and pre-use checks carried out
- 6.3 aircraft is correctly configured into position
- 6.4 accurate recording of post symmetry check results

Using the following equipment as appropriate to aircraft type and detailed in the aircraft document set:

- 6.5 steel tape measure
- 6.6 spring balance
- 6.7 datum/rigging pins
- 6.8 clinometer
- 6.9 spirit level & rigging/datum boards or levelling lugs
- 6.10 tensioning blocks
- 6.11 plumb bob & target (grid) plate
- 6.12 sighting rods & Theodolite

Learning outcome

The learner will:

- 7 carry out aircraft rigging checks including mechanical adjustment to one of the following:

Assessment criteria

- 7.1 flying control systems
7.2 undercarriage and retardation systems
-

Learning outcome

The learner will:

- 8 complete the relevant maintenance records, to include one from the following, and pass it to the appropriate people:

Assessment criteria

- 8.1 servicing/maintenance schedule/log
8.2 job cards
8.3 aircraft service/flight log
8.4 organisation specific documentation
-

Knowledge and understanding

- K1 the health and safety requirements, and safe working practices and procedures required for the activities undertaken
- K2 the importance of wearing appropriate protective clothing and equipment (PPE), and of keeping the work area safe and tidy
- K3 the hazards associated with carrying out structural husbandry maintenance activities (such as cockpit entry, working at height, application of ground power, hydraulics, flight control surfaces, fuel, oils and gases, misuse of tools or test equipment, not following laid-down maintenance procedures), and how to minimise them
- K4 the importance of applying the appropriate behaviours in the workplace and the implications for both the apprentice and the organisation if these are not adhered to
- K5 the system isolation procedures that apply
- K6 how to carry out pre-use checks that tools and equipment are free from damage or defect, are in a safe and usable condition, are within calibration, and are configured correctly for the intended purpose
- K7 how to obtain and interpret drawings, specifications, manufacturers' manuals and other documents needed for the structural husbandry maintenance activity
- K8 the aerodynamic and structural loads to which an airframe structure may be subjected
- K9 the different classifications of aircraft structure
- K10 the various classifications of damage and repair and the importance of accurate damage assessment
- K11 the various tools that can be used in the location and assessment of damage
- K12 how Non Destructive Testing (NDT) methods can assist in the maintenance of aircraft

- K13 how to check that systems meet the required specification/operating conditions
- K14 the basic principles of how the equipment functions, its operating sequence, the working purpose of individual units/components and how they interact
- K15 how to make adjustments to components/assemblies to ensure they function correctly (such as setting travel and working clearances)
- K16 the various aircraft jacking equipment available for use on aircraft maintenance operations and recognise the main components of aircraft lifting jacks and their operation
- K17 the common terms applicable to aircraft jacking operations including the term 'stress jacking'
- K18 the procedures to be observed during trestling and jacking operations, both lifting and lowering and for the correct location and position of ground support equipment
- K19 the inspection routines and methods of composite materials, the types of damage and their causes
- K20 the common types of damage and possible causes to aircraft transparencies and where to find information on damage limitation
- K21 the importance of completing maintenance documentation and/or reports following the maintenance activity
- K22 how to use lifting and handling equipment in the maintenance activity
- K23 the problems associated with the maintenance activity, and how they can be overcome
- K24 when to act on their own initiative and when to seek help and advice from others
- K25 the importance of maintaining aircraft surface finish and the benefits of doing so
- K26 the importance of leaving the work area and equipment in a safe and clean condition on completion of the maintenance activities (such as returning hand tools and test equipment to the designated locations, cleaning the work area, and removing and disposing of waste).

Unit 266

Aircraft Structural Husbandry

Supporting Information

Unit guidance

Assessment requirements for this have been developed by employers for the occupational competency units and qualifications for the Aerospace and Aviation Sector. These assessment requirements are set down in the Aerospace Engineering Employer Occupational Unit Assessment Strategy.

Although all of the content and assessment requirements must be met in full employers can tailor the training outcomes to ensure that the content of the programme is specific to their requirements in terms of products, processes, procedures, tools, equipment, materials, documentation and information systems.

This will allow each organisation to develop their own specific and tailored apprentice training programme whilst meeting their own requirements whilst at the same time ensuring that the overall generic content is to a high standard in terms of depth and breadth to enable progression and/or transferability to other employers.

Unit 267

Diagnosis, Rectification and Testing of Military Aircraft Mechanical Systems

Unit level:	Level 2
GLH:	100
Unit aim:	<p>This Employer Unit of Competence (EUC) has been developed by employers in the Aerospace and Aviation Sector and is part of an overall development programme designed to meet the requirements of the Sector, the published Apprenticeship Standard and Employer Occupational Brief.</p> <p>This EUC identifies the training and development required in order that the apprentice can demonstrate that they are competent in being able to cover diagnosis, rectification and testing activities on aircraft mechanical systems that will prepare them for entry into military aircraft related trades, creating a progression between education and employment, or providing a basis for the development of additional skills and occupational competences in the working environment.</p> <p>They will be expected to prepare for the diagnosis, rectification and testing activities by obtaining all necessary information, documentation, tools and equipment required, and to plan how they intend to carry out the required maintenance activities and the sequence of operations they intend to use.</p> <p>The apprentice will be required to select the appropriate equipment to use, based on the diagnosis, rectification and testing finding to be carried out and the type of aircraft being maintained. This may include equipment such as inspection aids, test equipment, standard tool kits, and other organisation-specific equipment. They will be expected to use a variety of maintenance inspection techniques and procedures, such as gathering information from aircrew/operator debriefs, inspecting, operating and testing the equipment. They will work under a high level of supervision, whilst taking responsibility for their own actions and for the quality and accuracy of the work that they carry out. On completion of the activities, the apprentice will be expected to return all tools and equipment to the correct locations and to leave the work area in a safe and tidy condition.</p> <p>The apprentice's responsibilities will require them to comply with health and safety requirements and organisational policy and procedures for the activities undertaken. They will understand the safety precautions required when carrying out the diagnosis, rectification and testing activities, and when using relevant tools and equipment; and will also be required to demonstrate safe working practices throughout, and will understand the responsibility they owe to themselves and others in the workplace.</p>

The apprentice's knowledge will provide an understanding of their work, and will enable them to apply appropriate diagnosis, rectification and testing techniques and procedures safely. They will understand the maintenance process, and its application, and will know about the aircraft equipment being maintained, the equipment components, tools and consumables used, to the required depth to provide a sound basis for carrying out the activities to the required specification. They will be able to apply the appropriate behaviours required in the workplace to meet the job profile and overall organization objectives, such as strong work ethic, positive attitude, team player, dependability, responsibility, honesty, integrity, motivation and commitment.

