

Level 3 NVQ Diploma in Aeronautical Engineering (Aircraft Surface Finishing) (1789-31)

September 2018 version 1.2





Qualification at a glance

| | |
|---------------------------------------|---|
| Subject area | Engineering |
| City & Guilds number | 1789 |
| Age group approved | 16-18, 19+ |
| Entry requirements | Level 3 |
| Assessment | Portfolio |
| Fast track | Available |
| Support materials | Centre handbook |
| Registration and certification | Consult the Walled Garden/Online Catalogue for last dates |

| Title and level | City & Guilds number | Accreditation number |
|--|---------------------------------|-----------------------------|
| Level 3 NVQ Diploma in Aeronautical Engineering (Aircraft Surface Finishing) | 1789-31 | 600/1575/5 |

| Version and date | Change detail | Section |
|-------------------------|--|--|
| 1.1 November 2012 | <ul style="list-style-type: none">• Formatting (not allowing sentences to split between two pages)• Amended UAN | <ul style="list-style-type: none">• Units 001, 403, 404• Unit 490 |
| 1.2 September 2018 | <ul style="list-style-type: none">• Changed from a seven to a nine | <ul style="list-style-type: none">• Unit 001 assessment criteria 2.3 |



Contents

| | | |
|-------------------|--|-----------|
| 1 | Introduction | 4 |
| 2 | Centre requirements | 5 |
| 3 | Delivering the qualification | 9 |
| 4 | Assessment | 10 |
| 5 | Units | 13 |
| Unit 001 | Complying with statutory regulations and organisational safety requirements | 14 |
| Unit 002 | Using and interpreting engineering data and documentation | 19 |
| Unit 403 | Working efficiently and effectively in engineering | 25 |
| Unit 404 | Reinstating the work area on completion of activities | 31 |
| Unit 489 | Applying aircraft paint finishes by hand | 36 |
| Unit 490 | Applying aircraft paint finishes by spray guns | 41 |
| Unit 491 | Applying transfers, decals and livery to aircraft | 46 |
| Unit 492 | Stripping and removing aircraft finishes | 51 |
| Unit 493 | Applying finishes to aircraft composite mouldings | 56 |
| Appendix 1 | Relationships to other qualifications | 62 |
| Appendix 2 | Sources of general information | 63 |



1 Introduction

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

| Area | Description |
|---|---|
| Who is the qualification for? | It is for candidates who work or want to work in the engineering sector |
| What does the qualification cover? | It allows candidates to learn, develop and practise the skills required for employment and/or career progression in the engineering sector. |
| Is the qualification part of a framework or initiative? | It serves as a technical certificate, in the engineering Apprenticeship framework. |

Structure

To achieve the **Level 3 NVQ Diploma in Aeronautical Engineering (Aircraft Surface Finishing)**, learners must achieve **20** credits from the mandatory units and a minimum of **132** credits from the optional units available.

| Unit accreditation number | City & Guilds unit | Unit title | Credit value |
|---------------------------|--------------------|---|--------------|
| Mandatory | | | |
| A/601/5013 | 001 | Complying with statutory regulations and organisational safety requirements | 5 |
| Y/601/5102 | 002 | Using and interpreting engineering drawings and documents | 5 |
| K/601/5055 | 403 | Working efficiently and effectively in engineering | 5 |
| K/601/4228 | 404 | Reinstating the work area on completion of activities | 5 |
| Optional | | | |
| K/601/4701 | 489 | Applying aircraft paint finishes by hand | 46 |
| T/601/4703 | 490 | Applying aircraft paint finishes by spray guns | 46 |
| A/601/4704 | 491 | Applying transfers, decals and livery to aircraft | 20 |
| J/601/4706 | 492 | Stripping and removing aircraft finishes | 20 |
| L/601/4707 | 493 | Applying finishes to aircraft composite mouldings | 46 |



2 Centre requirements

Approval

Centres currently offering the City & Guilds NVQ in Aeronautical Engineering (1689) will be automatically approved to run this new qualification.

To offer this qualification 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 qualification before designing a course programme.

Resource requirements

Physical resources and site agreements

Centres can use specially designated areas within a centre to assess, for example, the installation of specialised electrical systems, alignment and setting up of electric motors and driven devices (pumps, compressors and generators). The equipment, systems and machinery must meet industrial standards and be capable of being used under normal working conditions, for example electric motors must have a method of applying sufficient power and not be connected up to show movement.

Centre staffing

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

- be occupationally competent or technically knowledgeable in the area 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.

Centre staff may undertake more than one role, eg tutor and assessor or internal verifier, but cannot internally verify their own assessments.

Assessors and internal verifier

Assessor requirements to demonstrate effective assessment practice

Assessment must be carried out by competent Assessors that as a minimum must hold the QCF Level 3 Award in Assessing Competence in the Work Environment. Current and operational assessors that hold units

D32 and/or D33 or A1 and/or A2 as appropriate for the assessment requirements set out in this Unit Assessment Strategy. However, they will be expected to regularly review their skills, knowledge and understanding and where applicable undertake continuing professional development to ensure that they are carrying out workplace assessment to the most up to date National Occupational Standards (NOS)

Assessor technical requirements

Assessors must be able to demonstrate that they have verifiable, relevant and sufficient technical competence to evaluate and judge performance and knowledge evidence requirements as set out in the relevant QCF unit learning outcomes and associated assessment criteria.

This will be demonstrated either by holding a relevant technical qualification or by proven industrial experience of the technical areas to be assessed. The assessor's competence must, at the very least, be at the same level as that required of the learner(s) in the units being assessed.

Assessors must also be:

- Fully conversant with the Awarding Organisation's assessment recording documentation used for the QCF NVQ units against which the assessments and verification are to be carried out, other relevant documentation and system and procedures to support the QA process.

Verifier requirements (internal and external)

Internal quality assurance (Internal Verification) must be carried out by competent Verifiers that as a minimum must hold the QCF Level 4 Award in the Internal Quality Assurance of Assessment Processes and Practices. Current and operational Internal Verifiers that hold internal verification units V1 or D34 will not be required to achieve the QCF Level 4 Award as they are still appropriate for the verification requirements set out in this Unit Assessment Strategy. Verifiers must be familiar with, and preferably hold, either the nationally recognised Assessor units D32 and/or D33 or A1 and/or A2 or the QCF Level 3 Award in Assessing Competence in the Work Environment.

External quality assurance (**external verification**) must be carried out by competent External Verifiers that as a minimum must hold the QCF Level 4 Award in the External Quality Assurance of Assessment Processes and Practices. Current and operational External Verifiers that hold external verification units V2 or D35 will not be required to achieve the QCF Level 4 Award as they are still appropriate for the verification requirements set out in this Unit Assessment Strategy. Verifiers must be familiar with, and preferably hold, either the nationally recognised Assessor units D32 and/or D33 or A1 and/or A2 or the QCF Level 3 Award in Assessing Competence in the Work Environment.

External and Internal Verifiers will be expected to regularly review their skills, knowledge and understanding and where applicable undertake continuing professional development to ensure that they are carrying out workplace Quality Assurance (verification) of Assessment Processes and Practices to the most up to date National Occupational Standards (NOS) Verifiers, both Internal and External, will also be expected to be fully conversant with the terminology used in the QCF NVQ units against which the assessments and verification are to be carried out, the appropriate

Regulatory Body's systems and procedures and the relevant Awarding Organisation's documentation.

Continuing professional development (CPD)

Centres must support their staff to ensure that they have current knowledge of the occupational area, that delivery, mentoring, training, assessment and verification is in line with best practice, and that it takes account of any national or legislative developments.

Candidate entry requirements

City & Guilds does not set entry requirements for this qualification. However, centres must ensure that candidates have the potential and opportunity to gain the qualification successfully so should have the opportunity to gather work based evidence.

The Semta Engineering Manufacture apprenticeship framework suggests that:

- Employers would be interested in candidates that:
 - are keen and motivated to work in an engineering environment
 - are willing to undertake a course of training both on-the-job and off-the-job and apply this learning in the workplace
 - have previous work experience or employment in the sector
 - have completed a 14 to 19 diploma in engineering or manufacturing
 - have completed a young apprenticeship in engineering or other related area
 - have gcse's in english, maths and science
 - have completed tests in basic numeracy, literacy and communication skills and have spatial awareness.

As a guide, the Engineering Manufacturing framework is suitable for applicants who have five GCSEs grades D to E in English, Maths and Science. The selection process on behalf of employers may include initial assessment where applicants will be asked if they have any qualifications or experience that can be accredited against the requirements of the apprenticeship. They may also be required to take tests in basic numeracy and literacy, communications skills and spatial awareness. There may also be an interview to ensure applicants have selected the right occupational sector and are motivated to become an apprentice, as undertaking an apprenticeship is a major commitment for both the individual and the employer.'

Assessment environment (extract from Semta QCF Unit Assessment Strategy 1 January 2011)

The evidence put forward for this qualification can only be regarded valid, reliable, sufficient and authentic if achieved and obtained in the working environment and be clearly attributable to the learner. However, in certain circumstances, simulation/replication of work activities may be acceptable.

The use of high quality, realistic simulations/replication, which impose pressures which are consistent with workplace expectations, should only be used in relation to the assessment of the following:-

- rare or dangerous occurrences, such as those associated with health, safety and the environment issues, emergency scenarios and rare operations at work;
- the response to faults and problems for which no opportunity has presented for the use of naturally occurring workplace evidence of learners competence;
- aspects of working relationships and communications for which no opportunity has presented for the use of naturally occurring workplace evidence of learners competence.

