



Part of the  
**Enginuity** Group

# Qualification Manual

EAL Diploma in Engineering and Digital  
Manufacturing at SCQF Level 8

Qualification Code: R709 04

Issue 1

[www.eal.org.uk](http://www.eal.org.uk)



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## 1.0 About EAL

For over fifty years, EAL has been the specialist awarding organisation for engineering, manufacturing, building services and related sectors. Developed to the highest technical standards, our qualifications reflect ever-changing industry and regulatory needs. We support the providers of our qualifications with an unparalleled level of service to ensure that learners are well prepared to take the next step in their journeys, whether study, an apprenticeship or work.

Through industry partnerships with EAL centres and training providers, decades of experience supporting our core sectors, and our role as part of the Enginuity Group, we have built unrivalled knowledge and understanding of employer skills needs. As a result, EAL's skills solutions, including apprenticeship End-Point Assessment, External Quality Assurance and qualifications are respected and chosen by employers to deliver real lifelong career benefits for all our learners. That's why in the last ten years, 1.2 million people across the UK have taken EAL qualifications.

### 1.1 Equal Opportunities and Diversity

EAL expects its centres to enable learners to have equal access to training and assessment for qualifications in line with equalities legislation. Further details can be located in the EAL Equal Opportunities and Diversity Policy:

<http://www.eal.org.uk/centre-support/centre-support/policies-and-important-documents>

### 1.2 Customer Experience and Feedback

Customer Experience is a fundamental part of EAL's commitment to you. EAL aims to ensure that all customers receive a high-quality efficient service. We are always interested in feedback and if you have any comments or feedback on our qualifications, products or services, please contact the Customer Experience team:

EAL Customer Experience

Tel: +44 (0)1923 652 400

Email: [Customer.Experience@eal.org.uk](mailto:Customer.Experience@eal.org.uk)

## 2.0 Introduction to the Qualification

### 2.1 Who is this qualification for?

This qualification is for learners working in the engineering and digital manufacturing sector. Learners are likely to be working in roles such as Technician, Industrial Technician, Engineering Technician, Industrial Engineer, Lead Engineer and Production Engineer

### 2.2 About this qualification

This competence-based qualification is for learners who will undertake the Scottish Apprenticeship in Engineering and Digital Manufacturing at SCQF level 8. It can also be delivered for learners who will undertake the qualification but not as part of an apprenticeship.

This qualification is based on the Engineering and Digital Manufacturing apprenticeship standard and framework and the occupation profile agreed by the Engineering and Digital Manufacturing Technical Expert Group (TEG). Following wider engagement with the sector, the apprenticeship was approved by Apprenticeship Approvals Group in November 2021. This involved direct engagement with the industry in Scotland, which included employers and employees, industry experts, the sector skills council, trade unions, professional bodies, Awarding Bodies, Training Providers and other social partners.

It is a requirement that the qualification will:

- align fully to the Apprenticeship Standard in Engineering and Digital Manufacturing at SCQF level 8
- integrate all learning outcomes, knowledge, skills and behaviours associated with the apprenticeship standard
- provide guidance on the associated assessment
- reinforce the importance of the learner-centric delivery in the context of the learner's role within engineering and digital manufacturing
- have all content entirely based on the Unit summaries set out in appendix 1

### 2.3 Entry to this qualification

There are no formal entry requirements for this qualification, but it is recommended that applicants have either completed a modern apprenticeship in Engineering; or hold 2 or more SQA Highers, and Mathematics at National 5 or above; or hold a National Certificate (SCQF level 6) or a Higher National Certificate (SCQF level 7) qualification in Engineering, or equivalent.

However, employers can also consider existing workplace skills and experiences, where learners are either changing careers or upskilling. Being open to alternative assessment methods and relevant experience, instead of qualifications, can help to broaden the pool of potential applicants.

## 2.4 Purpose and aims of this qualification

The purpose of this qualification is to provide learners with the essential knowledge, skills and behaviours (including meta-skills) in the EAL Diploma in Engineering and Digital Manufacturing at SCQF level 8 on achievement of the qualification.

The qualification aims to:

- develop the knowledge, skills and behaviours needed to demonstrate competence in the engineering and digital manufacture roles outlined in section 2.1 above
- develop meta-skills, personal and professional practice in the role
- provide learners with a nationally recognised qualification for working in the Engineering and Digital Manufacturing industry

## 2.5 Work based learning in this qualification

Work based learning is the primary method by which learners develop knowledge, skills and behaviours and meta-skills in this qualification. This means it will be delivered and assessed using evidence generated by the learner during their day to day job. There may be a small number of exceptions to this, specifically where there are industry related safety implications. In these cases, a learner may need to be off site for parts of the qualification. In these circumstances the situation should be made as realistic to the workplace as possible. These requirements have been outlined in the Assessment Strategy (see section 6 below).