Relationship to NOS:

EUCAEF67

Performance Requirements

The learner can:

- P1 demonstrate the required behaviours in line with the job role and organisational objectives
- P2 work safely at all times, complying with health and safety legislation, regulations and other relevant guidelines
- P3 follow the relevant maintenance schedules to carry out the required diagnosis, rectification and testing activities
- P4 carry out the diagnosis, rectification and testing activities within the limits of their personal authority
- P5 carry out the diagnosis, rectification and testing activities in the specified sequence and in an agreed timescale
- P6 report any instances where the diagnosis, rectification and testing activities cannot be fully met or where there are identified defects outside the planned schedule
- P7 complete relevant maintenance records accurately and pass them on to the appropriate person
- P8 dispose of waste materials in accordance with safe working practices and approved procedures

Learning outcome

The learner will:

- 1 carry out all of the following during the diagnosis, rectification and testing activity:

Assessment criteria

- 1.1 adhere to procedures or systems in place for risk assessment, COSHH, personal protective equipment (PPE) and other relevant safety regulations
- 1.2 ensure the safe isolation of equipment, where appropriate, (such as mechanical, electrical, gas, air or fluids)
- 1.3 follow job instructions, maintenance drawings and procedures

- 1.4 carry out pre-use checks and examinations on the tools and equipment to be utilised ensuring they are in a safe and usable condition
 - 1.5 ensure that the system is kept free from foreign objects, dirt or other contamination
 - 1.6 return all tools and equipment to the correct location on completion of the diagnosis, rectification and testing activities
 - 1.7 deal promptly and effectively with problems within their control and seek help and guidance from the relevant people if they have problems that they cannot resolve
 - 1.8 leave the work area in a safe and tidy condition on completion of the maintenance activities.
-

Learning outcome

The learner will:

- 2 carry out diagnosis, rectification and testing activities on three of the following types of systems:

Assessment criteria

- 2.1 Hydraulic Flying Control
 - 2.2 Gas Turbines
 - 2.3 Fuel Systems
 - 2.4 Undercarriage and Retardation
 - 2.5 Air Conditioning & Pressurisation
 - 2.6 Oxygen
-

Learning outcome

The learner will:

- 3 use three of the following maintenance/diagnostic documentation:

Assessment criteria

- 3.1 aircraft maintenance manuals
 - 3.2 digital publications
 - 3.3 diagnostic flowcharts
 - 3.4 information gathered from aircrew/operator debriefs
 - 3.5 F700 documentation
-

Learning outcome

The learner will:

- 4 use four of the following maintenance diagnostic techniques, tools and aids:

Assessment criteria

- 4.1 fault finding techniques (such as half-split, input/output)
- 4.2 system operation
- 4.3 examination e.g. boroscope/endoprobe

- 4.4 history checks
 - 4.5 test equipment e.g. BITE/ATE, DMM
 - 4.6 sensory input (such as sight, sound, smell, touch)
 - 4.7 information from monitoring equipment or gauges.
-

Learning outcome

The learner will:

- 5 carry out all of the following during the diagnosis, rectification and testing activity:

Assessment criteria

- 5.1 determine the cause of the fault
 - 5.2 fault corrective action by minor component replacement (e.g. fuel transfer pump, coalescer)
 - 5.3 fault corrective action by major component replacement (e.g. Engine Change Unit (ECU), Powered Flying Control Unit (PFCU))
 - 5.4 post-rectification functional checks and ensure aircraft system is serviceable and three of the following:
 - 5.5 fluids/gas replenishment
 - 5.6 hydraulic sampling
 - 5.7 leak check
 - 5.8 apply electrical power
 - 5.9 apply hydraulic power
-

Learning outcome

The learner will:

- 6 inspect aircraft bay/compartments for faults and damage prior to component replacement, including but not limited to:

Assessment criteria

- 6.1 corrosion
 - 6.2 fluid leaks
 - 6.3 signs of overheating
 - 6.4 cracks
 - 6.5 wiring damage
-

Learning outcome

The learner will:

- 7 complete the relevant servicing records, to include one from the following, and pass it to the appropriate people:

Assessment criteria

- 7.1 servicing/maintenance schedule/log

- 7.2 job cards
 - 7.3 aircraft service/flight log
-

Knowledge and understanding

- K1 the health and safety requirements, and safe working practices and procedures required for the diagnosis, rectification and testing activities undertaken
- K2 the importance of wearing appropriate protective clothing and equipment (PPE), and of keeping the work area safe and tidy
- K3 the hazards associated with carrying out maintenance activities (such as cockpit entry, application of ground power, hydraulics, flight control surfaces, fuel, oils and gases, misuse of tools or test equipment, not following laid-down maintenance procedures), and how to minimise them
- K4 the importance of applying the appropriate behaviours in the workplace and the implications for both the apprentice and the organisation if these are not adhered to
- K5 the system isolation procedures that apply
- K6 how to obtain and interpret drawings, specifications, manufacturers' manuals and other documents needed in the maintenance process
- K7 the procedure for obtaining drawings, job instructions, related specifications, replacement parts, materials and other consumables necessary for the maintenance activities
- K8 the basic principles of how the equipment functions, its operating sequence, the working purpose of individual units/components and how they interact
- K9 the various maintenance techniques and aids that can be used (such as fault reports, visual checks, measuring, movement and alignment checks, testing)
- K10 the various fault location techniques that can be used (such as half split, test equipment including ATE and BITE, decision trees, manufacturers fault finding aids)
- K11 how to evaluate sensory information (sight, sound, smell, touch)
- K12 how to check that systems meet the required specification/operating conditions (such as values, tolerance, power rating)
- K13 how to carry out pre-use checks that tools and equipment are free from damage or defect, are in a safe and usable condition, are within calibration, and are configured correctly for the intended purpose
- K14 how to make adjustments to components/assemblies to ensure they function correctly (such as setting travel and working clearances)
- K15 the techniques used to dismantle/assemble mechanical systems and equipment (such as pressure dissipation and replenishment, disconnection and reconnection of pipes, hoses, cables, seals, clamps, aligning and torque loading components)
- K16 methods of identifying fluid line connections (such as colour coded labels)
- K17 the importance of completing maintenance documentation and/or reports following the maintenance activity
- K18 How to use lifting and handling equipment in the maintenance activity
- K19 the problems associated with the maintenance activity, and how they can be overcome
- K20 when to act on their own initiative and when to seek help and advice from others
- K21 the importance of leaving the work area and equipment in a safe and clean condition on completion of the maintenance activities (such as returning hand tools and test

equipment to the designated locations, cleaning the work area, and removing and disposing of waste).

Unit 267

Diagnosis, Rectification and Testing of Military Aircraft Mechanical Systems

Supporting Information

Unit guidance

Assessment requirements for this have been developed by employers for the occupational competency units and qualifications for the Aerospace and Aviation Sector. These assessment requirements are set down in the Aerospace Engineering Employer Occupational Unit Assessment Strategy.

Although all of the content and assessment requirements must be met in full employers can tailor the training outcomes to ensure that the content of the programme is specific to their requirements in terms of products, processes, procedures, tools, equipment, materials, documentation and information systems.

This will allow each organisation to develop their own specific and tailored apprentice training programme whilst meeting their own requirements whilst at the same time ensuring that the overall generic content is to a high standard in terms of depth and breadth to enable progression and/or transferability to other employers.