Simulations/replications will require prior approval from centres City & Guilds external verifier/qualification consultant and should be designed in relation to the following parameters:

- the environment in which simulations take place must be designed to match the characteristics of the working environment
- competencies achieved via simulation/replication must be transferable to the working environment
- simulations which are designed to assess competence in dealing with emergencies, accidents and incidents must be verified as complying with relevant health, safety and environmental legislation by a competent health and safety/environmental control officer before being used
- simulated activities should place learners under the same pressures of time, access to resources and access to information as would be expected if the activity was real
- simulated activities should require learners to demonstrate their competence using plant and/or equipment used in the working environment
- simulated activities which require interaction with colleagues and contacts should require the learner to use the communication media that would be expected at the workplace
- for health and safety reason simulations need not involve the use of genuine substances/materials. Any simulations which require the learner to handle or otherwise deal with materials substances/should ensure that the substitute take the same form as in the workplace.

Age restrictions

There is no age restriction for this qualification unless this is a legal requirement of the process or the environment.



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 qualification.
- any units they have already completed, or credit they have accumulated which is relevant to the qualification.
- the appropriate type and level of qualification.

We recommend that centres provide an induction programme so the candidate fully understands the requirements of the qualification, their responsibilities as a candidate, and the responsibilities of the centre. This information can be recorded on a learning contract.

Support materials

The following resources are available for these qualifications

| Description | How to access |
|---|---|
| Personal Learning and Thinking skills (required for apprenticeship) | www.cityandguilds.com , 1789 product documentation pages |
| Centre approval forms | www.cityandguilds.com |
| Semta QCF Assessment Strategy | www.cityandguilds.com |
| Unit assessment guidance | www.cityandguilds.com , 1789 product documentation pages |

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

Assessment of the qualification (extract from Semta QCF Unit Assessment Strategy 1 January 2011)

Carrying out assessments

The NVQ units were specifically developed to cover a wide range of activities. The evidence produced for the units will, therefore, depend on the learner's choice of 'bulleted items' listed in the unit assessment criteria.

Where the assessment criteria gives a choice of bulleted items (for example 'any three from five'), assessors should note that learners do not need to provide evidence of the other items to complete the unit (in this example, two) items, particularly where these additional items may relate to other activities or methods that are not part of the learners normal workplace activity or area of expertise.

Minimum performance evidence requirements

Performance evidence must be the main form of evidence gathered. In order to demonstrate consistent, competent performance for a unit, a minimum of 3 different examples of performance must be provided, and must be sufficient to show that the assessment criteria have been achieved to the prescribed standards. It is possible that some of the bulleted items in the assessment criteria may be covered more than once. The assessor and learner need to devise an assessment plan to ensure that performance evidence is sufficient to cover all the specified assessment criteria and which maximises the opportunities to gather evidence. Where applicable, performance evidence may be used for more than one unit.

The most effective way of assessing competence, is through direct observation of the learner. Assessors must make sure that the evidence provided reflects the learner's competence and not just the achievement of a training programme.

Evidence that has been produced from team activities, for example, maintenance or installation activities is only valid when it clearly relates to the learners specific and individual contribution to the activity, and not to the general outcome(s).

Each example of performance evidence will often contain features that apply to more than one unit, and can be used as evidence in any unit where appropriate.

Performance evidence must be a combination of:

- outputs of the learner's work, such as items that have been manufactured, installed, maintained, designed, planned or quality assured, and documents produced as part of a work activity together with:
- evidence of the way the learner carried out the activities such as witness testimonies, assessor observations or authenticated learner reports, records or photographs of the work/activity carried out, etc.

Competent performance is more than just carrying out a series of individual set tasks. Many of the units contain statements that require the learner to provide evidence that proves they are capable of combining the various features and techniques. Where this is the case, separate fragments of evidence would not provide this combination of features and techniques and will not, therefore, be acceptable as demonstrating competent performance.

If there is any doubt as to what constitutes valid, authentic and reliable evidence, the internal and/or external verifier (qualifications consultant) should be consulted.

Assessing knowledge and understanding

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 learner's knowledge and understanding (and the handling of contingency situations) 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. Semta (the Sector Skills Council) expects oral questioning and practical demonstrations to be used, as these are considered the most appropriate for these units. Assessors should ask enough questions to make sure that the learner has an appropriate level of knowledge and understanding, as required by the unit.

Evidence of knowledge and understanding will **not** be required for those bulleted items in the assessment criteria that have not been selected by the learner.

The achievement of the specific knowledge and understanding requirements of the units cannot simply be inferred by the results of tests or assignments from other units, qualifications or training programmes. Where evidence is submitted from these sources, the assessor must, as with any assessment, make sure the evidence is valid, reliable, authentic, directly attributable to the learner, and meets the full knowledge and understanding requirements of the unit. Where oral questioning is used the assessor must retain a record of the questions asked, together with the learner'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 learner. This could be a team leader, supervisor, mentor or line manager who may be regarded as a suitable witness to the learner'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 learner. It will be the responsibility of the assessor to make sure that any witness testimonies accepted as evidence of the learner's competency are reliable, auditable and technically valid.

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.

RPL is allowed and is also sector specific.



5 Units

Availability of units

Below is a list of the learning outcomes for all the units. If you want to download a complete set of units, go to www.cityandguilds.com

Structure of units

These units each have the following:

- City & Guilds reference number
- unit accreditation number (UAN)
- title
- level
- credit value
- unit aim
- relationship to NOS, other qualifications and frameworks
- endorsement by a sector or other appropriate body
- information on assessment
- learning outcomes which are comprised of a number of assessment criteria
- notes for guidance.

Unit 001

Complying with statutory regulations and organisational safety requirements

| | |
|--|--|
| UAN: | A/601/5013 |
| Level: | 2 |
| Credit value: | 5 |
| GLH: | 35 |
| Relationship to NOS: | This unit has been derived from national occupational standard: Complying with statutory regulations and organisational safety requirements (Suite 2). |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Semta, the Sector Skills Council for science, engineering and manufacturing |
| Aim: | <p>This unit covers the skills and knowledge needed to prove the competences required to deal with statutory regulations and organisational safety requirements. It does not deal with specific safety regulations or detailed requirements, it does, however, cover the more general health and safety requirements that apply to working in an industrial environment.</p> <p>The learner will be expected 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. The learner will need to be able to identify the relevant qualified first aiders and know the location of the first aid facilities. The learner will have a knowledge and 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. The learner will also need to be fully conversant with their organisation's procedures for fire alerts and the evacuation of premises.</p> <p>The learner will also 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, the materials and substances that they use, any working practices that do not follow laid-down procedures, and manual</p> |

lifting and carrying techniques.

The learner's responsibilities will require them to comply with all relevant statutory and organisational policy and procedures for health and safety in the workplace. The learner must act in a responsible and safe manner at all times, and present themselves in the workplace suitably prepared for the activities to be undertaken. The learner will be expected to report any problems with health and safety issues, to the relevant authority.

The learner's knowledge will provide a good understanding of the relevant statutory regulations and organisational requirements associated with their work, and will provide an informed approach to the procedures used.

The learner will need to understand their organisation's health and safety requirements and their application, in adequate depth to provide a sound basis for carrying out their activities in a safe and competent manner.

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| Learning outcome |
| The learner will: 1. Be able to comply with statutory regulations and organisational safety requirements |
| Assessment criteria |
| The learner can: 1.1 comply with their duties and obligations as defined in the health and safety at work act 1.2 demonstrate their understanding of their duties and obligations to health and safety by: <ul style="list-style-type: none">• applying in principle their duties and responsibilities as an individual under the health and safety at work act• identifying, within their organisation, appropriate sources of information and guidance on health and safety issues, such as:<ul style="list-style-type: none">o eye protection and personal protective equipment (PPE)o COSHH regulationso Risk assessments• identifying the warning signs and labels of the main groups of hazardous or dangerous substances• complying with the appropriate statutory regulations at all times 1.3 present themselves in the workplace suitably prepared for the activities to be undertaken 1.4 follow organisational accident and emergency procedures 1.5 comply with emergency requirements, to include: <ul style="list-style-type: none">• identifying the appropriate qualified first aiders and the location of first aid facilities• identifying the procedures to be followed in the event of injury to themselves or others |

| | |
|------|--|
| | <ul style="list-style-type: none"> • following organisational procedures in the event of fire and the evacuation of premises • identifying the procedures to be followed in the event of dangerous occurrences or hazardous malfunctions of equipment |
| 1.6 | recognise and control hazards in the workplace |
| 1.7 | identify the hazards and risks that are associated with the following: <ul style="list-style-type: none"> • their working environment • the equipment that they use • materials and substances (where appropriate) that they use • working practices that do not follow laid-down procedures |
| 1.8 | use correct manual lifting and carrying techniques |
| 1.9 | demonstrate one of the following methods of manual lifting and carrying: <ul style="list-style-type: none"> • lifting alone • with assistance of others • with mechanical assistance |
| 1.10 | apply safe working practices and procedures to include: <ul style="list-style-type: none"> • maintaining a tidy workplace, with exits and gangways free from obstruction • using equipment safely and only for the purpose intended • observing organisational safety rules, signs and hazard warnings • taking measures to protect others from any harm resulting from the work that they are carrying out. |

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|----------------------------|--|
| Learning outcome | |
| The learner will: | |
| 2. | Know how to comply with statutory regulations and organisational safety requirements |
| Assessment criteria | |
| The learner can: | |
| 2.1 | describe the roles and responsibilities of themselves and others under the health and safety at work act, and other current legislation |
| 2.2 | describe the specific regulations and safe working practices and procedures that apply to their work activities |
| 2.3 | describe the warning signs for the nine main groups of hazardous substances defined by classification, packaging and labelling of dangerous substances regulations |
| 2.4 | explain how to locate relevant health and safety information for their tasks, and the sources of expert assistance when help is needed |
| 2.5 | explain what constitutes a hazard in the workplace |
| 2.6 | describe their responsibilities for identifying and dealing with hazards and reducing risks in the workplace |
| 2.7 | describe the risks associated with their working environment |
| 2.8 | describe the processes and procedures that are used to identify and rate the level of risk |

- 2.9 describe the first aid facilities that exist within their work area and within the organisation in general; the procedures to be followed in the case of accidents involving injury
- 2.10 explain what constitute dangerous occurrences and hazardous malfunctions, and why these must be reported even if no-one is injured
- 2.11 describe 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
- 2.12 describe the organisational policy with regard to fire fighting procedures; the common causes of fire and what they can do to help prevent them
- 2.13 describe the protective clothing and equipment that is available for their areas of activity
- 2.14 explain how to safely lift and carry loads, and the manual and mechanical aids available
- 2.15 explain how to prepare and maintain safe working areas; the standards and procedures to ensure good housekeeping
- 2.16 describe the importance of safe storage of tools, equipment, materials and products
- 2.17 describe the extent of their own authority, and to whom they should report in the event of problems that they cannot resolve.