As they progress through the qualification, learners will be continuously engaged in the process of learning through being observed, engaging in professional discussion, responding to work challenges and accumulating evidence of their progression and learning.

The delivery, assessment and SCQF credit and level of this qualification reflects continuous and cumulative learning and will provide evidence to support it.

## 2.6 Achievement of the Qualification

The EAL Diploma in Engineering and Digital Manufacturing at SCQF Level 8 contains 14 Units, learners must successfully complete 4 mandatory Units and 5 optional Units in line with the Rule of Combination to achieve the qualification. For further information on the Rules of Combination, please see Section 3.

This qualification has been credit rated, with an overall credit value of minimum 203 and maximum 229 SCQF credits and an overall SCQF level of SCQF level 8.

The overall grading type for this qualification is **competent / not yet competent**.

When a grade of competent has been achieved for the full qualification, the Centre will then be able to apply for the learner's certificate, once authorised by the internal verifier.

## 2.7 Progression

A successfully completed qualification, including the achievement of competence-based and professional qualifications, opens the door to a number of opportunities for progression in both work and further learning.

### **Career advancement**

Successful learners may progress within the workplace to technical specialist roles, supervisory roles or management roles.

### **Further study**

Options for those wishing to pursue further professional learning and development include degree level study in Engineering or in business related subjects. In particular, the Technical Apprenticeship supports progression to the Graduate Apprenticeship in Engineering Design and Manufacture.

## 3.0 Qualification Structure

The qualification structure below sets out the SCQF credit and level of the qualification, alongside details of the Unit titles and combination or groupings in which the Units must be taken for learners to achieve the qualification.

All associated Unit summaries can be found in appendix 1.

### Rule of Combination: Mandatory Section (4 Units) Candidates must complete all 4 Units

EAL Code	Unit Title	SCQF Level	Credit Value
SEDM8/001	Supporting engineering processes	8	36
SEDM8/007	Applying methods and principles in project management	8	12
SEDM8/009	Understanding digital manufacturing	8	9
SEDM8/012	Developing meta-skills and personal professionalism	8	16

### Optional Group A - Candidates must complete 1 of the following Units

SEDM8/003	Designing and building within engineering	8	32
SEDM8/008	Providing design-led solutions	8	34

### Optional Group B - Candidates must complete 3 of the following Units which have not been completed from Group A

SEDM8/002	Maintaining engineering equipment	8	30
SEDM8/003	Designing and building within engineering	8	32
SEDM8/004	Inspection and testing within engineering	7	30
SEDM8/005	Diagnosing and resolving faults	8	30
SEDM8/006	Conducting quality control and assurance	8	30
SEDM8/008	Providing design-led solutions	8	34

### Optional Group C - Candidates must complete 1 further Unit from the following Units which have not already been completed from Group A or Group B

SEDM8/002	Maintaining engineering equipment	8	30
SEDM8/003	Designing and building within engineering	8	32
SEDM8/004	Inspection and testing within engineering	7	30
SEDM8/005	Diagnosing and resolving faults	8	30
SEDM8/006	Conducting quality control and assurance	8	30
SEDM8/008	Providing design-led solutions	8	34
SEDM8/010	Organising and facilitating meetings	7	8
SEDM8/011	Establishing and maintaining effective working relationships	7	12
SEDM8/013	Providing effective leadership	8	16
SEDM8/014	Managing teams and stakeholders	8	20

## 3.1 Barred Combinations

There are no barred Unit combinations, but the Rule of Combination above must be followed.

## 4.0 Centre and Qualification Approval

Centres wishing to run the qualification will need to comply with the Qualification Manual and EAL's centre recognition criteria for this qualification. Centres must also put in place the appropriate physical and human resources and administration systems to effectively run the qualification.

Please refer to Section 5 below for the requirements of centre staff involved in the delivery of the qualification.

### **For existing EAL centres to put the qualification on your centre remit:**

- Create and complete a qualification approval application form in Smarter Touch and submit to EAL.

### **For non EAL centres to gain centre approval to run the qualification, please contact EAL Customer Service:**

EAL Customer Experience

Tel: +44 (0)1923 652400

Email: [customer.experience@eal.org.uk](mailto:customer.experience@eal.org.uk)

## 5.0 Profiles and Requirements

### 5.1 Staff Responsible for Registering and Certification of Learners

Centres are required to appoint a suitable member of staff who can take responsibility for registering learners onto qualifications, submitting entries for assessments to EAL, and taking receipt of external assessment procedures (if appropriate). They may also be responsible for applying to EAL for learner certificates. The role may be undertaken by the same person who undertakes quality assurance.