Unit 268

Installing Military Aircraft Mechanical Fasteners

Unit level:	Level 2
GLH:	65
Unit aim:	<p>This Employer Unit of Competence (EUC) has been developed by employers in the Aerospace and Aviation Sector and is part of an overall development programme designed to meet the requirements of the Sector, the published Apprenticeship Standard and Employer Occupational Brief.</p> <p>This EUC identifies the training and development required in order that the apprentice can demonstrate that they are competent in being able to install aircraft mechanical fasteners that will prepare them for entry into aircraft related trades, creating a progression between education and employment, or providing a basis for the development of additional skills and occupational competences in the working environment.</p> <p>They will be expected to prepare for the installation activities by obtaining all necessary information, documentation, tools and equipment required, and to plan how they intend to carry out the required activities and the sequence of operations they intend to use.</p> <p>The apprentice will be required to select the appropriate tools equipment to use, based on the types of fastener to be installed and the accuracy required. The mechanical fasteners to be installed will include devices such as hollow and solid rivets, threaded fasteners, anchor nuts, pins and other locking devices. The learner will need to use a range of different techniques to prepare, install and check that the mechanical fasteners are installed to the required specification.</p>

During and on completion of the installation operations, the apprentice will be expected to check the quality of the work using measuring equipment appropriate to the aspects being checked and the tolerances to be achieved. The apprentice will need to recognise defects, to take appropriate action to remedy any faults that occur and to ensure that the finished product meets the drawing requirements. They will work under a high level of supervision, whilst taking responsibility for their own actions and for the quality and accuracy of the work that they carry out. On completion of the activities, the apprentice will be expected to return all tools and equipment to the correct locations and to leave the work area in a safe and tidy condition.

The apprentice's responsibilities will require them to comply with health and safety requirements and organisational policy and procedures for the installation activities undertaken. They will understand the safety precautions required when using aircraft mechanical fastener installation techniques, and when using relevant tools and equipment. They will also be required to demonstrate safe working practices throughout, and will understand the responsibility they owe to themselves and others in the workplace.

The apprentice's knowledge will provide an understanding of their work, and will enable them to apply appropriate techniques, for the installation of the aircraft mechanical fasteners, safely. They will understand fastener installation process, and its application, and will know about the equipment materials and consumables, to the required depth to provide a sound basis for carrying out the activities to the required specification. They will be able to apply the appropriate behaviours required in the workplace to meet the job profile and overall organization objectives, such as strong work ethic, positive attitude, team player, dependability, responsibility, honesty, integrity, motivation and commitment.

Relationship to NOS:

EUCAE68

Performance Requirements

The learner can:

- P1 demonstrate the required behaviours in line with the job role and organisational objectives
- P2 work safely at all times, complying with health and safety legislation, regulations and other relevant guidelines
- P3 plan the installation of the mechanical fasteners before they start the activity
- P4 obtain the appropriate tools and equipment for the installation operations, and check that they are in a safe and usable condition
- P5 assemble and secure the components, using the correct fastening devices and joining techniques

- P6 measure and check that all dimensional and geometrical aspects of the component are to the specification
 - P7 check that the installation is complete, and that all components are free from damage
 - P8 deal promptly and effectively with problems within their control, and seek help and guidance from the relevant people if they have problems that they cannot resolve
 - P9 leave the work area in a safe and tidy condition on completion of the fitting activities disposing of waste materials in accordance with safe working practices and approved procedures
-

Learning outcome

The learner will:

- 1 carry out all of the following during the installation of the mechanical fasteners:

Assessment criteria

- 1.1 adhere to procedures or systems in place for risk assessment, COSHH, personal protective equipment (PPE) and other relevant safety regulations
 - 1.2 follow all relevant drawings and specifications for the installation being carried out
 - 1.3 ensure that all tools and equipment to be utilised are in a safe, usable condition and within calibration date where appropriate
 - 1.4 follow safe practice/approved installation techniques and procedures at all times
 - 1.5 return all tools and equipment to the correct location on completion of the installation activities
 - 1.6 leave the work area in a safe and tidy condition, free from foreign object debris on completion of the activities
-

Learning outcome

The learner will:

- 2 install mechanical fasteners, to include three of the following

Assessment criteria

- 2.1 hollow rivets
- 2.2 solid rivets
- 2.3 threaded fasteners
- 2.4 quick release fasteners
- 2.5 collared fasteners

Plus three more from the following:

- 2.6 split pins
- 2.7 pin clips
- 2.8 wire locks
- 2.9 anchor nuts
- 2.10 rivnuts
- 2.11 Pip/PIT pins
- 2.12 NAPPY pins

2.13 other specific locking devices

Learning outcome

The learner will:

3 use both of the following types of equipment:

Assessment criteria

- 3.1 riveting guns (appropriate to rivet type)
- 3.2 gripping pins or location dowels

Plus two more from the following:

- 3.3 gauges for intrusions
 - 3.4 redline templates
 - 3.5 clamps
 - 3.6 drills and tools with attachments
 - 3.7 jigs
 - 3.8 fastener installation tools
-

Learning outcome

The learner will:

4 use five of the following installation methods and techniques:

Assessment criteria

- 4.1 countersinking
 - 4.2 solid riveting (single and double handed)
 - 4.3 through-hole
 - 4.4 milling fasteners
 - 4.5 wire locking
 - 4.6 blind riveting
 - 4.7 installing fasteners with a clearance fit
 - 4.8 installing fasteners with an interference fit
 - 4.9 taperlok
 - 4.10 bonded fasteners
-

Learning outcome

The learner will:

5 make three types of connection from:

Assessment criteria

- 5.1 wet assembly
- 5.2 panels

- 5.3 structures
 - 5.4 dry assembly
 - 5.5 skins
 - 5.6 repairs
-

Learning outcome

The learner will:

- 6 use four of the following to carry out appropriate checks during and on completion of, the installation activities:

Assessment criteria

- 6.1 rules
 - 6.2 feeler gauges
 - 6.3 squares
 - 6.4 bore/hole gauges
 - 6.5 callipers
 - 6.6 Radius/profile gauges
 - 6.7 protractors
 - 6.8 dial test indicators (DTI)
 - 6.9 micrometers
 - 6.10 torque wrenches/gauges
 - 6.11 verniers
 - 6.12 rivet intrusion gauges
 - 6.13 slip gauges
-

Learning outcome

The learner will:

- 7 install aircraft mechanical fasteners to comply with all of the following requirements:

Assessment criteria

- 7.1 all components are correctly assembled and aligned, in accordance with the specification
 - 7.2 overall dimensions are within specification tolerances
 - 7.3 assemblies meet appropriate geometric tolerances (such as square, straight, angles free from twists)
 - 7.4 where appropriate, pitches of rivets/fasteners meet specification requirements
 - 7.5 completed assemblies have secure and firm joints, and are clean and free from burrs/flash, deformation or cracking
-

Knowledge and understanding

- K1 the health and safety requirements, and safe working practices and procedures required for the installation of the aircraft mechanical fasteners

- K2 the importance of wearing appropriate protective clothing and equipment (PPE), and of keeping the work area safe and tidy
- K3 the hazards associated with installing aircraft mechanical fasteners and with the tools and equipment used (such as correct tool and equipment selection and handling, not following laid-down procedures), and how to minimise them
- K4 the importance of applying the appropriate behaviours in the workplace and the implications for both the apprentice and the organisation if these are not adhered to
- K5 the importance of working to the installation instructions and appropriate specifications
- K6 explain how to use and extract information from engineering drawings, related specifications and the aircraft document set in relation to work undertaken specifications
- K7 explain how to interpret first and third angle drawings, imperial and metric systems of measurement, workpiece reference points and system of tolerancing
- K8 how to identify the mechanical fasteners to be used; material identification system and codes used
- K9 the purpose and use of joint sealing agents and anti-electrolysis barriers, and the precautions to be taken when using them
- K10 the various types and range of screwed fasteners used on aircraft fittings, and the methods of installing them
- K11 the types and applications of aircraft rivets, and the advantages of hollow rivets over solid rivets
- K12 the various types of riveted joints: single chain, double chain, staggered (zigzag), lap joint, butt joint
- K13 basic riveting terms e.g. clearance, allowance, pitch, land, spacing, sphere of influence, grip range
- K14 the reasons for using screw fastenings rather than rivets
- K15 the various locking devices used with fastenings
- K16 the purpose and use of locating dowels, gripping pins and gauges, when carrying out fastening operations
- K17 the procedures to be adopted when removing rivets and other fasteners
- K18 bolt break-offs, and where they occur
- K19 how to check that riveting guns, power tools and attachments are in a safe and usable condition, and the action to be taken in the event of identifying defective equipment
- K20 the types of gauges used to measure angles, depths, countersinks and torque
- K21 how and why tools are calibrated, and how to check that the tools they are using are within calibration dates
- K22 how to conduct any necessary checks to ensure the accuracy and quality of the installations produced
- K23 the problems that can occur with the installation of the mechanical fasteners, and how these can be overcome
- K24 how to identify standard aircraft locking devices and the conditions governing their re-use
- K25 how to prepare for and accurately drill holes in components and structures
- K26 how to identify and use and the purpose of parallel and taper reamers
- K27 when to act on their own initiative and when to seek help and advice from others