Unit 001 Complying with statutory regulations and organisational safety requirements

Supporting information

Guidance

2.1 (such as The Management of Health and Safety at Work Regulations, Workplace Health and Safety and Welfare Regulations, Personal Protective Equipment at Work Regulations, Manual Handling Operations Regulations, Provision and Use of Work Equipment Regulations, Display Screen at Work Regulations, Reporting of Injuries, Diseases and Dangerous Occurrences Regulations)

2.5 (such as moving parts of machinery, electricity, slippery and uneven surfaces, poorly placed equipment, dust and fumes, handling and transporting, contaminants and irritants, material ejection, fire, working at height, environment, pressure/stored energy systems, volatile, flammable or toxic materials, unshielded processes, working in confined spaces)

2.7 (such as the tools, materials and equipment that they use, spillages of oil, chemicals and other substances, not reporting accidental breakages of tools or equipment and not following laid-down working practices and procedures)

2.8 (such as safety inspections, the use of hazard checklists, carrying out risk assessments, COSHH assessments)

Unit 002

Using and interpreting engineering data and documentation

| | |
|--|---|
| UAN: | Y/601/5102 |
| Level: | 2 |
| Credit value: | 5 |
| GLH: | 25 |
| Relationship to NOS: | This unit has been derived from national occupational standard: Using and interpreting engineering data and documentation (Suite 2). |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Semta, the Sector Skills Council for science, engineering and manufacturing |
| Aim: | <p>This unit covers the skills and knowledge needed to prove the competences required to make effective use of text, numeric and graphical information, by interpreting and using technical information extracted from documents such as engineering drawings, technical manuals, reference tables, specifications, technical sales/marketing documentation, charts or electronic displays, in accordance with approved procedures. The learner will be required to extract the necessary information from the various documents, in order to establish and carry out the work requirements, and to make valid decisions about the work activities based on the information extracted.</p> <p>The learner's responsibilities will require them to comply with organisational policy and procedures for obtaining and using the documentation applicable to the activity. They will be expected to report any problems with the use and interpretation of the documents that they cannot personally resolve, or are outside their permitted authority, to the relevant people. They will be expected to work to instructions if necessary, with an appropriate level of supervision or as a member of a team, and take personal responsibility for their own actions and for the quality and accuracy of the work that they carry out.</p> <p>The learner's underpinning knowledge will provide a good understanding of the types of documentation used, and will provide an</p> |

informed approach to applying instructions and procedures. They will be able to read and interpret the documentation used and will know about the conventions, symbols and abbreviations, in adequate depth to provide a sound basis for carrying out the activities to the required specification.

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| Learning outcome |
| The learner will: 1. Be able to use and interpret engineering data and documentation |
| Assessment criteria |
| The learner can: 1.1 use the approved source to obtain the required data and documentation 1.2 use the data and documentation and carry out all of the following: <ul style="list-style-type: none">• check the currency and validity of the data and documentation used• exercise care and control over the documents at all times• correctly extract all necessary data in order to carry out the required tasks• seek out additional information where there are gaps or deficiencies in the information obtained• deal with or report any problems found with the data and documentation• make valid decisions based on the evaluation of the engineering information extracted from the documents• return all documents to the approved location on completion of the work• complete all necessary work related documentation such as production documentation, installation documentation, maintenance documentation, planning documentation 1.3 correctly identify, interpret and extract the required information 1.4 extract information that includes three of the following: <ul style="list-style-type: none">• materials or components required• dimensions• tolerances• build quality• installation requirements• customer requirements• time scales• financial information• operating parameters• surface texture requirements• location/orientation of parts• process or treatments required• dismantling/assembly sequence• inspection/testing requirements• number/volumes required |

- repair/service methods
 - method of manufacture
 - weld type and size
 - operations required
 - connections to be made
 - surface finish required
 - shape or profiles
 - fault finding procedures
 - safety/risk factors
 - environmental controls
 - specific data (such as component data, maintenance data, electrical data, fluid data)
 - resources (such as tools, equipment, personnel)
 - utility supply details (such as electricity, water, gas, air)
 - location of services, including standby and emergency backup systems
 - circuit characteristics (such as pressure, flow, current, voltage, speed)
 - protective arrangements and equipment (such as containment, environmental controls, warning and evacuation systems and equipment)
 - other specific related information
- 1.5 use the information obtained to ensure that work output meets the specification
- 1.6 use information extracted from documents to include one from the following:
- drawings (such as component drawings, assembly drawings, modification drawings, repair drawings, welding/fabrication drawings, distribution and installation drawings)
 - diagrams (such as schematic, fluid power diagrams, piping, wiring/circuit diagrams)
 - manufacturers manuals/drawings
 - approved sketches
 - technical illustrations
 - photographic representations
 - visual display screen information
 - technical sales/marketing documentation
 - contractual documentation
 - other specific drawings/documents
- 1.7 use information extracted from related documentation, to include two from the following:
- instructions (such as job instructions, drawing instructions, manufacturers instructions)
 - specifications (such as material, finish, process, contractual, calibration)
 - reference materials (such as manuals, tables, charts, guides, notes)
 - schedules

| | |
|-----|--|
| | <ul style="list-style-type: none"> • operation sheets • service/test information • planning documentation • quality control documents • company specific technical instructions • national, international and organisational standards • health and safety standards relating to the activity (such as coshh) • other specific related documentation |
| 1.8 | deal promptly and effectively with any problems within their control and report those which cannot be solved |
| 1.9 | report any inaccuracies or discrepancies in documentation and specifications. |

| | |
|---|---|
| Learning outcome | |
| The learner will: | |
| 2. Know how to use and interpret engineering data and documentation | |
| Assessment criteria | |
| The learner can: | |
| 2.1 | explain what information sources are used for the data and documentation that they use in their work activities |
| 2.2 | explain how documents are obtained, and how to check that they are current and valid |
| 2.3 | explain the basic principles of confidentiality (including what information should be available and to whom) |
| 2.4 | describe the different ways/formats that data and documentation can be presented |
| 2.5 | explain how to use other sources of information to support the data |
| 2.6 | describe the importance of differentiating fact from opinion when reviewing data and documentation |
| 2.7 | describe the importance of analysing all available data and documentation before decisions are made |
| 2.8 | describe the different ways of storing and organising data and documentation to ensure easy access |
| 2.9 | describe the procedures for reporting discrepancies in the data or documentation, and for reporting lost or damaged documents |
| 2.10 | describe the importance of keeping all data and documentation up to date during the work activity, and the implications of this not being done |
| 2.11 | explain the care and control procedures for the documents, and how damage or graffiti on documents can lead to scrapped work |
| 2.12 | explain the importance of returning documents to the designated location on completion of the work activities |
| 2.13 | explain what basic drawing conventions are used and why there needs to be different types of drawings (such as isometric and orthographic, first and third angle, assembly drawings, circuit and wiring diagrams, block and schematic diagrams) |
| 2.14 | explain what types of documentation are used and how they interrelate |
| 2.15 | explain the imperial and metric systems of measurement; tolerancing and fixed reference points |

- 2.16 describe the meaning of the different symbols and abbreviations found on the documents that they use
- 2.17 describe the extent of their own responsibility, when to act on their own initiative to find, clarify and evaluate information, and to whom they should report if they have problems that they cannot resolve.