### 5.2 Assessment

#### **Assessor requirements**

Assessors must:

- have occupational experience at a level suitable to the level of the qualification being assessed
- be occupationally competent and knowledgeable in respect of the Units they are assessing
- have thorough understanding of the Units of the competence-based qualifications they are assessing in order to be able to interpret and make judgements on current working practices and technologies within the area of work
- have sufficient time to carry out the role
- actively engage in relevant, industry specific continuing professional development activities to keep up-to-date with developments relating to the practice in which they are assessing
- hold or be working towards an appropriate Assessor qualification as identified by EAL and SQA Accreditation the qualification regulator. Assessors holding older assessor qualifications must be able to demonstrate that they are assessing to the current standards

Assessors' experience and knowledge could be verified by CV and references, possession of a relevant qualification, or membership of a relevant professional body.

#### **Assessors must also know:**

- the content and meaning of the qualification against which the assessments are to be carried out
- the relevant EAL documentation and system of vocational qualifications within which the assessment is taking place

### 5.3 Internal Quality Assurance

#### **Internal verifier requirements**

Internal Verifiers for competence-based qualifications must:

- have occupational expertise and experience appropriate to the competence-based qualifications that they are internally verifying
- hold or be working towards an appropriate Internal Verifier qualification as identified by EAL and SQA Accreditation, the qualification regulator. Internal Verifiers holding older qualifications must be able to demonstrate that they are verifying to the current standards

- stay up-to-date with relevant developments in both occupational practice and assessment practice
- have a thorough understanding of the Units making up the competence-based qualifications which they are internally verifying and be able to provide advice upon the interpretation of the Units

**Internal verifiers must also know:**

- the content and meaning of the qualification against which the assessments are to be carried out
- the relevant EAL documentation and system of vocational qualifications within which the assessment is taking place

**The tables below show the recommended levels of occupational competence for assessors, internal verifiers, and external verifiers/EQA's.**

Position	Prime activity requirements	Support activity requirements	Occupational requirements (see notes below)
Assessor	Assessment Skills	IV Systems	occupational <i>competence</i> in the areas covered by the qualifications being assessed
Internal Verifier	Verification Skills	Assessment Knowledge	occupational <i>understanding</i> of the areas covered by the qualifications
External Verifier / External Quality Assurer	Verification skills	Assessment Understanding	occupational <i>awareness</i> of the areas covered by the qualifications

**Notes**

1. occupational *competence* is defined here as a combination of practical skills, knowledge, and the ability to apply both of these, in familiar and new situations, within a real working environment.
2. occupational *understanding* is defined here as having a good understanding of the activities being assessed, together with knowledge of relevant Health & Safety implications and requirements of the assessments.
3. occupational *awareness* is defined here as a general overview of the subject area, sufficient to ensure that assessment and portfolio evidence are reliable, and that relevant Health and Safety requirements have been complied with.
4. The competences required by the assessor, internal verifier and external verifier/external quality assurer, in the occupational area being assessed, is likely to exist at three levels as indicated by the shaded zones in the following table.

Occupational Competence required by:	An ability to <i>discuss</i> the general principles of the competences being assessed	An ability to <i>describe</i> the practical aspects of the competence being assessed	An ability to <i>demonstrate</i> the practical competences being assessed
Assessor			
Internal Verifier			
External Verifier / External Quality Assurer			

## 5.4 Expert Witnesses

### Expert witness requirements

The use of expert witnesses is encouraged as a contribution to the provision of performance evidence presented for assessment. The role of the expert witness is to submit evidence to the assessor as to the competence of the learner in any given Unit. This evidence must directly relate to learner's performance in the workplace which has been seen by the expert witness.

All Expert Witnesses must:

- be occupationally competent in the area being assessed. This means that each expert witness must, according to current sector practice, be competent in the functions covered by the Units to which they are contributing
- maintain their occupational competence by actively engaging in relevant continuous professional development activities in order to keep up to date with developments
- provide current records of their skills and the current supporting knowledge and understanding in the context of a recent role directly related to the qualification Unit that they are witnessing
- be familiar with the qualification Unit; and must be able to interpret current working practices and technologies within the area of work
- be inducted by the Centre so that they are familiar with the standards for those Units for which they are to provide expert witness evidence. They must also understand the Centre's recording requirements and will need guidance on the skills required to provide evidence for the qualification

**It will be the responsibility of the Assessor to make sure that any Expert Witness testimonies accepted as evidence of a learner's competency meet the requirements of validity, authenticity, reliability, currency and sufficiency.**

## 6.0 Assessment

### 6.1 Introduction

This Assessment Strategy has been developed by EAL, SDS and the Apprenticeship Technical Expert Group (TEG) for Engineering and Digital Manufacturing. This Strategy complies with SQA Accreditation's regulatory requirements and has been approved by them.