K28 the importance of leaving the work area and equipment in a safe and clean condition on completion of the maintenance activities (such as returning hand tools and test equipment to the designated locations, cleaning the work area, and removing and disposing of waste).

Unit 268

Installing Military Aircraft Mechanical Fasteners

Supporting Information

Unit guidance

Assessment requirements for this have been developed by employers for the occupational competency units and qualifications for the Aerospace and Aviation Sector. These assessment requirements are set down in the Aerospace Engineering Employer Occupational Unit Assessment Strategy.

Although all of the content and assessment requirements must be met in full employers can tailor the training outcomes to ensure that the content of the programme is specific to their requirements in terms of products, processes, procedures, tools, equipment, materials, documentation and information systems.

Unit 269

Maintaining Military Aircraft Armament Systems

Unit level: Level 2

GLH: 80

Unit aim: This Employer Unit of Competence (EUC) has been developed by employers in the Aerospace and Aviation Sector and is part of an overall development programme designed to meet the requirements of the Sector, the published Apprenticeship Standard and Employer Occupational Brief.

This EUC identifies the training and development required in order that the apprentice can demonstrate that they are competent in being able to maintain military aircraft armament systems that will prepare them for entry into military aircraft related trades, creating a progression between education and employment, or providing a basis for the development of additional skills and occupational competences in the working environment.

They will be expected to prepare for the maintenance activities by obtaining all necessary information, documentation, tools and equipment required, and to plan how they intend to carry out the required maintenance activities and the sequence of operations they intend to use.

The apprentice will be required to select the appropriate equipment to use, based on the maintenance to be carried out and the type of aircraft armament system being maintained. This may include equipment such as inspection aids, test equipment, standard tool kits, support equipment including special to contents (STC) containers and other organisation-specific equipment. They will be expected to use a variety of maintenance techniques and procedures, such as gathering information, installing, removing, inspecting, operating and testing the equipment. They will work under a high level of supervision, whilst taking responsibility for their own actions and for the quality and accuracy of the work that they carry out.

On completion of the activities, the apprentice will be expected to return all tools and equipment to the correct locations and to leave the work area in a safe and tidy condition. The apprentice's responsibilities will require them to comply with health and safety requirements and organisational policy and procedures for the activities undertaken. They will understand the safety precautions required when carrying out the maintenance activities, and when using relevant tools and equipment; and will also be required to demonstrate safe working practices throughout, and will understand the responsibility they owe to themselves and others in the workplace.

The apprentice's knowledge will provide an understanding of their work, and will enable them to apply appropriate maintenance techniques and procedures safely. They will understand the maintenance process, and its application, and will know about the armament equipment being maintained, the equipment components, tools and consumables used, to the required depth to provide a sound basis for carrying out the activities to the required specification. They will be able to apply the appropriate behaviours required in the workplace to meet the job profile and overall organization objectives, such as strong work ethic, positive attitude, team player, dependability, responsibility, honesty, integrity, motivation and commitment.

**Relationship
to NOS:**

EUCAEF69

Performance Requirements

The learner can:

- P1 work safely at all times, complying with health and safety legislation, regulations and other relevant guidelines
- P2 follow the relevant maintenance schedules to carry out the required maintenance activities
- P3 carry out the activities within the limits of their personal authority
- P4 carry out the activities in the specified sequence and in an agreed timescale
- P5 report any instances where the maintenance activities cannot be fully met or where there are identified defects outside the planned schedule
- P6 complete relevant documentation accurately and pass them on to the appropriate person
- P7 dispose of waste materials in accordance with safe working practices and approved procedures
- P8 demonstrate the required behaviours in line with the job role and organisational objectives

Learning outcome

The learner will:

- 1 carry out all of the following during the maintenance activities:

Assessment criteria

- 1.1 adhere to procedures or systems in place for risk assessment, COSHH, personal protective equipment (PPE) and other relevant safety regulations
- 1.2 ensure the safe isolation of equipment, where appropriate, (such as explosive, mechanical, electrical, gas, air or fluids)
- 1.3 ensure Aircraft Assisted Escape System and Aircraft Armament System safety devices are placed in the appropriate condition prior to maintenance being carried out
- 1.4 follow job instructions, maintenance drawings and procedures

- 1.5 carry out pre-use checks and examinations on the tools and equipment to be utilised ensuring they are in a safe and usable condition
 - 1.6 ensure that the system is kept free from foreign objects, dirt or other contamination
 - 1.7 return all tools and equipment to the correct location on completion of the maintenance activities
 - 1.8 deal promptly and effectively with problems within their control and seek help and guidance from the relevant people if they have problems that they cannot resolve
 - 1.9 leave the work area in a safe and tidy condition on completion of the maintenance activities.
-

Learning outcome

The learner will:

- 2 carry out all the following aircraft maintenance activities, using appropriate methods and techniques:

Assessment criteria

- 2.1 loading/unloading of aircraft expendable ordnance
 - 2.2 removal/installation of Aircraft Assisted Escape System (AAES) components
 - 2.3 Installing/removal of aircraft armament equipment
 - 2.4 pre & post installation/loading/unloading checks/tests
 - 2.5 aircraft armament equipment pre & post installation checks/tests
 - 2.6 post firing maintenance checks
 - 2.7 pre-use checks (conformity) on AAS Aviation Support Equipment
-

Learning outcome

The learner will:

- 3 carry out three of the following loading/unloading activities:

Assessment criteria

- 3.1 ammunition (aircraft guns)
 - 3.2 aircraft bombs
 - 3.3 missiles
 - 3.4 role equipment e.g. fuel tanks, weapons carriers
 - 3.5 WPU Code setting
 - 3.6 re-cocking cartridges
-

Learning outcome

The learner will:

- 4 carry out the installation/removal of three of the following aircraft armament equipment/system:

Assessment criteria

- 4.1 aircraft gun
 - 4.2 Ejector Release Units (ERU)
 - 4.3 ejection seat
 - 4.4 launcher
-

Learning outcome

The learner will:

- 5 carry out the installation/removal of one the following (AAES) aircraft armament components:

Assessment criteria

- 5.1 EO2 Cylinder
 - 5.2 leg restraint lines
 - 5.3 canopy jettison initiator unit
 - 5.4 canopy unlocking jack
-

Learning outcome

The learner will:

- 6 carry out all of the following during the installation/removal of aircraft armament equipment & systems:

Assessment criteria

- 6.1 pre-installation/removal requirements
 - 6.2 Barrel removal/installation
 - 6.3 post installation requirements such as: gun harmonisation
-

Learning outcome

The learner will:

- 7 complete the relevant maintenance records, to include one from the following, and pass it to the appropriate people:

Assessment criteria

- 7.1 servicing/maintenance schedule/equipment log (History Card)
 - 7.2 job cards
 - 7.3 flight servicing certificate
 - 7.4 role equipment and expendable stores form
-

Knowledge and understanding

- K1 the health and safety requirements, and safe working practices and procedures required for the maintenance activities undertaken

- K2 the importance of wearing appropriate protective clothing and equipment (PPE), and of keeping the work area safe and tidy
- K3 the hazards associated with carrying out maintenance activities (such as cockpit entry, application of ground power, weapon loading/unloading, hydraulics, flight control surfaces, explosive devices, fuel, oils and gases, manual handling, misuse of tools or test equipment, not following laid-down maintenance procedures), and how to minimise them
- K4 the importance of applying the appropriate behaviours in the workplace and the implications for both the apprentice and the organisation if these are not adhered to
- K5 the system isolation procedures that apply for the maintenance activity undertaken
- K6 the armed aircraft safety precautions, including hazard division and safety signs
- K7 the symbols and markings used to indicate the locations of AAES components on the aircraft
- K8 the conditions (states) in which AAES safety devices may be placed and the significance of each condition
- K9 how to obtain and the procedure for obtaining job instructions, replacement parts, materials, consumables, specifications, manufacturers' manuals and other documents needed in the maintenance process
- K10 the basic principles of how the equipment functions, its operating sequence, the working purpose of individual units/components and how they interact
- K11 the various maintenance techniques and aids that can be used (such as visual checks, measuring, movement and alignment checks, testing and code setting)
- K12 the requirement for specific maintenance activities following the installation of Aircraft Armament systems and components
- K13 how to check Aircraft Armament Systems meet the required specification/operating conditions and be able to identify and rectify faults
- K14 how to carry out pre-use checks that tools and equipment are free from damage or defect, are in a safe and usable condition, are within calibration, and are configured correctly for the intended purpose
- K15 tool control procedures in an aircraft maintenance environment and the importance of them
- K16 the techniques used to dismantle/assemble armament systems (such as disconnection and reconnection of pipes, hoses, cables, seals, clamps, and component removal, aligning and torque loading)
- K17 the importance of completing maintenance documentation and/or reports following the maintenance activity
- K18 how to use lifting and handling equipment during maintenance activities
- K19 the problems associated with the maintenance activity, and how they can be overcome
- K20 when to act on their own initiative and when to seek help and advice from others
- K21 the importance of leaving the work area and equipment in a safe and clean condition on completion of the maintenance activities (such as returning hand tools and test equipment to the designated locations, cleaning the work area, and removing and disposing of waste)

Unit 269

Maintaining Military Aircraft Armament Systems

Supporting Information

Unit guidance

Assessment requirements for this have been developed by employers for the occupational competency units and qualifications for the Aerospace and Aviation Sector.

Although all of the content and assessment requirements must be met in full employers can tailor the training outcomes to ensure that the content of the programme is specific to their requirements in terms of products, processes, procedures, tools, equipment, materials, documentation and information systems.

This will allow each organisation to develop their own specific and tailored apprentice training programme whilst meeting their own requirements whilst at the same time ensuring that the overall generic content is to a high standard in terms of depth and breadth to enable progression and/or transferability to other employers.

Unit 270

Maintaining Aircraft Armament Electrical Installations (AAEI)

Unit level:	Level 2
GLH:	100
Unit aim:	<p>This Employer Unit of Competence (EUC) has been developed by employers in the Aerospace and Aviation Sector and is part of an overall development programme designed to meet the requirements of the Sector, the published Apprenticeship Standard and Employer Occupational Brief.</p> <p>This EUC identifies the training and development required in order that the apprentice can demonstrate that they are competent in being able to undertake a range of aircraft electrical maintenance activities synonymous with the aircraft weapons technician that will prepare them for entry into the military aircraft armament trade, creating a progression between education and employment, or providing a basis for the development of additional skills and occupational competences in the working environment.</p> <p>They will be expected to prepare for the aircraft armament electrical activities by obtaining all necessary information, documentation, tools and equipment required, and to plan how they intend to carry out the required maintenance activities and the sequence of operations they intend to use.</p> <p>The apprentice will be required to select the appropriate equipment to use, based on the electrical maintenance activity to be carried out and the type of aircraft armament electrical installation being maintained. These activities will include: basic fault finding and circuit testing, precision termination processes, soldering operations, using equipment such as digital multimeters, crimping tools, wire strippers, solder stations, and other organisation-specific equipment. They will be expected to use a variety of maintenance inspection techniques and procedures, such as the probability of failure and half split rule, identifying the different types of aircraft cables and their application, the associated termination process applicable to each type and how to identify the unsatisfactory electrical termination of components from inspection and operating the appropriate test equipment.</p> <p>The apprentice's knowledge will provide an understanding of their work and the responsibilities involved in carrying out maintenance activities on an AAEI, and will enable them to carry out Armament Electrical activities safely. They will understand the purpose, function and different application of the different skills utilised within aerospace, along with the process, equipment, components, tools and consumables used, to the required depth to provide a sound basis for carrying out electrical maintenance activities to the required specification on the AAEI being maintained. They will understand the</p>

safety precautions required when carrying out these activities, and when using relevant tools and equipment; and they will also be required to demonstrate safe working practices throughout, and will understand the responsibility they owe to themselves and others in the workplace. They will be able to apply the appropriate behaviours required in the workplace to meet the job profile and overall organization objectives, such as strong work ethic, positive attitude, team player, dependability, responsibility, honesty, integrity, motivation and commitment.

Relationship to NOS:

EUCAEF70

Performance Requirements

The learner can:

- P1 work safely at all times, complying with health and safety legislation, regulations and other relevant guidelines
 - P2 demonstrate AAEI maintenance activities
-

Learning outcome

The learner will:

- 1 carry out all of the following during the Aircraft Armament Electrical Installation (AAEI) maintenance activity:

Assessment criteria

- 1.1 adhere to procedures or systems in place for risk assessment, COSHH, personal protective equipment (PPE) and other relevant safety regulations
- 1.2 obtain the correct tools and equipment for the activity and check that the tools, equipment and test instruments are within calibration date, and are in a safe and usable condition
- 1.3 follow job instructions, maintenance drawings and procedures
- 1.4 carry out pre-use checks and examinations on the tools and equipment to be utilised ensuring they are in a safe and usable condition
- 1.5 ensure that the system is kept free from foreign objects, dirt or other contamination
- 1.6 return all tools and equipment to the correct location on completion of the AAEI maintenance activities
- 1.7 deal promptly and effectively with problems within their control and seek help and guidance from the relevant people if they have problems that they cannot resolve
- 1.8 leave the work area in a safe and tidy condition on completion of the maintenance activities.