Unit 002 Using and interpreting engineering data and documentation

Supporting information

Guidance

2.4 (such as such as drawings, job instructions product data sheets, manufacturers' manuals, financial spreadsheets, production schedules, inspection and calibration requirements, customer information)

2.5 (such as electronic component pin configuration specifications, reference charts, standards, bend allowances required for material thickness, electrical conditions required for specific welding rods, mixing ratios for bonding and finishing materials, metal specifications and inspection requirements, health and safety documentation)

2.14 (such as production drawings, assembly drawings, circuit and wiring diagrams, block and schematic diagrams)

2.16 (such as surface finish, electronic components, weld symbols, linear and geometric tolerances, pressure and flow characteristics)

Unit 403

Working efficiently and effectively in engineering

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| UAN: | K/601/5055 |
| Level: | 3 |
| Credit value: | 5 |
| GLH: | 25 |
| Relationship to NOS: | This unit has been derived from national occupational standard: working efficiently and effectively in engineering (Suite 3). |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Semta, the Sector Skills Council for science, engineering and manufacturing |
| Aim: | <p>This unit covers the skills and knowledge needed to prove the competences required to work efficiently and effectively in the workplace, in accordance with approved procedures and practices. Prior to undertaking the engineering activity, the learner will be required to carry out all necessary preparations within the scope of their responsibility. This may include preparing the work area and ensuring that it is in a safe condition to carry out the intended activities, ensuring they have the appropriate job specifications and instructions and that any tools, equipment, materials and other resources required are available and in a safe and usable condition.</p> <p>On completion of the engineering activity, the learner will be required to return their immediate work area to an acceptable condition before recommencing further work requirements. This may involve placing completed work in the correct location, returning and/or storing any tools and equipment in the correct area, identifying any waste and/or scrapped materials and arranging for their disposal, and reporting any defects or damage to tools and equipment used.</p> <p>In order to be efficient and effective in the workplace, the learner will also be required to demonstrate that they can create and maintain effective working relationships with colleagues and line management. The learner will also be expected to review objectives and targets for their personal development and make recommendations to, and communicate any</p> |

opportunities for, improvements that could be made to working practices and procedures.

The learner's responsibilities will require them to comply with organisational policy and procedures for the engineering activities undertaken, and to report any problems with the activities, or the tools and equipment that are used that they cannot personally resolve, or are outside their permitted authority, to the relevant people. The learner will be expected to take personal responsibility for their own actions and for the quality and accuracy of the work that they carry out.

The learner's knowledge will provide a good understanding of their work, and will provide an informed approach to working efficiently and effectively in an engineering environment. The learner will understand the need to work efficiently and effectively, and will know about the areas they need to consider when preparing and tidying up the work area, how to contribute to improvements, deal with problems, maintain effective working relationships and agree their development objectives and targets, in adequate depth to provide a sound basis for carrying out the activities safely and correctly.

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

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| Learning outcome |
| The learner will: 3. Be able to work efficiently and effectively in engineering |
| Assessment criteria |
| The learner can: 3.1 work safely at all times, complying with health and safety and other relevant regulations and guidelines 3.2 prepare the work area to carry out the engineering activity 3.3 prepare to carry out the engineering activity, taking into consideration all of the following, as applicable to the work to be undertaken: <ul style="list-style-type: none">• the work area is free from hazards and is suitably prepared for the activities to be undertaken• any required safety procedures are implemented• any necessary personal protection equipment is obtained and is in a usable condition |

- tools and equipment required are obtained and checked that they are in a safe and useable condition
 - all necessary drawings, specifications and associated documentation is obtained
 - job instructions are obtained and understood
 - the correct materials or components are obtained
 - storage arrangements for work are appropriate
 - appropriate authorisation to carry out the work is obtained
- 3.4 check that there are sufficient supplies of materials and/or consumables and that they meet work requirements
- 3.5 ensure that completed products or resources are stored in the appropriate location on completion of the activities
- 3.6 complete work activities, to include all of the following:
- completing all necessary documentation accurately and legibly
 - returning tools and equipment
 - returning drawings and work instructions
 - identifying, where appropriate, any unusable tools, equipment or components
 - arranging for disposal of waste materials
- 3.7 tidy up the work area on completion of the engineering activity
- 3.8 deal promptly and effectively with problems within their control and report those that cannot be resolved
- 3.9 deal with problems affecting the engineering process, to include two of the following:
- materials
 - tools and equipment
 - drawings
 - job specification
 - quality
 - people
 - timescales
 - safety
 - activities or procedures
- 3.10 contribute to and communicate opportunities for improvement to working practices and procedures
- 3.11 make recommendations for improving to two of the following:
- working practices
 - working methods
 - quality
 - safety
 - tools and equipment
 - supplier relationships
 - internal communication
 - customer service
 - training and development
 - teamwork
 - other

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| 3.12 | maintain effective working relationships with colleagues to include two of the following: <ul style="list-style-type: none"> • colleagues within own working group • colleagues outside normal working group • line management • external contacts |
| 3.13 | review personal training and development as appropriate to the job role |
| 3.14 | review personal development objectives and targets to include one of the following: <ul style="list-style-type: none"> • dual or multi-skilling • training on new equipment / technology • increased responsibility • understanding of company working practices, procedures, plans and policies • other specific requirements. |

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| Learning outcome | |
| The learner will: | |
| 4. | Know how to work efficiently and effectively in engineering |
| Assessment criteria | |
| The learner can: | |
| 4.1 | describe the safe working practices and procedures to be followed whilst preparing and tidying up their work area |
| 4.2 | describe the correct use of any equipment used to protect the health and safety of themselves and their colleagues |
| 4.3 | describe the procedure for ensuring that all documentation relating to the work being carried out is available and current, prior to starting the activity |
| 4.4 | describe the action that should be taken if documentation received is incomplete and/or incorrect |
| 4.5 | describe the procedure for ensuring that all tools and equipment are available prior to undertaking the activity |
| 4.6 | describe the checks to be carried out to ensure that tools and equipment are in full working order, prior to undertaking the activity |
| 4.7 | describe the action that should be taken if tools and equipment are not in full working order |
| 4.8 | describe the checks to be carried out to ensure that all materials required are correct and complete, prior to undertaking the activity |
| 4.9 | describe the action that should be taken if materials do not meet the requirements of the activity |
| 4.10 | explain whom to inform when the work activity has been completed |
| 4.11 | describe the information and/or documentation required to confirm that the activity has been completed |
| 4.12 | explain what materials, equipment and tools can be reused |
| 4.13 | explain how any waste materials and/or products are transferred, stored and disposed of |
| 4.14 | explain where tools and equipment should be stored and located |

- 4.15 describe the importance of making recommendations for improving working practices
- 4.16 describe the procedure and format for making suggestions for improvements
- 4.17 describe the benefits to organisations if improvements can be identified
- 4.18 describe the importance of maintaining effective working relationships within the workplace
- 4.19 describe the procedures to deal with and report any problems that can affect working relationships
- 4.20 describe the difficulties that can occur in working relationships
- 4.21 describe the regulations that affect how they should be treated at work
- 4.22 describe the benefits of continuous personal development
- 4.23 describe the training opportunities that are available in the workplace
- 4.24 describe the importance of reviewing their training and development
- 4.25 explain with whom to discuss training and development issues
- 4.26 describe the extent of their own responsibility and to whom they should report if they have any problems that they cannot resolve.

Unit 403 **Working efficiently and effectively in engineering**

Supporting information

Guidance

2.21 (such as Equal Opportunities Act, Race and Sex Discrimination, working Time Directive)

Unit 404

Reinstating the work area on completion of activities

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| UAN: | K/601/4228 |
| Level: | 3 |
| Credit value: | 5 |
| GLH: | 25 |
| Relationship to NOS: | This unit has been derived from national occupational standard aeronautical engineering Unit 004: Reinstating the work Area on completion of activities (Suite 3). |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Semta, the Sector Skills Council for science, engineering and manufacturing |
| Aim: | <p>This unit covers the skills and knowledge needed to prove the competences required to reinstate the work area, in accordance with approved procedures. The learner will be required to follow the correct procedures for the safe storage of finished products and surplus materials, and to correctly identify and separate all waste materials and ensure that they are removed to their designated locations. The learner will also need to ensure that all tools, equipment and documents used are accounted for and returned to the appropriate places. Tidying of the work area will be of prime importance and includes office and clean working area environments, workshops, staging and platforms, internal areas of aircraft such as wings, tanks and fuselage sections, and areas that are airside. The learner's responsibilities will require them to comply with organisational policy and procedures for the activities undertaken, and to report any problems with the reinstatement activities that they cannot personally resolve, or that are outside their permitted authority, to the relevant people. The learner will be expected to work with a minimum of supervision, taking personal responsibility for their own actions and for the quality of the work they carry out.</p> <p>The learner's knowledge will provide a good understanding of their work, and provide an informed approach to applying the required procedures. The learner will understand the need for reinstating the work areas, and will</p> |

know about the storage requirements of the products, equipment, materials, documentation and consumables, in adequate depth to provide a sound basis for carrying out the activities to the required standard and ensuring that the work area is reinstated satisfactorily.

The learner will understand the safety precautions required when reinstating the work area. The learner will be required to demonstrate safe working practices throughout, and will understand the responsibility they owe to themselves and others in the workplace.