This Assessment Strategy has been designed to:

- assist assessors, internal verifiers and external quality assurance personnel
- encourage and promote consistent assessment of the qualification and/or Units

The Assessment Strategy provides definitions for:

- the assessment environment and notes on simulation/replication
- access to the qualification/ Units

and information on:

- carrying out assessments
- assessing knowledge, understanding and skills

There are two key measures of success for this assessment strategy:

- the importance employers and learners place on the qualification
- the relationship between the learner, the assessor and the employer

EAL will use these measures, and review the following guidance, to continually improve its assessment strategies for part or whole qualifications.

### 6.2 Assessment of Performance

#### **Workplace Assessment**

Performance evidence must be the main form of evidence gathered. In order to demonstrate competent performance of the knowledge, understanding and skills for a unit, learners will need to show consistent performance across multiple examples and must be sufficient to show that the performance requirements of the unit have been carried out to the prescribed standards. It is critical to the validity of the competence-based qualifications that performance is assessed in the workplace. Learners must therefore be in a relevant job role throughout the period in which they undertake the qualification. All the Units of competence are designed to reflect the expected performance of practitioners in real workplace situations and settings. Where, for reasons of safety or security, or in exceptional circumstances a learner is not in a position to provide evidence due to their current assignment, the learner will need to negotiate with their assessor, suitable alternative opportunities to generate evidence and gain internal verifier approval of this. This might be through an alternative work placement or through simulation within a realistic working environment – but must be both planned and agreed with the assessment centre.

**See the section on realistic environment and simulation at section 6.6 for details.**

Learners will gather evidence of their competence in the workplace, and this will be assessed within an EAL approved centre by qualified and experienced staff. Evidence that is sourced from the working environment must be naturally occurring and can be generated by:

- direct observation of performance in the workplace by a qualified assessor
- testimony from an expert witness to the activity being assessed
- reflective accounts of performance from the learner
- professional discussion
- questioning
- evidence of work plans and work-based products produced by the learner

Generating evidence of workplace competence to meet assessment requirements will require initial discussions and planning between the learner and assessor.

Centre arrangements should also ensure that competence can be demonstrated over a period of time, rather than simply for the purposes of a single assessment.

### 6.3 Holistic Assessment

Holistic approaches to assessment are encouraged so that larger pieces of work are used to evidence a number of performance requirements rather than the process of finding separate evidence for each performance requirement or assessment criteria. In this qualification for example learners undertaking engineering design, build activities are likely to provide assessment opportunities for Designing and building within engineering (SEDM8/003) and Providing design-led solutions (SEDM8/008). Similarly, an activity which is often undertaken by a cross team project group is likely to provide assessment opportunities for multiple Units.

Knowledge and understanding requirements can be demonstrated in a number of different ways, but it is suggested that the most appropriate methods for this qualification are oral or written questioning, professional discussion and reflective accounts. Where questioning is used, Assessors should ask enough questions to be able to determine that the learner has an appropriate level of knowledge and understanding as required by the Units.

### 6.4 Guidance on the use of projects

Evidence from project activity in either full or part may be applicable for a number of Units within this qualification. Learners may be working on specific projects which may generate evidence for a number of Units. Where projects are used and will form part of learner evidence the following should be considered. Projects should, where possible, be live and naturally occurring at work, where this is not possible an engineering-based context project could be created for the purpose of assessment in a realistic working environment in exceptional circumstances.

Any project should follow a plan, do, and review methodology. Learners should produce a project plan outlining clearly how the project will be delivered, consider the opportunities for the inclusion of meta-skills and their application within the project delivery. Learners will be recommended to communicate and collaborate with a minimum of two others in delivery of a project. Continuous reflective practice should be used to monitor progress against project delivery outcomes and any meta-skills should additionally be recorded, as well as technical evidence for the specific Unit. Learners should also consider any plan changes as the project evolves and justify any adjustments where necessary. Where possible any project should consider how it might be used to assess content in other Units and therefore maximise any evidence generated. A project approach for example in Unit SEDM8/008 'Providing design-led solutions' should be helpful in generating evidence for Unit SEDM8/013 'Providing effective leadership and Unit SEDM8/007 'Applying methods and principles in project management'.