Learning outcome

The learner will:

- 2 carry out an Aircraft Armament Electrical Installation (AAEI) assessment, inspecting and correctly identifying damage to:

Assessment criteria

- 1.1 wiring
 - 1.2 cables
 - 1.3 connectors
-

Learning outcome

The learner will:

- 3 carry out precision termination crimping procedure to include all the following:

Assessment criteria

- 3.1 correctly select the appropriate termination for the cable being utilised
 - 3.2 select and use the correct tools/equipment for the precision termination process
 - 3.3 undertake equipment and tooling pre-use checks
 - 3.4 correctly set up tooling for the task
 - 3.5 correct cable preparation (e.g. cut to length within tolerance, strip length, no conductor/insulator damage)
 - 3.6 post crimp inspection
 - 3.7 lacing
 - 3.8 cable ties
 - 3.9 heatshrink/thermofit
 - 3.10 pin and socket
 - 3.11 BNC
 - 3.12 in-line splices
-

Learning outcome

The learner will:

- 4 carry out soldering operations to include all of the following:

Assessment criteria

- 4.1 pre-use checks of solder station
- 4.2 soldering iron preparation
- 4.3 demonstrate correct stripping of wire
- 4.4 demonstrate correct tinning of wire
- 4.5 demonstrate correct soldering methods
- 4.6 prepare components
- 4.7 correctly position components

- 4.8 undertake de-soldering
 - 4.9 soldering joint formations:
 - 4.10 cleaning of the finished product
-

Learning outcome

The learner will:

- 5 carry out one of the following types of test as part of Aircraft Armament Electrical Installation (AAEI) maintenance activities:

Assessment criteria

- 5.1 continuity testing
 - 5.2 precision termination specific tests (such as pull off checks)
-

Learning outcome

The learner will:

- 6 carry out basic fault finding activities on an Aircraft Armament Electrical Installation (AAEI) using three of the following diagnostic aids:

Assessment criteria

- 6.1 half split (eg Voltage, Current, Resistance)
- 6.2 continuity test (point to point)
- 6.3 functional check/system operation
- 6.4 voltage checks
- 6.5 continuity checks
- 6.6 half split (eg Voltage, Current, Resistance)
- 6.7 open circuit
- 6.8 short circuit

Using two of the following pieces of test equipment:

- 6.9 Digital multi-meter
 - 6.10 Insulation tester
 - 6.11 Safety Ohmmeter
-

Learning outcome

The learner will:

- 7 complete the relevant servicing records, to include one from the following, and pass it to the appropriate people:

Assessment criteria

- 7.1 servicing/maintenance schedule/log
- 7.2 job cards

Knowledge and understanding

- K1 the health and safety requirements, and safe working practices and procedures required for the Aircraft Armament Electrical Installation (AAEI) maintenance activities undertaken
- K2 the importance of wearing appropriate protective clothing and equipment (PPE), and of keeping the work area safe and tidy
- K3 the hazards associated with carrying out the Aircraft Armament Electrical Installation (AAEI) maintenance activities (such as handling fibre optics, soldering, sharp tooling, dealing with lethal voltages, misuse of tools or test equipment, not following laid-down maintenance procedures) and how to minimise them
- K4 the importance of applying the appropriate behaviours in the workplace and the implications for both the apprentice and the organisation if these are not adhered to
- K5 how to carry out pre-use checks that tools and equipment are free from damage or defect, are in a safe and usable condition, are within calibration, and are configured correctly for the intended purpose
- K6 the requirement for publications and standards and where these can be found in relation to the Aircraft Armament Electrical Installation (AAEI) maintenance activity
- K7 the different types of cabling, their construction, identification and application (such as multicore cables, single core cables, solid and multi-stranded cables, screened cables, data/communications cables, fibre-optics)
- K8 the requirement for Electrical Wiring Interconnect Systems (EWIS) husbandry (such as storage, handling, connectors and terminations, cleaning, installation and repair)
- K9 the corrosion associated with aircraft cables and connectors (such as Cadmium corrosion), the health hazards this presents and the actions to be taken if encountered
- K10 how to conduct an Electrical Wiring Interconnect Systems (EWIS) assessment and describe aircraft EWIS defects
- K11 how to prepare the materials and components in readiness for Aircraft Armament Electrical Installation (AAEI) maintenance activity
- K12 the tools and equipment used during the activities (including the use of cable stripping tools, crimping tools, soldering irons, digital multi-meters, insulation testers and safety ohmmeters)
- K13 the techniques used to terminate electrical equipment (such as plugs and sockets; soldering; screwed, clamped and crimped connections, glands and sealed connectors), and the implications if carried out incorrectly
- K14 EWIS installation and repair such as: the need to ensure the minimum bend radius is not exceeded, that cables are supported, secured and protected
- K15 the primary categories of testing and measuring equipment (TME), its scaling, storing, handling and the purpose of calibration
- K16 the types and functions of basic circuit testing equipment and the requirement for pre-use inspection of testing equipment
- K17 the occasions when an Aircraft Armament Electrical Installation (AAEI) must be tested
- K18 the basic principles of how the equipment functions, its operating sequence, the working purpose of individual units/components and how they interact

- K19 the basic methods of fault finding and circuit testing, the types and functions of basic circuit testing equipment and the requirement for pre-use inspection of testing equipment
- K20 the importance of completing maintenance documentation and/or reports following the maintenance activity
- K21 the problems associated with the activities, and how they can be overcome
- K22 the importance of leaving the work area and equipment in a safe and clean condition on completion of the maintenance activities (such as returning hand tools and test equipment to the designated locations, cleaning the work area, and removing and disposing of waste).

Unit 270

Maintaining Aircraft Armament Electrical Installations (AAEI)

Supporting Information

Unit guidance

Assessment requirements for this have been developed by employers for the occupational competency units and qualifications for the Aerospace and Aviation Sector. These assessment requirements are set down in the Aerospace Engineering Employer Occupational Unit Assessment Strategy

Although all of the content and assessment requirements must be met in full employers can tailor the training outcomes to ensure that the content of the programme is specific to their requirements in terms of products, processes, procedures, tools, equipment, materials, documentation and information systems.

This will allow each organisation to develop their own specific and tailored apprentice training programme whilst meeting their own requirements whilst at the same time ensuring that the overall generic content is to a high standard in terms of depth and breadth to enable progression and/or transferability to other employers.

Unit 271

Maintaining Military Aircraft Armament Equipment

Unit level: Level 2

GLH: 100

Unit aim: This Employer Unit of Competence (EUC) has been developed by employers in the Aerospace and Aviation Sector and is part of an overall development programme designed to meet the requirements of the Sector, the published Apprenticeship Standard and Employer Occupational Brief.

This EUC identifies the training and development required in order that the apprentice can demonstrate that they are competent in being able to carry out maintenance activities on military aircraft armament equipment that will prepare them for entry into military aircraft related trades, creating a progression between education and employment, or providing a basis for the development of additional skills and occupational competences in the working environment.

They will be expected to prepare for the activities by obtaining all necessary information, documentation, tools and equipment required, and to plan how they intend to carry out the required overhaul activities and the sequence of operations they intend to use.

The apprentice will be required to select the appropriate equipment to use, based on the activity to be carried out and the type of aircraft armament equipment being maintained. This may include equipment such as inspection aids, test equipment, standard tool kits, and other organisation-specific equipment. They will be expected to use a variety of maintenance inspection techniques and procedures, such as gathering information from inspecting, operating and testing the equipment. They will work under a high level of supervision, whilst taking responsibility for their own actions and for the quality and accuracy of the work that they carry out.

On completion of the activities, the apprentice will be expected to return all tools and equipment to the correct locations and to leave the work area in a safe and tidy condition. The apprentice's responsibilities will require them to comply with health and safety requirements and organisational policy and procedures for the activities undertaken. They will understand the safety precautions required when carrying out the overhaul activities, and when using relevant tools and equipment; and will also be required to demonstrate safe working practices throughout, and will understand the responsibility they owe to themselves and others in the workplace.