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| Learning outcome |
| The learner will: 1. Be able to reinstate the work area on completion of activities |
| Assessment criteria |
| The learner can: 1.1 work safely at all times, complying with health and safety and other relevant regulations and guidelines 1.2 carry out all of the following activities during reinstatement of the work area: <ul style="list-style-type: none"> • work to current schedules • adhere to procedures or systems in place for risk assessment, coshh, personal protective equipment and other relevant safety regulations and procedures to realise a safe system of work • report any loss or damage to equipment • report any identified hazards within the work area • return all consumables and materials to their correct location • complete any documentation as required 1.3 separate equipment, components, and materials for re-use from waste items and materials 1.4 store reusable materials and equipment in an appropriate location 1.5 correctly label and store four the following resources: <ul style="list-style-type: none"> • finished products/components • components requiring overhaul/repair • surplus materials/components • tooling, jigs, fixtures or other equipment used • drawings requiring actioning/adjusting • scrap components • measuring and test instruments • finished drawings • finished documentation • documentation requiring actioning/adjusting 1.6 dispose of waste materials in line with organisational and environmental safe procedures |

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| 1.7 | deal with waste materials, in line with company and environmental regulations, to include two of the following: <ul style="list-style-type: none"> • correctly segregating waste materials • correctly dispose of waste materials • disposing of joining compounds, sealants and adhesives • disposing of other chemical products • removing non-hazardous materials • disposing of fluid waste (such as oil, hydraulic fluids, fuel) |
| 1.8 | restore the work areas to a safe condition in accordance with agreed requirements and schedules |
| 1.9 | carry out reinstatement activities on two work areas from: <ul style="list-style-type: none"> • workshops/hangers • airside • areas at height (such as platforms, staging, lifts) • internal areas of aircraft (such as wings, tanks, fuselage sections) • office environment • computer aided design (cad) environment • technical/clean room environment • other appropriate environment |
| 1.10 | deal promptly and effectively with problems within their control and report those that cannot be solved. |

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| Learning outcome | |
| The learner will: | |
| 2. | Know how to reinstate the work area on completion of activities |
| Assessment criteria | |
| The learner can: | |
| 2.1 | explain the specific safety practices and procedures they need to observe when reinstating the work area |
| 2.2 | explain the health and safety requirements of the work area where they are carrying out the activities, and the responsibility these requirements place on them |
| 2.3 | describe the hazards associated with reinstating the work area, and explain how to minimise them and reduce any risks |
| 2.4 | explain the safe working practices and procedures to be followed when carrying out the various activities |
| 2.5 | explain what personal protective clothing and equipment needs to be worn, and where this can be obtained |
| 2.6 | explain why work areas need to be restored to a set standard, and what these requirements are |
| 2.7 | describe the types of work area that will need to be restored |
| 2.8 | explain the importance of tool and equipment control, and why this is critical within the aerospace industry |
| 2.9 | explain the meaning of 'foreign object debris', and why it is vital to ensure that this does not occur or is removed |
| 2.10 | describe the stores procedures for tools and equipment, documentation and surplus or waste materials |
| 2.11 | explain what materials will need to be stored and disposed of, and why they need to be segregated, correctly identified and labelled |

- 2.12 explain how the various disposal bins can be identified
- 2.13 explain the procedures for disposing of hazardous materials
- 2.14 explain what documentation needs to be used on completion of the reinstatement activities
- 2.15 describe the extent of their own responsibility and explain to whom they should report if they have problems that they cannot resolve.

Unit 404 Reinstating the work area on completion of activities

Supporting information

Guidance

2.1 (such as any specific legislation, regulations/codes of practice for the activities, equipment or materials)

2.4 (such as lifting and handling techniques)

2.7 (such as office environments, computer aided design (CAD) environment, technical/clean room environment, workshops, test areas, stages and platforms and aircraft areas such as wing, tank, fuselage, airside section areas)

2.12 (such as colour coded, labelled)

2.13 (such as chemicals, adhesives, oil, hydraulic fluids, fuel)

Unit 489

Applying aircraft paint finishes by hand

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| UAN: | K/601/4701 |
| Level: | 3 |
| Credit value: | 46 |
| GLH: | 52 |
| Relationship to NOS: | This unit has been derived from national occupational standard Aeronautical Engineering Unit 089: Applying Aircraft Paint Finishes by Hand (Suite 3). |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Semta, the Sector Skills Council for science, engineering and manufacturing |
| Aim: | <p>This unit covers the skills and knowledge needed to prove the competences required to apply aircraft paint finishes by hand, in accordance with approved procedures. The learner will be required to use appropriate job instructions, specifications, tools and equipment to paint parts of the aircraft by hand. The learner will be expected to use the specified or appropriate process and techniques to degrease, prime and colour the various parts, using brushes and rollers as applicable to the task.</p> <p>The learner's responsibilities will require them to comply with organisational policy and procedures for the painting activities undertaken, and to report any problems with the painting, components or equipment that they cannot personally resolve, or that are outside their permitted authority, to the relevant people. The learner will be expected to work with a minimum of supervision, taking personal responsibility for their own actions and for the quality and accuracy of the work that they carry out.</p> <p>The learner's knowledge will provide a good understanding of their work, and will provide an informed approach to applying hand painting techniques and procedures. The learner will understand the painting procedures used, and their application, and will know about the hand painting techniques, paints and equipment used, in adequate depth to provide a sound basis for carrying out the activities to the required specification.</p> |

The learner will understand the safety precautions required when carrying out the painting operations. The learner will be required to demonstrate safe working practices throughout, and will understand the responsibility they owe to themselves and others in the workplace.

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| Learning outcome |
| The learner will: 1. Be able to apply aircraft paint finishes by hand |
| Assessment criteria |
| The learner can: 1.1 work safely at all times, complying with health and safety and other relevant regulations and guidelines 1.2 carry out all of the following during the finishing process: <ul style="list-style-type: none">• obtain and use the appropriate documentation (such as job instructions, aircraft standards and specifications material data sheets, planning and quality control documentation)• adhere to procedures or systems in place for risk assessment, coshh, personal protective equipment and other relevant safety regulations and procedures to realise a safe system of work• provide and maintain a safe working environment for the finishing activities• obtain the correct tools and equipment for the activity, and check that they are in a safe and usable condition and within current calibration date• prepare the tools and equipment in readiness for the painting operations• use appropriate techniques and procedures to produce the required finish on the aircraft components• clean all tools and equipment on completion of the painting activities• return all tools and equipment to the correct location on completion of the activities• leave the work area and components in a safe and appropriate condition, free from foreign object debris on completion of the activities 1.3 ensure that material surfaces to be treated are suitably prepared for the finishing operations to be carried out 1.4 prepare for the finishing operations by carrying out six of the following activities: <ul style="list-style-type: none">• degreasing and cleaning• re-activating treatments• masking• surface pre-treatments• mixing of colour• mixing primers• flattening down |

- sealing
- 1.5 use three of the following consumables:
 - masking medium and tape
 - rubbing paper
 - abrasive pads
 - cleaning materials
- 1.6 check that the finishing equipment and treatment solutions are set up and maintained at satisfactory operating conditions and levels
- 1.7 apply four types of finishing material from the following, using brushes or rollers:
 - alacrom
 - epoxy
 - polyurethane
 - varnish
 - walkway
 - urethane
 - temporary protective coatings
 - other special finishes
 - acrylic
- 1.8 carry out the treatment process in accordance with operating procedures and the component specification requirements
- 1.9 apply finishes to two of the following aircraft components:
 - details
 - sub assemblies
 - major assemblies
 - blades and shafts (helicopters only)
- 1.10 apply finishes to parent materials, to include three of the following:
 - bare metal (ferrous)
 - bare metal (non-ferrous)
 - non-metallic
 - painted
- 1.11 check that the treated workpiece achieves the required characteristics and meets the finishing specification
- 1.12 apply finishes using appropriate techniques to achieve all of the following:
 - required tolerances
 - gloss levels
 - colour match
- 1.13 apply finishes in compliance with one of the following standards:
 - civil aviation authority (CAA)/european aviation safety agency (EASA)
 - ministry of defence (MoD)
 - federal aviation authority (FAA)
 - bs, iso or bsen standards and procedures
 - customer standards and requirements
 - company standards and procedures
- 1.14 deal promptly and effectively with problems within their control and report those that cannot be solved

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| 1.15 dispose of waste and excess materials in line with agreed organisational procedures |
| 1.16 shut down the finishing equipment to a safe condition on completion of the processing activities |

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| Learning outcome |
| The learner will: 2. Know how to apply aircraft paint finishes by hand |
| Assessment criteria |
| The learner can: 2.1 explain the specific safety precautions to be taken whilst carrying out the application of paint finishes 2.2 explain the health and safety requirements of the work area in which they are carrying out the finishing activity, and the responsibility these requirements place on them 2.3 describe the hazards associated with painting aircraft components, and with the materials and equipment used, and explain how to minimise them and reduce any risks 2.4 explain what personal protective equipment and clothing needs to be worn during the finishing activity 2.5 describe the various types of drawing and specifications that are used during the finishing activity 2.6 explain what surface treatment methods and techniques need to be undertaken prior to the finishing 2.7 explain the preparation methods and techniques for mixing paints and varnishes 2.8 describe the procedures for the transportation and storage of finishing materials 2.9 describe the equipment care and control procedures 2.10 explain the cleaning and maintenance procedures for brushes and rollers 2.11 describe the surface treatments available, and their characteristics and use 2.12 describe the procedures for dealing with waste materials 2.13 explain how to recognise defects such as bubbles, foreign object damage, contamination and surface defects 2.14 describe the tools and equipment used in the activities, and explain their preparation, care and control procedures 2.15 explain why tool/equipment control is critical, and what to do if a tool or piece of equipment is unaccounted for on completion of the activities 2.16 describe the problems that can occur with the finishing operations, and explain how these can be overcome 2.17 explain what recording documentation needs to be completed for the finishing activities undertaken and, where appropriate, the importance of marking and identifying specific pieces of work in relation to the documentation 2.18 describe the extent of their own responsibility and explain to whom they should report if they have problems that they cannot resolve |

Unit 489 Applying aircraft paint finishes by hand

Supporting information

Guidance

2.1 (including any specific legislation, regulations or codes of practice relating to the activities, equipment or materials)

2.9 (such as fume extraction systems)

2.11 (such as degreasers, solvents and soap washes, colours, alacrom, epoxy, polyurethane, acrylic, walkway, varnish, urethane)

Unit 490

Applying aircraft paint finishes by spray guns

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| UAN: | T/601/4703 |
| Level: | 3 |
| Credit value: | 46 |
| GLH: | 52 |
| Relationship to NOS: | This unit has been derived from national occupational standard Aeronautical Engineering Unit 090: Applying Aircraft Paint Finishes by Spray Guns (Suite 3). |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Semta, the Sector Skills Council for science, engineering and manufacturing |
| Aim: | <p>This unit covers the skills and knowledge needed to prove the competences required to apply aircraft paint finishes using spray guns, in accordance with approved procedures. The learner will be required to use appropriate job instructions, specifications, tools and equipment to apply aircraft paint finishes by spray methods. The learner will be expected to use the specified or appropriate processes and techniques to degrease, prime and colour aircraft parts and whole aircraft, using spray guns, spray booths and ovens.</p> <p>The learner's responsibilities will require them to comply with organisational policy and procedures for the painting activities undertaken, and to report any problems with the activities, components or equipment that they cannot personally resolve, or that are outside their permitted authority, to the relevant people. The learner will be expected to work with a minimum of supervision, taking personal responsibility for their own actions and for the quality and accuracy of the work that they carry out.</p> <p>The learner's knowledge will provide a good understanding of their work, and will provide an informed approach to the techniques and procedures of applying paint finishes by spray guns. The learner will understand the painting procedures, and their application, and will know about the spray guns, painting techniques, materials and consumables used, in adequate depth to provide a sound basis for carrying out the activities to the required</p> |

specification.