## 6.5 Additional Assessment Requirements

### Expert witnesses

The use of expert witnesses is encouraged as a contribution to the provision of performance evidence presented for assessment. The role of the expert witness is to submit evidence to the assessor as to the competence of the learner in any given Unit. This evidence must directly relate to the learner's performance in the workplace as seen by the expert witness.

All Expert Witnesses must:

- be occupationally competent in the area being assessed. This means that each expert witness must, according to current sector practice, be competent in the functions covered by the Units to which they are contributing
- maintain their occupational competence by actively engaging in relevant continuous professional development activities in order to keep up to date with developments
- provide current records of their skills and the current supporting knowledge and understanding in the context of a recent role directly related to the qualification Unit that they are witnessing
- be familiar with the qualification Units; and must be able to interpret current working practices and technologies within the area of work
- be inducted by the Centre so that they are familiar with the standards for those Units for which they are to provide expert witness evidence. They must also understand the Centre's recording requirements and will need guidance on the skills required to provide evidence for the qualification

**It will be the responsibility of the Assessor to make sure that any Expert Witness testimonies accepted as evidence of a learner's competency meet the requirements of validity, authenticity, reliability, currency and sufficiency.**

## 6.6 Simulation in a Realistic Work Environment

Simulation may be undertaken only when the learner is unable to provide sufficient evidence of workplace performance to complete the Unit and/or where there is a potential risk to the learner or others. Evidence of competence in such situations is viewed as essential to ensure best practice and confidence in the learner's ability to act appropriately.

The use of simulation to provide performance evidence (and support assessment) should be agreed in advance by the assessor and learner at the assessment planning stage. Those involved in the assessment process must be satisfied that the use of simulation does not compromise the rigour and integrity of assessment.

Where simulation is used to generate evidence of competence, this should not be used as the sole source of evidence for any one Unit of competence. Other sources and types of evidence will need to be generated to corroborate the evidence derived from simulation.

Simulation may be **mandatory** for the assessment of safety-critical activities, and/or for other activities.

Simulation may also be **permissible** in those circumstances where the opportunities to collect naturally occurring evidence are limited or absent, and the learner lacks evidence for completion of the Unit.

In all cases, simulation must take place in a Realistic Work Environment (RWE) which re-creates the environment, tools, equipment and time pressures found in a typical work environment.

**The following table indicates the Units and performance requirements where simulation is permitted:**

Unit	Whether Simulation is permitted
SEDM8/001 – Supporting engineering processes	No Simulation
SEDM8/002 – Maintaining engineering equipment	No Simulation
SEDM8/003 – Designing and building within engineering	No Simulation
SEDM8/004 – Inspection and testing within engineering	No Simulation
SEDM8/005 – Diagnosing and resolving faults	No Simulation
SEDM8/006 – Conducting quality control and assurance	No Simulation
SEDM8/007 – Applying methods and principles in project management	Performance requirements 1-10 See further guidance on this Unit in section 6.8.1 below
SEDM8/008 – Providing design-led solutions	No Simulation
SEDM8/009 – Understanding digital manufacturing	See further guidance on this Unit in section 6.8.2 below
SEDM8/010 – Organising and facilitating meetings	No Simulation
SEDM8/011 – Establishing and maintaining effective working relationships	No Simulation
SEDM8/012 – Developing meta-skills and personal professionalism	See further guidance on this Unit in section 6.8.3 below
SEDM8/013 – Providing effective leadership	Performance requirements 1-8 See further guidance on this Unit in section 6.8.1 below
SEDM8/014 – Managing teams and stakeholders	Performance requirements 8, 12, 13, and 14

**If the learner cannot meet all performance requirements under naturally occurring activities in their workplace and need to simulate a specific task, the External Verifier must be consulted, and agreement reached on what is suitable.**

For the relevant performance requirements, specified above, simulation is permissible only when the learner is unable to provide sufficient evidence of workplace performance due to the various working practices of different organisations or job roles. Beyond this, simulation should be used where safety or security considerations associated with the work being undertaken by the learner makes the use of workplace evidence impossible. Any simulation should be carried out in a realistic working environment where conditions should be set which replicate those in the real workplace.

**Where simulation is used, Assessors must ensure that competence is fully transferable to the workplace.**

## 6.7 Meta-skills

A key aspect of this qualification is that it supports the development of a learner's **meta-skills** and the development of their awareness of the importance of these in becoming effective in their current work role, and in supporting continued personal and career development.

Meta-skills sit alongside and complement technical knowledge, skills and behaviours. As technology, society and the way we work change at an ever-increasing pace, meta-skills are the over-arching and future-focused attributes that enable other skills to be developed through consideration, reflection and implementation.