The apprentice's knowledge will provide an understanding of their work, and will enable them to apply appropriate overhaul techniques and procedures safely. They will have a basic understanding of the

equipment being maintained, and its application, and will know about the overhaul requirements and the equipment components, tools and consumables used, to the required depth to provide a sound basis for carrying out the activities to the required specification. They will be able to apply the appropriate behaviours required in the workplace to meet the job profile and overall organization objectives, such as strong work ethic, positive attitude, team player, dependability, responsibility, honesty, integrity, motivation and commitment.

**Relationship
to NOS:**

EUCAEF71

Performance Requirements

The learner can:

- P1 work safely at all times, complying with health and safety legislation, regulations and other relevant guidelines
 - P2 follow the relevant maintenance schedules to carry out the required diagnosis, rectification and testing activities
 - P3 carry out the maintenance activities within the limits of their personal authority
 - P4 carry out the maintenance activities in the specified sequence and in an agreed timescale
 - P5 report any instances where the maintenance activities cannot be fully met or where there are identified defects outside the planned schedule
 - P6 complete relevant documentation accurately and pass them on to the appropriate person
 - P7 dispose of waste materials in accordance with safe working practices and approved procedures
 - P8 demonstrate the required behaviours in line with the job role and organisational objectives
-

Learning outcome

The learner will:

- 1 carry out all of the following during the maintenance activities:

Assessment criteria

- 1.1 adhere to procedures or systems in place for risk assessment, COSHH, personal protective equipment (PPE) and other relevant safety regulations
- 1.2 ensure the safe isolation of equipment, where appropriate, (such as mechanical, electrical, gas, air, fluids and explosive)
- 1.3 follow job instructions, maintenance drawings and procedures
- 1.4 carry out pre-use checks and examinations on the tools and equipment to be utilised ensuring they are in a safe and usable condition
- 1.5 ensure that the system is kept free from foreign objects, dirt or other contamination

- 1.6 return all tools and equipment to the correct location on completion of the maintenance activities
 - 1.7 deal promptly and effectively with problems within their control and seek help and guidance from the relevant people if they have problems that they cannot resolve
 - 1.8 leave the work area in a safe and tidy condition on completion of the maintenance activities
-

Learning outcome

The learner will:

- 2 carry out maintenance activities on all of the following:

Assessment criteria

- 2.1 aircraft ammunition
 - 2.2 aircraft missile launchers
 - 2.3 aircraft guns
 - 2.4 aircraft bombs
 - 2.5 Electrical Explosive Devices (EED)
 - 2.6 Ejector Release Units (ERU)
 - 2.7 Armament Airfield Support Equipment (AASE) eg operator maintenance on Weapons trolleys
-

Learning outcome

The learner will:

- 3 carry out all of the following maintenance activities as applicable to the equipment being maintained:

Assessment criteria

- 3.1 unpack/repack
- 3.2 examine/inspect
- 3.3 prepare
- 3.4 test
- 3.5 assemble/disassemble
- 3.6 dismantling equipment to unit/sub-assembly level
- 3.7 dismantling unit to component level
- 3.8 tightening fastenings to the required torque
- 3.9 identify and solve faults
- 3.10 application of markings
- 3.11 clean & lubricate components

Learning outcome

The learner will:

- 4 carry out four of the following diagnostic/maintenance techniques as appropriate to the maintenance activity:

Assessment criteria

- 4.1 operate/functional check
- 4.2 visual checks (such as signs of leakage, damage, missing parts, wear/deterioration)
- 4.3 Standard Serviceability Test (SST)
- 4.4 movement checks (such as excessive movement or clearance, loose fittings and connections)
- 4.5 gauging
- 4.6 fastener extraction
- 4.7 use of specialist maintenance equipment/tools e.g. PS installation tool

Learning outcome

The learner will:

- 5 use the following maintenance documentation as appropriate:

Assessment criteria

- 5.1 aircraft publications
- 5.2 digital publications
- 5.3 maintenance schedule
- 5.4 manufacturers' documentation
- 5.5 aircraft publications

Learning outcome

The learner will:

- 6 remove and refit a range of mechanical components, to include seven of the following:

Assessment criteria

- 6.1 shafts
- 6.2 pipes
- 6.3 gears
- 6.4 pistons
- 6.5 splines
- 6.6 seals
- 6.7 location studs/keys
- 6.8 springs
- 6.9 Plates
- 6.10 cams and followers

- 6.11 levers and links
 - 6.12 slides
 - 6.13 rollers
 - 6.14 housings/fairings
 - 6.15 actuating mechanisms
 - 6.16 structural components
 - 6.17 locking and retaining devices (such as circlips, pins, screws)
 - 6.18 plates
 - 6.19 other specific components e.g: switches, umbilical cables
-

Learning outcome

The learner will:

- 7 complete the relevant servicing and maintenance records, to include one from the following:

Assessment criteria

- 7.1 servicing/maintenance schedule/equipment log (History Card),
 - 7.2 maintenance work recording/job card
 - 7.3 Weapon/store preparation and recovery log
-

Knowledge and understanding

- K1 the health and safety requirements, and safe working practices and procedures required for the activities undertaken
- K2 the importance of wearing appropriate protective clothing and equipment (PPE), and of keeping the work area safe and tidy
- K3 the hazards associated with carrying out maintenance activities on aircraft armament equipment such as lethal voltages, explosive components, cadmium, oils and lubricants, as well as the mechanical and physical safety devices (design features) inherent and their indication of when in 'safe' condition
- K4 the importance of applying the appropriate behaviours in the workplace and the implications for both the apprentice and the organisation if these are not adhered to
- K5 the general orders and special instructions applicable to aircraft armament equipment such as Aircraft Guns, Aircraft Armament Suspension Equipment and bombs
- K6 the types of explosive munitions used on military aircraft and how they operate
- K7 the operator maintenance associated with but not limited to: weapons transportation trolleys and associated ancillaries, weapon loading trolleys, palletisers, and cradles
- K8 the depth of maintenance permitted on the aircraft armament equipment, limitations and any system isolation procedures that may apply
- K9 the scheduled maintenance periodicities that are applicable to aircraft armament equipment including both permanent and temporary fitted Aircraft Armament Suspension Equipment (AASE)
- K10 the storage and security requirements for aircraft armament equipment

- K11 the differences between electrically initiated and explosively operated Aircraft Armament Suspension Equipment (AASE)
- K12 the procedure for obtaining drawings, job instructions, related specifications, replacement parts, materials and other consumables necessary for the maintenance activities
- K13 the basic principles of how the equipment functions, its operating sequence, the working purpose of individual units/components and how they interact
- K14 the various maintenance techniques and aids that can be used (such as fault reports, visual checks, measuring, movement and alignment checks, testing)
- K15 how to check that systems meet the required specification/operating conditions and be able to identify and rectify faults
- K16 how to carry out pre-use checks that tools and equipment are free from damage or defect, are in a safe and usable condition, are within calibration, and are configured correctly for the intended purpose
- K17 the techniques used to dismantle/assemble Aircraft Armament equipment (such as disconnection and reconnection of pipes, hoses, cables, seals, clamps, aligning and torque loading components)
- K18 the importance of completing maintenance documentation and/or reports following the maintenance activity
- K19 when and how to use lifting and handling equipment in the maintenance activity
- K20 the problems associated with the maintenance activity, and how they can be overcome
- K21 when to act on their own initiative and when to seek help and advice from others such as AASE hang up investigations
- K22 the importance of leaving the work area and equipment in a safe and clean condition on completion of the maintenance activities (such as returning hand tools and test equipment to the designated locations, cleaning the work area, and removing and disposing of waste)

Unit 271

Maintaining Military Aircraft Armament Equipment

Supporting Information

Unit Range Description

This Employer Unit of Competence (EUC) has been developed by employers in the Aerospace and Aviation Sector and is part of an overall development programme designed to meet the requirements of the Sector, the published Apprenticeship Standard and Employer Occupational Brief.