The learner will understand the safety precautions required when carrying out the painting operations. The learner will be required to demonstrate safe working practices throughout, and will understand the responsibility they owe to themselves and others in the workplace.

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| Learning outcome |
| The learner will: 1. Be able to apply aircraft paint finishes by spray guns |
| Assessment criteria |
| The learner can: 1.1 work safely at all times, complying with health and safety and other relevant regulations and guidelines 1.2 carry out all of the following during the finishing process: <ul style="list-style-type: none">• obtain and use the appropriate documentation (such as job instructions, aircraft standards and specifications material data sheets, planning and quality control documentation)• adhere to procedures or systems in place for risk assessment, coshh, personal protective equipment and other relevant safety regulations and procedures to realise a safe system of work• provide and maintain a safe working environment for the finishing activities• obtain the correct tools and equipment for the activity, and check that they are in a safe and usable condition and within current calibration date• obtain clearance to work on the aircraft, and observe any power isolation procedures• ensure that the spraying equipment is correctly prepared for the finishing operations• use appropriate techniques and procedures to produce the required finish on the aircraft components• clean all tools and equipment on completion of the finishing activities• return all tools and equipment to the correct location on completion of the activities• leave the work area and components in a safe and appropriate condition, free from foreign object debris on completion of the activities 1.3 ensure that material surfaces to be treated are suitably prepared for the finishing operations to be carried out 1.4 prepare for the finishing operations by carrying out six of the following activities: <ul style="list-style-type: none">• degreasing and cleaning• re-activating treatments• masking• surface pre-treatments• mixing of colour |

- mixing primers
 - flattening down
 - sealing
- 1.5 use three of the following consumables:
- masking medium and tape
 - rubbing paper
 - abrasive pads
 - cleaning materials
- 1.6 check that the finishing equipment and treatment solutions are set up and maintained at satisfactory operating conditions and levels
- 1.7 use two of the following types of finishing material:
- epoxy
 - polyurethane
 - acrylic
 - temporary protective coatings
 - other special finishes
- 1.8 carry out the treatment process in accordance with operating procedures and the component specification requirements
- 1.9 apply finishes to three of the following aircraft components:
- blades and shafts (helicopters only)
 - complete aircraft
 - sub-assemblies
 - major assemblies
 - details
- 1.10 apply finishes to parent materials, to include three of the following:
- bare metal (ferrous)
 - bare metal (non-ferrous)
 - non-metallic
 - painted
- 1.11 check that the treated workpiece achieves the required characteristics and meets the finishing specification
- 1.12 apply finishes, using appropriate techniques to achieve all of the following:
- required tolerances
 - gloss levels
 - colour match
- 1.13 apply finishes in compliance with one of the following standards:
- civil aviation authority (CAA)/european aviation safety agency (EASA)
 - ministry of defence (MoD)
 - federal aviation authority (FAA)
 - bs, iso or bsen standards and procedures
 - customer standards and requirements
 - company standards and procedures
- 1.14 deal promptly and effectively with problems within their control and report those that cannot be solved
- 1.15 dispose of waste and excess materials in line with agreed organisational procedures

1.16 shut down the finishing equipment to a safe condition on completion of the processing activities.

Learning outcome

The learner will:

2. Know how to apply aircraft paint finishes by spray guns

Assessment criteria

The learner can:

- 2.1 explain the specific safety precautions to be taken whilst carrying out the application of paint finishes using spray guns
- 2.2 explain the health and safety requirements of the work area in which they are carrying out the finishing activity, and the responsibility these requirements place on them
- 2.3 describe the hazards associated with applying paint finishes to aircraft, and with the materials and equipment used, and explain how to minimise them and reduce any risks
- 2.4 explain what personal protective equipment and clothing needs to be worn during the finishing activity
- 2.5 describe the various types of drawing and specification that are used during the finishing activity
- 2.6 explain what surface treatment methods and techniques need to be undertaken, prior to finishing, for metals and composites
- 2.7 explain the preparation methods and techniques for mixing paints
- 2.8 describe the procedures for the transportation and storage of finishing materials
- 2.9 explain the equipment care and control procedures
- 2.10 explain the cleaning and maintenance procedures for spray guns, spray booths and ovens
- 2.11 explain the safe operation of compressed air facilities, and how to set the different air pressures
- 2.12 describe the surface treatments available, and their characteristics and use
- 2.13 explain how to recognise defects such as bubbles, foreign object damage, contamination and surface defects
- 2.14 describe the tools and equipment used in the activities, and explain their preparation, care and control procedures
- 2.15 describe the procedures for dealing with waste materials
- 2.16 explain why tool/equipment control is critical, and what to do if a tool or piece of equipment is unaccounted for on completion of the activities
- 2.17 describe the problems that can occur with the finishing operations, and explain how these can be overcome
- 2.18 explain what recording documentation needs to be completed for the finishing activities undertaken and, where appropriate, the importance of marking and identifying specific pieces of work in relation to the documentation
- 2.19 describe the extent of their own responsibility and explain to whom they should report if they have problems that they cannot resolve

Unit 490 Applying aircraft paint finishes by spray guns

Supporting information

Guidance

2.1 (including any specific legislation, regulations or codes of practice relating to the activities, equipment or materials)

2.9 (such as fume extraction systems)

2.12 (such as degreasers, solvents and soap washes, primers, epoxy and LIR, colours, acrylic and urethane)

Unit 491

Applying transfers, decals and livery to aircraft

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| UAN: | A/601/4704 |
| Level: | 3 |
| Credit value: | 20 |
| GLH: | 52 |
| Relationship to NOS: | This unit has been derived from national occupational standard Aeronautical Engineering Unit 091: Applying Transfers, Decals and Livery to Aircraft (Suite 3). |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Semta, the Sector Skills Council for science, engineering and manufacturing |
| Aim: | <p>This unit covers the skills and knowledge needed to prove the competences required to apply transfers, decals and livery to aircraft, in accordance with approved procedures. The learner will be required to use the appropriate application drawings and specifications to apply the various types of decal, transfer and livery to the aircraft. The learner will be expected to position, align and secure the decals and transfers in the correct locations, using the specified/appropriate techniques. Decals and transfers will include self-adhesive, spray-through stencils, stencils used to mark out, mask and then spray, standard single colour livery, and multi-colour livery.</p> <p>The learner's responsibilities will require them to comply with organisational policy and procedures for the application of decals, transfers and livery, and to report any problems with the application activities, components or equipment that they cannot personally resolve, or that are outside their permitted authority, to the relevant people. The learner will be expected to work with a minimum of supervision, taking personal responsibility for their own actions and for the quality and accuracy of the work that they carry out.</p> <p>The learner's knowledge will provide a good understanding of their work, and will provide an informed approach to the techniques and procedures used to apply transfers, decals and livery to aircraft. The learner will understand the decals and transfers being used, and their application, and will know about the application</p> |

techniques, in adequate depth to provide a sound basis for carrying out the activities to the required specification.

The learner will understand the safety precautions required when carrying out the finishing operations. The learner will be required to demonstrate safe working practices throughout, and will understand the responsibility they owe to themselves and others in the workplace.