Meta-skills support improved performance and productivity, greater adaptability and resilience to change. For learners, meta-skills are a critical asset, supporting their ability to cope and excel in the face of change, to solve problems, to collaborate with others and to create successful futures.

There are three categories, each with four meta-skills:

- **Managing yourself** – focus, integrity, adaptability and initiative
- **Connecting with others** – communication, feeling, collaboration and leadership
- **Interacting with change** – curiosity, creativity, sense-making and critical thinking

Reflection on performance and on the skills used or developed is central to the development of meta-skills, so regular reflective accounts of the skills utilised or developed through work activities are the key source of assessment evidence for the development of meta-skills.

These reflective accounts must be supported by professional discussion with an assessor, supervisor or work colleague who can:

- observe and offer constructive feedback
- encourage self-reflection by the learner
- encourage and promote professional discussion
- provide challenge for the learner's learning and development

**In all cases**, it is the assessor who is responsible for judging that appropriate professional discussion has taken place, and that the requirements of the qualification have been met.

For the learner these discussions support a three-stage process:

- undertake an initial self-assessment to inform goal-setting and action planning
- regularly reflect on practice and collect evidence
- complete an end of qualification self-assessment, reflect on the development of meta-skills and ensure that evidence has been produced that clearly evidences the meta-skills developed

In order that the initial self-assessment and ongoing professional discussions are meaningful, the learner will also require to have an initial discussion with the assessor, supervisor or experienced work colleague that helps them to define, exemplify and understand meta-skills within the context of their work role.

As is the case more widely, a holistic approach to assessment is therefore encouraged. Using larger pieces of work to evidence several learning outcomes or performance and knowledge requirements will more naturally provide opportunities to reflect on how meta-skills as well as technical or vocational knowledge and skills have been applied or developed.

Further guidance on meta-skills can be found in section 6.8.4 of this document.

A fuller description of meta-skills can be found [here](#).

Skills Development Scotland have additionally produced a range of tools which may be used to support assessment:

- Meta-skills self-profiling tool
- Meta-skills self-assessment tool
- Meta-skills development plan
- QA Guidance for Meta-skills Delivery
- Guidance on level of reflective practice expected for different SCQF levels

The meta-skills tools are available from Skills Development Scotland by request to [apprenticeshipdevelopment@sds.co.uk](mailto:apprenticeshipdevelopment@sds.co.uk)

## 6.8 Additional assessment guidance for specific Units

### 6.8.1 Unit SEDM8/007 – Applying methods and principles in project management and Unit SEDM8/013 – Providing effective leadership

Simulated activities and tasks may be used in these Units to achieve the stated performance requirements as not all learners may have the opportunity to lead others or the opportunity to be involved in a real live project and therefore are unable to provide naturally occurring evidence. Learning Providers are encouraged to review the individual performance requirements and only use a simulated task or activity performed in a realistic work environment where it is deemed necessary. Tasks and activities should correlate with and be in the context of engineering and digital manufacturing. (Also see guidance on Projects)

### 6.8.2 Unit SEDM8/009 – Understanding digital manufacturing

This Unit is knowledge based and is designed to enhance the learners understanding of existing, new and emerging technologies that are impacting on the engineering and manufacturing environments. Evidence for this Unit may be obtained from learners' direct exposure through other Units where digital knowledge and understanding has been obtained and applied, learners may be able highlight evidence through a cross referencing approach in a detailed portfolio of evidence. Where gaps exist, this knowledge may be explicitly taught. Specific subject sessions, self-directed learning materials or other relevant methods may be used, assessment of evidence for these approaches should align to knowledge delivery methodology, for example oral or written questions. Centre produced and marked examination papers may be appropriate. Learners will be expected to confirm their understanding as part of their recorded evidence.

### 6.8.3 Unit SEDM8/012 Developing meta-skills and personal professionalism

This Unit introduces meta-skills and is designed to integrate with the other Units. Evidence from this Unit, including evidence of meta-skills will be generated from undertaking problem solving, challenge resolutions, projects and other critical thinking skills activities which will integrate the knowledge, understanding and skills demonstrated when completing other Units. Learners will be expected to undertake regular reflection on their learning and skills development through professional dialogue with their assessor, supervisor or work colleague, and learning provider. This reflection could align with Personal Development Review conversations naturally occurring between the learner and their line manager. This

approach can be supported with various types of evidence such as reflective accounts, witness testimonies, professional discussion and evidence of tasks and challenges documentation.

In relation to meta-skills the minimum requirement for this qualification is that:

- reflective discussion on skills developed/to be developed takes place on a minimum of four occasions
- and:
- these discussions include at least one meta-skill from each of the three categories and a minimum of six meta-skills in total (see [here](#) for more detail on meta-skills and categories).