This EUC identifies the training and development required in order that the apprentice can demonstrate that they are competent in being able to carry out maintenance activities on military aircraft armament equipment that will prepare them for entry into military aircraft related trades, creating a progression between education and employment, or providing a basis for the development of additional skills and occupational competences in the working environment.

They will be expected to prepare for the activities by obtaining all necessary information, documentation, tools and equipment required, and to plan how they intend to carry out the required overhaul activities and the sequence of operations they intend to use.

The apprentice will be required to select the appropriate equipment to use, based on the activity to be carried out and the type of aircraft armament equipment being maintained. This may include equipment such as inspection aids, test equipment, standard tool kits, and other organisation-specific equipment. They will be expected to use a variety of maintenance inspection techniques and procedures, such as gathering information from inspecting, operating and testing the equipment. They will work under a high level of supervision, whilst taking responsibility for their own actions and for the quality and accuracy of the work that they carry out. On completion of the activities, the apprentice will be expected to return all tools and equipment to the correct locations and to leave the work area in a safe and tidy condition.

The apprentice's responsibilities will require them to comply with health and safety requirements and organisational policy and procedures for the activities undertaken. They will understand the safety precautions required when carrying out the overhaul activities, and when using relevant tools and equipment; and will also be required to demonstrate safe working practices throughout, and will understand the responsibility they owe to themselves and others in the workplace.

The apprentice's knowledge will provide an understanding of their work, and will enable them to apply appropriate overhaul techniques and procedures safely. They will have a basic understanding of the equipment being maintained, and its application, and will know about the overhaul requirements and the equipment components, tools and consumables used, to the required depth to provide a sound basis for carrying out the activities to the required specification. They will be able to apply the appropriate behaviours required in the workplace to meet the job profile and overall organization objectives, such as strong work ethic, positive attitude, team player, dependability, responsibility, honesty, integrity, motivation and commitment.

Unit guidance

Assessment requirements for this have been developed by employers for the occupational competency units and qualifications for the Aerospace and Aviation Sector. These assessment requirements are set down in the Aerospace Engineering Employer Occupational Unit Assessment Strategy.

Although all of the content and assessment requirements must be met in full employers can tailor the training outcomes to ensure that the content of the programme is specific to their requirements in terms of products, processes, procedures, tools, equipment, materials, documentation and information systems.

This will allow each organisation to develop their own specific and tailored apprentice training programme whilst meeting their own requirements whilst at the same time ensuring that the overall generic content is to a high standard in terms of depth and breadth to enable progression and/or transferability to other employers.

Appendix 1 Relationships to other qualifications

Links to other qualifications

Centres are responsible for checking the different requirements of all qualifications they are delivering and ensuring that candidates meet requirements of all units/qualifications.

Literacy, language, numeracy and ICT skills development

This qualification can develop skills that can be used in the following qualifications:

- Functional Skills (England) – see www.cityandguilds.com/functionalskills
- Essential Skills (Northern Ireland) – see www.cityandguilds.com/essentialskillsni
- Essential Skills Wales – see www.cityandguilds.com/esw

Appendix 2 Sources of general information

The following documents contain essential information for centres delivering City & Guilds qualifications. They should be referred to in conjunction with this handbook. To download the documents and to find other useful documents, go to the Centres and Training Providers homepage on www.cityandguilds.com.

Centre Manual - Supporting Customer Excellence contains detailed information about the processes which must be followed and requirements which must be met for a centre to achieve 'approved centre' status, or to offer a particular qualification, as well as updates and good practice exemplars for City & Guilds assessment and policy issues.

Specifically, the document includes sections on:

- The centre and qualification approval process
- Assessment, internal quality assurance and examination roles at the centre
- Registration and certification of candidates
- Non-compliance
- Complaints and appeals
- Equal opportunities
- Data protection
- Management systems
- Maintaining records
- Assessment
- Internal quality assurance
- External quality assurance.

Our Quality Assurance Requirements encompasses all of the relevant requirements of key regulatory documents such as:

- SQA Awarding Body Criteria (2007)
- NVQ Code of Practice (2006)

and sets out the criteria that centres should adhere to pre and post centre and qualification approval.

Access to Assessment & Qualifications provides full details of the arrangements that may be made to facilitate access to assessments and qualifications for candidates who are eligible for adjustments in assessment.

The **centre homepage** section of the City & Guilds website also contains useful information on such things as:

- **Walled Garden:** how to register and certificate candidates on line
- **Events:** dates and information on the latest Centre events
- **Online assessment:** how to register for e-assessments.

Centre Guide – Delivering International Qualifications contains detailed information about the processes which must be followed and requirements which must be met for a centre to achieve 'approved centre' status, or to offer a particular qualification.

Specifically, the document includes sections on:

- The centre and qualification approval process and forms

- Assessment, verification and examination roles at the centre
- Registration and certification of candidates
- Non-compliance
- Complaints and appeals
- Equal opportunities
- Data protection
- Frequently asked questions.

Appendix 3 Useful contacts

UK learners

General qualification information

E: learnersupport@cityandguilds.com

International learners

General qualification information

F: +44 (0)20 7294 2413

E: intcg@cityandguilds.com

Centres

Exam entries, Certificates, Registrations/enrolment, Invoices, Missing or late exam materials, Nominal roll reports, Results

F: +44 (0)20 7294 2413

E: centresupport@cityandguilds.com

Single subject qualifications

Exam entries, Results, Certification, Missing or late exam materials, Incorrect exam papers, Forms request (BB, results entry), Exam date and time change

F: +44 (0)20 7294 2413

F: +44 (0)20 7294 2404 (BB forms)

E: singlesubjects@cityandguilds.com

International awards

Results, Entries, Enrolments, Invoices, Missing or late exam materials, Nominal roll reports

F: +44 (0)20 7294 2413

E: intops@cityandguilds.com

Walled Garden

Re-issue of password or username, Technical problems, Entries, Results, e-assessment, Navigation, User/menu option, Problems

F: +44 (0)20 7294 2413

E: walledgarden@cityandguilds.com

Employer

Employer solutions, Mapping, Accreditation, Development Skills, Consultancy

T: +44 (0)121 503 8993

E: business@cityandguilds.com

Publications

Logbooks, Centre documents, Forms, Free literature

F: +44 (0)20 7294 2413

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As the UK's leading vocational education organisation, City & Guilds is leading the talent revolution by inspiring people to unlock their potential and develop their skills. We offer over 500 qualifications across 28 industries through 8500 centres worldwide and award around two million certificates every year. City & Guilds is recognised and respected by employers across the world as a sign of quality and exceptional training.

City & Guilds Group

The City & Guilds Group is a leader in global skills development. Our purpose is to help people and organisations to develop their skills for personal and economic growth. Made up of City & Guilds, City & Guilds Kineo, The Oxford Group and ILM, we work with education providers, businesses and governments in over 100 countries.

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