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| Learning outcome |
| The learner will: 1. Be able to apply transfers, decals and livery to aircraft |
| Assessment criteria |
| The learner can: 1.1 work safely at all times, complying with health and safety and other relevant regulations and guidelines 1.2 carry out all of the following during the finishing process: <ul style="list-style-type: none">• obtain and use the appropriate documentation (such as job instructions, aircraft standards and specifications livery data sheets, planning and quality control documentation)• adhere to procedures or systems in place for risk assessment, coshh, personal protective equipment and other relevant safety regulations and procedures to realise a safe system of work• provide and maintain a safe working environment for the finishing activities• obtain the correct tools and equipment for the activity, and check that they are in a safe and usable condition and within current calibration date• obtain clearance to work on the aircraft, and observe any power isolation procedures (where appropriate)• ensure that the equipment is correctly prepared for the finishing operations• use appropriate techniques and procedures to apply the required livery/decals on the aircraft/components• clean all tools and equipment on completion of the finishing activities• return all tools and equipment to the correct location on completion of the activities• leave the work area and components in a safe and appropriate condition, free from foreign object debris on completion of the activities 1.3 check that material surfaces to be treated are suitably prepared for the finishing operations to be carried out 1.4 carry out two of the following before applying the decals or transfers: <ul style="list-style-type: none">• degreasing and cleaning• masking• mixing of colour |

- flattening down
- 1.5 apply transfers and decals to parent materials, to include three of the following:
 - bare metal (ferrous)
 - bare metal (non-ferrous)
 - non-metallic
 - painted
- 1.6 use stick-on templates and at least two of the following consumables:
 - masking medium and tape
 - rubbing paper
 - abrasive pads
 - cleaning materials
- 1.7 check that the finishing equipment and treatment solutions are set up and maintained at satisfactory operating conditions and levels
- 1.8 carry out the treatment process in accordance with operating procedures and the component specification requirements
- 1.9 apply transfers and decals to two of the following aircraft components:
 - details
 - major assemblies
 - complete aircraft
- 1.10 use three of the following to apply transfers and decals:
 - self-adhesive and varnish
 - spray-through stencil
 - stencil, mark out, then spray
 - main colour, and mask out for further colours
- 1.11 use appropriate techniques to achieve tolerances and gloss levels for four of the following:
 - standard single colour livery
 - stencil
 - multi-colour livery
 - stick-on decals
 - spray-through decals
- 1.12 check that the treated workpiece achieves the required characteristics and meets the finishing specification
- 1.13 apply transfers, livery and decals in compliance with one of the following standards:
 - civil aviation authority (CAA)/european aviation safety agency (EASA)
 - ministry of defence (MoD)
 - federal aviation authority (FAA)
 - bs, iso or bsen standards and procedures
 - customer standards and requirements
 - company standards and procedures
- 1.14 deal promptly and effectively with problems within their control and report those that cannot be solved
- 1.15 dispose of waste and excess materials in line with agreed organisational procedures

1.16 shut down the finishing equipment to a safe condition on completion of the processing activities.

Learning outcome

The learner will:

2. Know how to apply transfers, decals and livery to aircraft

Assessment criteria

The learner can:

- 2.1 explain the specific safety precautions to be taken whilst carrying out the application of transfers, decals and aircraft paints
- 2.2 explain the health and safety requirements of the work area in which they are carrying out the finishing activity, and the responsibility these requirements place on them
- 2.3 describe the hazards associated with applying transfers, decals and livery to aircraft, and explain how to minimise them and reduce any risks
- 2.4 explain what personal protective equipment and clothing to be worn during the application activity
- 2.5 describe the various types of drawing and specifications that are used during the application activity
- 2.6 explain what surface treatment methods and techniques need to be undertaken, prior to applying transfers, decals and livery
- 2.7 explain how to mark out the components for positioning of the transfers, decals or livery painting operations
- 2.8 describe the methods used to apply transfers and decals to the aircraft components
- 2.9 explain the preparation methods and techniques for mixing paints and varnishes
- 2.10 describe the procedures for the transportation and storage of transfers, decals, and finishing materials
- 2.11 explain the equipment operating, care and control procedures
- 2.12 explain the cleaning and maintenance procedures for spray guns, spray booths, mini spray guns and ovens
- 2.13 explain the safe operation of compressed air facilities, and how to set the different air pressures
- 2.14 describe the surface treatments available, and their characteristics and use
- 2.15 describe the procedures for dealing with waste materials
- 2.16 explain how to recognise defects
- 2.17 describe the tools and equipment used in the activities, and explain their calibration, care, preparation and control procedures
- 2.18 explain why tool/equipment control is critical, and what to do if a tool or piece of equipment is unaccounted for on completion of the activities
- 2.19 describe the problems that can occur with the finishing operations, and explain how these can be overcome
- 2.20 explain what recording documentation to be completed for the finishing activities undertaken and, where appropriate, the importance of marking and identifying specific pieces of work in relation to the documentation
- 2.21 describe the extent of their own responsibility and explain to whom they should report if they have problems that they cannot resolve.

Unit 491 Applying transfers, decals and livery to aircraft

Supporting information

Guidance

2.1 (including any specific legislation, regulations or codes of practice relating to the activities, equipment or materials)

2.11 (such as the operation of spray guns)

2.14 (such as degreasers, solvents and soap washes, colours, epoxy, acrylic and urethane lacquers)

2.16 (such as misalignment, distortion, bubbles, foreign object damage, contamination and surface defects)

Unit 492

Stripping and removing aircraft finishes

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| UAN: | J/601/4706 |
| Level: | 3 |
| Credit value: | 20 |
| GLH: | 52 |
| Relationship to NOS: | This unit has been derived from national occupational standard Aeronautical Engineering Unit 092: Stripping and Removing Aircraft Finishes (Suite 3). |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Semta, the Sector Skills Council for science, engineering and manufacturing |
| Aim: | <p>This unit covers the skills and knowledge needed to prove the competences required to strip and remove aircraft paint finishes, in accordance with approved procedures. The learner will be required to work to and use appropriate job instructions, specifications, tools and equipment to strip and remove aircraft paint finishes. The learner will be expected to use the specified or appropriate process and techniques to strip back to bare metal or composites, clean all areas that have been stripped, and dispose of all the waste materials in line with organisational procedures.</p> <p>The learner's responsibilities will require them to comply with organisational policy and procedures for the stripping and removal activities undertaken, and to report any problems with the activities, components or equipment that they cannot personally resolve, or that are outside their permitted authority, to the relevant people. The learner will be expected to work with a minimum of supervision, taking personal responsibility for their own actions and for the quality and accuracy of the work that they produce.</p> <p>The learner's knowledge will provide a good understanding of their work, and will provide an informed approach to the techniques and procedures used for stripping and removing aircraft finishes. The learner will understand the procedures for stripping, cleaning and disposal of waste materials, and will know about the stripping and removal techniques, tools,</p> |

equipment, materials and consumables, in adequate depth to provide a sound basis for carrying out the activities to the required specification.

The learner will understand the safety precautions required when working with stripping agents and when carrying out the stripping operations. The learner will be required to demonstrate safe working practices throughout, and will understand the responsibility they owe to themselves and others in the workplace.

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| Learning outcome |
| The learner will: 1. Be able to strip and remove aircraft finishes |
| Assessment criteria |
| The learner can: 1.1 work safely at all times, complying with health and safety and other relevant regulations and guidelines 1.2 carry out all of the following during the stripping process: <ul style="list-style-type: none">• obtain and use the appropriate documentation (such as job instructions, aircraft standards and specifications material data sheets, planning and quality control documentation)• adhere to procedures or systems in place for risk assessment, coshh, personal protective equipment and other relevant safety regulations and procedures to realise a safe system of work• provide and maintain a safe working environment for the paint stripping activities• obtain the correct tools and equipment for the activity, and check that they are in a safe and usable condition and within current certification date• obtain clearance to work on the aircraft, and observe any power isolation procedures• prepare the required tools and equipment in readiness for the stripping operations• use appropriate techniques and procedures to strip the paint finish from the aircraft/components• clean all tools and equipment on completion of the stripping activities• return all tools and equipment to the correct location on completion of the activities• leave the work area, aircraft/components in a safe and appropriate condition, free from foreign object debris on completion of the activities 1.3 check that material surfaces to be treated are suitably prepared for the finishing operations to be carried out 1.4 carry out all of the following in preparation/during the stripping process: <ul style="list-style-type: none">• preparation of the area• masking perishable items |

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| <ul style="list-style-type: none"> • surface pre-treatments • washing down stripped areas • applying stripper |
| 1.5 use three of the following consumables: <ul style="list-style-type: none"> • paper masking tape • abrasive pads • masking film • cleaning materials • metal masking tape |
| 1.6 check that the finishing equipment and treatment solutions are set up and maintained at satisfactory operating conditions and levels |
| 1.7 apply both types of stripper (below), using spray wands: <ul style="list-style-type: none"> • hot paint stripper (stripper that will remove all paint back to bare metal) • mild paint stripper (stripper that will remove paint back to primer) |
| 1.8 carry out the treatment process in accordance with operating procedures and the component specification requirements |
| 1.9 strip paint finishes from three of the following aircraft components: <ul style="list-style-type: none"> • blades and shafts (helicopters only) • complete aircraft • sub-assemblies • major assemblies • details |
| 1.10 check that the treated workpiece achieves the required characteristics and meets the finishing specification |
| 1.11 carry out paint stripping activities in compliance with one of the following standards: <ul style="list-style-type: none"> • civil aviation authority (CAA)/european aviation safety agency (EASA) • ministry of defence (MoD) • federal aviation authority (FAA) • bs, iso or bsen standards and procedures • customer standards and requirements • company standards and procedures |
| 1.12 deal promptly and effectively with problems within their control and report those that cannot be solved |
| 1.13 dispose of waste and excess materials in line with agreed organisational procedures |
| 1.14 shut down the finishing equipment to a safe condition on completion of the processing activities |

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| Learning outcome |
| The learner will: 2. Know how to strip and remove aircraft finishes |
| Assessment criteria |
| The learner can: 2.1 explain the specific safety precautions to be taken whilst stripping |