#### 6.8.4 Guidance on meta-skills

The Overarching Assessment Strategy for competence-based qualifications introduces meta-skills.

Meta-skills sit alongside and complement technical knowledge, skills and behaviours. As technology, society and the way we work change at an ever-increasing pace, so meta-skills are the over-arching and future-focused attributes that enable other skills to be developed through consideration, reflection and implementation. Meta-skills support improved performance and productivity, greater adaptability and resilience to change. For learners, meta-skills are a critical asset, supporting their ability to cope and excel in the face of change, to solve problems, to collaborate with others and to create successful futures. There are three categories, each with four meta-skills. (See Overarching Assessment Strategy for competence-based qualifications)

The following meta-skills examples were identified by employees working in engineering and digital manufacturing roles. These examples are not exhaustive, merely provided to help learners to understand the meaning of meta-skills in engineering and digital manufacturing context.

##### **Managing yourself:**

**Focus**, working carefully and correctly and avoiding distraction, is essential for complex tasks, and critical when using dangerous equipment or machinery; **integrity**, being honest and trustworthy, is essential for open and honest analysis of failures, or when challenging an issue with colleagues or managers; **adapting** is essential when responding to things that don't work as initially planned; and **initiative** is required when faced with unclear instructions or when colleagues are unavailable.

##### **Connecting with others:**

**Communicating** clearly and concisely is key when circumstances are changing – either for customers or for co-workers; **feeling** creates awareness of the emotions of both learner and others and helps in adapting or responding to new situations or surroundings; **collaborating**, working effectively with colleagues to get a job done to standard and on time is key for complex tasks or when faced by technical problems; and skills in **leading** are often developed through helping and directing newer colleagues or others.

**Interacting with change:**

**Curiosity** helps with learning new things and better ways of doing things; **creativity** helps produce solutions to new problems, or develop new products or processes; interpreting complex instructions or technical drawings and breaking down tasks into simpler, manageable steps are common examples of **sense making**; and **critical thinking** is key to coming up with solutions when fault finding.

Supported by their assessor, supervisor or work colleague and learning provider, learners should consider, practise, and reflect on their use of meta-skills during their work, building those skills to enhance their personal effectiveness in their present role and their future careers. This can be done effectively using the following three stage process:

**Self-assessment:** Learners should undertake a self-assessment of own strengths and areas for meta-skill development, a relevant complex engineering challenge, project or high-level activity should be selected. Learners will use a range of approaches to formulate and critically evaluate evidence-based solutions/responses to a defined situation. The selected activity should be sufficiently unstructured to facilitate assessment appropriate to SCQF level 8 which allows all categories of meta-skills to be developed.

**Reflection and Evaluation:** Evidence should reflect the process of developing meta-skills through regular, authentic and supported reflective practice and goal setting in the context of the whole qualification, referencing those meta-skills relevant to the learner and their sector, rather than mechanistic coverage which simply notes where particular meta-skills have been observed.

**Final Review:** Learners should carry out a final review of personal meta-skills developed during the qualification, linking this to the areas for development identified at the beginning of the Unit and the activities taken to increase effectiveness. This should clearly identify how the meta-skills across Self-management, Social Intelligence and Innovation were developed and applied in combination in the delivery of the qualification. Finally, learners are required to identify goals for future meta-skills development.

## 6.9 Evidence of prior achievement

The achievement of the specific knowledge, understanding and skills requirements of Units cannot simply be inferred by the results of tests or assignments from other 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, understanding and skills requirements of the Unit.

## 7.0 Quality Control of Assessments

### General

There are two major points where EAL interacts with the Centre in relation to the external quality control of assessment for a qualification and these are:

- Approval - when a Centre takes on new qualification(s), EAL normally through an external verifier/external quality assurer, ensures that the Centre is suitably equipped and prepared to deliver the new qualification(s)
- Monitoring - throughout the ongoing delivery of the qualification(s) EAL, through external monitoring and other mechanisms must maintain the quality and consistency of assessment of the qualification/s

### Approval

In granting approval, EAL, normally through its external verifiers/external quality assurers ensures that the prospective Centre:

- meets the requirements of SQA Accreditation
- has sufficient and appropriate physical and staff resources
- meets relevant health and safety, equality and access requirements
- has a robust plan for the delivery of the qualification(s)

Depending on an assessment of the condition of the Centre by EAL this may require a visit to the Centre to view evidence or may be undertaken through other means. EAL must have a clear rationale for the method(s) deployed.