- and removing finishes using spray equipment
- 2.2 explain the health and safety requirements of the work area in which they are carrying out the stripping and removal activity, and the responsibility these requirements place on them
 - 2.3 describe the hazards associated with stripping aircraft surface finishes, and with the tools, equipment and materials used, and explain how to minimise them and reduce any risks
 - 2.4 explain what personal protective equipment and clothing to be worn during the stripping and removal activity
 - 2.5 describe the various types of drawing and specification that are used during the stripping and removal activity
 - 2.6 explain the preparation methods and techniques to be undertaken prior to stripping and removal
 - 2.7 explain the surface treatment methods and techniques to be undertaken, prior to stripping and removal for metals and composites
 - 2.8 explain the preparation methods and techniques for mixing stripper solutions.
 - 2.9 describe the procedures for the transportation and storage of stripper solutions
 - 2.10 explain the equipment care and control procedures
 - 2.11 explain the cleaning and maintenance procedures for spray guns and spray areas
 - 2.12 explain the safe operation of compressed air facilities, and how to set the different air pressures
 - 2.13 explain the surface treatments available and their characteristics and use
 - 2.14 explain how to recognise defects
 - 2.15 describe the tools and equipment used in the activities, and explain their calibration, care, preparation and control procedures
 - 2.16 describe the procedures for dealing with waste materials
 - 2.17 explain why tool/equipment control is critical, and what to do if a tool or piece of equipment is unaccounted for on completion of the activities
 - 2.18 describe the problems that can occur with the stripping operations, and explain how these can be overcome
 - 2.19 explain what recording documentation needs to be completed for the stripping activities undertaken and, where appropriate, marking and identifying specific pieces of work in relation to the documentation
 - 2.20 describe the extent of their own responsibility and explain to whom they should report if they have problems that they cannot resolve

Unit 492 Stripping and removing aircraft finishes

Supporting information

Guidance

2.1 (including any specific legislation, regulations or codes of practice relating to the activities, equipment or materials)

2.10 (such as fume extraction systems, stripper wands and air fed suites)

2.13 (such as degreasers, solvent cleaners, paint strippers and water washes)

2.14 (such as residues, foreign object damage, contamination, and surface defects due to the process)

Unit 493

Applying finishes to aircraft composite mouldings

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| UAN: | L/601/4707 |
| Level: | 3 |
| Credit value: | 46 |
| GLH: | 126 |
| Relationship to NOS: | This unit has been derived from national occupational standard Aeronautical Engineering Unit 093: Applying Finishes to Aircraft Composite Mouldings (Suite 3). |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Semta, the Sector Skills Council for science, engineering and manufacturing |
| Aim: | <p>This unit covers the skills and knowledge needed to prove the competences required to apply finishes to aircraft composite mouldings, in accordance with approved procedures. The learner will be required to use appropriate drawings, specifications and documentation to apply finishes, using the correct techniques. The learner will apply finishes to aircraft composite mouldings using a range of techniques and processes. A variety of finishes will be applied to a range of resin and fibre materials. The learner's responsibilities will require them to comply with organisational policy and procedures for the finishing activities undertaken, and to report any problems with the activities, equipment or materials that they cannot personally resolve, or that are outside their permitted authority, to the relevant people. The learner will be expected to work with a minimum of supervision, taking personal responsibility for their own actions and for the quality and accuracy of the work that they carry out. The learner's knowledge will provide a good understanding of their work, and will provide an informed approach to applying finishing techniques and procedures to aircraft composite mouldings. The learner will understand the finishing techniques used, and their application, in adequate depth to provide a sound basis for carrying out the activities, correcting faults and ensuring that the work output is to the required specification. The learner will understand the safety precautions required when carrying out the</p> |

finishing operations, and when using the associated tools and equipment. The learner will be required to demonstrate safe working practices throughout, and will understand the responsibility they owe to themselves and others in the workplace.

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| Learning outcome |
| The learner will: 1. Be able to apply finishes to aircraft composite mouldings |
| Assessment criteria |
| The learner can: 1.1 work safely at all times, complying with health and safety and other relevant regulations and guidelines 1.2 carry out all of the following during the finishing activities: <ul style="list-style-type: none">• obtain and use the appropriate documentation (such as job instructions, drawings, planning and quality control documentation, material data sheets, specifications)• adhere to procedures or systems in place for risk assessment, coshh, personal protective equipment and other relevant safety regulations and procedures to realise a safe system of work• provide and maintain a safe working environment for the composite finishing activities• obtain the correct tools and equipment for the activity, and check that they are in a safe and usable condition• follow safe practice/approved mould finishing techniques and procedures at all times• return all tools and equipment to the correct location on completion of the mould finishing activities• dispose of waste materials in accordance with approved procedures• leave the work area in a safe and appropriate condition on completion of the activities 1.3 check that the material surfaces to be treated are suitably prepared for the finishing operations to be carried out 1.4 carry out all of the following activities when preparing for the finishing activity: <ul style="list-style-type: none">• check that mouldings are correct and complete• check for any defects in the mouldings• check availability of ancillary materials required• select the correct equipment for the activity• check that the equipment is suitable for use• identify and protect the moulding in the work area 1.5 prepare surfaces of composite mouldings, using two of the following methods: <ul style="list-style-type: none">• abrading• bead blasting• water cleaning• solvent cleaning |

- priming
- 1.6 apply finishes to composite mouldings, using four of the following consumable materials:
 - abrasives
 - masking tapes
 - masking films
 - polishes
 - thinners
 - solvents
 - stoppers
 - fillers
 - sealers
 - primers
 - cutting compounds
 - cleaning agents
- 1.7 check that the finishing equipment and treatment solutions are set up and maintained at satisfactory operating conditions and levels
- 1.8 apply two types of finish to composite mouldings from:
 - surface sealers
 - primers
 - top coats
 - adhesive films
 - uv coatings
 - heatproof coatings
 - speciality coatings
 - flexible coatings
- 1.9 apply finishes to composite mouldings, using three of the following:
 - one-part finishes
 - two-part finishes
 - multiple coatings
 - combination coats
 - solvent based
 - adhesive based
 - water based
 - single coatings
- 1.10 carry out the treatment process in accordance with operating procedures and the component specification requirements
- 1.11 apply finishes to composite mouldings, using two of the following techniques:
 - cloth application
 - brush
 - spray
 - laying films
 - roller
- 1.12 apply finishes suitable for two of the following resin types:
 - polyester
 - vinyl ester

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| <ul style="list-style-type: none"> • epoxy • phenolic • bismaleimide • cyanate ester <p>1.13 apply finishes suitable for two of the following fibre types:</p> <ul style="list-style-type: none"> • polyethylene • glass • aramid • carbon <p>1.14 check that the treated workpiece achieves the required characteristics and meets the finishing specification</p> <p>1.15 apply finishes to a range of mouldings in compliance with one of the following:</p> <ul style="list-style-type: none"> • civil aviation authority (CAA)/european aviation safety agency (EASA) • ministry of defence (MoD) • federal aviation authority (FAA) • bs, iso or bsen standards and procedures • customer standards and requirements • company standards and procedures <p>1.16 deal promptly and effectively with problems within their control and report those that cannot be solved</p> <p>1.17 dispose of waste and excess materials in line with agreed organisational procedures</p> <p>1.18 shut down the finishing equipment to a safe condition on completion of the processing activities</p> |
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| Learning outcome |
| The learner will: 2. Know how to apply finishes to aircraft composite mouldings |
| Assessment criteria |
| The learner can: 2.1 explain the health and safety precautions to be taken and procedures used when working with aircraft composite materials, consumables, tools and equipment in the specific work area 2.2 describe the hazards associated with applying finishes to aircraft composite materials, and with the consumables, tools and equipment used, and explain how to minimise them and reduce any risks in the work area 2.3 explain what protective equipment is needed for personal protection and, where required, the protection of others 2.4 explain the application of coshh regulations in relation to the storage, use and disposal of aircraft composite materials and consumables 2.5 explain the specific workshop environmental conditions that must be observed when applying finishes to aircraft composite mouldings 2.6 explain how to extract and use information from engineering drawings and related specifications in relation to work undertaken 2.7 describe the quality procedures used in the workplace to ensure |

- production control, and the completion of such documents
- 2.8 explain the conventions and terminology used for applying finishes
 - 2.9 describe the different types of composite resin systems, fibres, reinforcements, and their merits
 - 2.10 describe the different finishes applied to aircraft composites, and their merits
 - 2.11 describe the correct methods of storage, handling and disposal of finishing materials
 - 2.12 explain the methods of preparation for applying different finishes
 - 2.13 explain the mixing ratios for two-part finishes, and the associated working times
 - 2.14 describe the methods of application for different finishes
 - 2.15 describe the problems that can occur during the finishing process
 - 2.16 explain how defects can be overcome during the finishing activity
 - 2.17 describe the tools and equipment used in finishing activities, and explain their care, preparation and control procedures
 - 2.18 describe the extent of their own responsibility and explain to whom they should report if they have problems that they cannot resolve

Unit 493 Applying finishes to aircraft composite mouldings

Supporting information

Guidance

2.5 (such as temperature, humidity, styrene levels to threshold limits, fume/dust extraction systems and equipment)

2.6 (to include symbols and conventions to appropriate BS, ISO or BSEN standards)

2.7 (in relation to currency, issue, meeting specification)

2.8 (such as surface keying, finish thickness, matt finish, gloss finish, treatment reactions)

2.15 (including defects such as contamination)



Appendix 1 Relationships to other 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:

- Regulatory Arrangements for the Qualifications and Credit Framework (2008)
- 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 such on such things as:

- **Walled Garden:** how to register and certificate candidates on line
- **Qualifications and Credit Framework (QCF):** general guidance about the QCF and how qualifications will change, as well as information on the IT systems needed and FAQs
- **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.

Useful contacts

UK learners

General qualification information

T: +44 (0)844 543 0033

E: learnersupport@cityandguilds.com

International learners

General qualification information

T: +44 (0)844 543 0033

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

T: +44 (0)844 543 0000

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

T: +44 (0)844 543 0000

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

T: +44 (0)844 543 0000

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

T: +44 (0)844 543 0000

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

T: +44 (0)844 543 0000

F: +44 (0)20 7294 2413

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City & Guilds Group

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City & Guilds

1 Giltspur Street

London EC1A 9DD

T +44 (0)844 543 0000

F +44 (0)20 7294 2413

www.cityandguilds.com

WW-08-1789