### Monitoring

EAL, through external monitoring and other mechanisms ensures:

- that a strategy is developed and deployed for the ongoing monitoring of the Centre. This strategy must be based on an active risk assessment of the Centre. In particular, the strategy must identify the learner, assessor and internal verifier sampling strategy to be deployed and the rationale behind this
- that the Centre's internal quality assurance processes are effective in learner assessment
- that sanctions are applied to a Centre where necessary and that corrective actions are taken by the Centre and monitored by the EAL external verifier/ external quality assurer
- that reviews of EAL external auditing arrangements are undertaken

## 8.0 Grading

The overall grading type for this qualification is **competent / not yet competent**.



## Appendix 1: Unit Summaries

### Unit Title: **Supporting engineering processes**

SCQF Level: **8**

SCQF Credit: **36**

Unit Code: **SEDM8/001**

#### Goal of Unit:

To provide engineering process support, working between senior engineers and the shop floor to inform decision making within organisational requirements.

#### Brief Outline:

This involves contributing substantially to the analysis of problems, and producing technical documentation, reports, or specifications to allow decisions to be made. This will support the delivery of high quality, repeatable, statistically stable, and sustainable processes, accounting for cost planning implications, cost control and environmental impact, and the application and introduction of digital technologies.



## Unit Title: **Maintaining engineering equipment**

SCQF Level: **8**

SCQF Credit: **30**

Unit Code: **SEDM8/002**

### Goal of Unit:

To provide day to day engineering maintenance support, working with the senior engineer to inform decision making within organisational requirements.

### Brief Outline:

This involves contributing substantially in the assessment of equipment problems and the production of technical documentation, reports, or specifications to allow decisions to be made by the senior engineer. This covers areas such as quality, reliability, production, schedules and targets, cost control, environmental impact, or other technical documentation, use and introduction of digital technologies.

## Unit Title: **Designing and building within engineering**

SCQF Level: **8**

SCQF Credit: **32**

Unit Code: **SEDM8/003**

### Goal of Unit:

To interpret design requirements and create the processes to build precision components and assemblies to meet required specifications and quality requirements in compliance with safe systems of work and standard operating procedures.

### Brief Outline:

This involves interpreting design needs and processes to enable the assembly of components and sub-assemblies as part of the production of an end-product. This includes working in accordance with standard operating procedures and safe systems of work, and the use of industry standard digital tools.



## Unit Title: **Inspection and testing within engineering**

SCQF Level: **7**

SCQF Credit: **30**

Unit Code: **SEDM8/004**

### Goal of Unit:

To inspect and test products, systems, or components to meet safety and functional requirements.

### Brief Outline:

This involves diagnosing and identifying problems by applying appropriate inspection and testing methods, using available data and digital tools, and making recommendations for improvement in line with organisational requirements. This includes recording and reporting results and arranging for final sign off and certification.



## Unit Title: **Diagnosing and resolving faults**

SCQF Level: **8**

SCQF Credit: **30**

Unit Code: **SEDM8/005**

### Goal of Unit:

To safely locate, diagnose, resolve, and rectify faults using problem solving techniques, diagnostic software, and tools in line with safe systems of work.

### Brief Outline:

This involves using approaches and techniques, including available data and digital tools, to safely locate, diagnose and rectify faults in machinery, including identifying areas for improvement and the communication of outcomes.



## Unit Title: **Conducting quality control and assurance**

SCQF Level: **8**

SCQF Credit: **30**

Unit Code: **SEDM8/006**

### Goal of Unit:

Applying approved industry quality control and assurance processes to support the delivery of products and services to meet safety and regulatory requirements.

### Brief Outline:

This involves applying approved quality control and assurance processes for products and services to ensure they conform to quality standards and meet stakeholder requirements. It also involves monitoring improvements and communicating outcomes to stakeholders.

## Unit Title: **Applying methods and principles in project management**

SCQF Level: **8**

SCQF Credit: **12**

Unit Code: **SEDM8/007**

### Goal of Unit:

Use project management tools to plan, organise and monitor the progress of activities to achieve production quality performance indicators.

### Brief Outline:

This is about applying methods and principles of project management in line with organisational requirements. This includes ensuring activities are delivered in accordance with the business case and safe systems of work, and involves liaising with and reporting progress to stakeholders, ensuring activities contribute to key milestones and deliverables.



## Unit Title: **Providing design-led solutions**

SCQF Level: **8**

SCQF Credit: **34**

Unit Code: **SEDM8/008**

### Goal of Unit:

To support the development of new or revised products by providing design-led solutions to problems in compliance with safe systems of work and standard operating procedures.

### Brief Outline:

This involves supporting all stages of product design and redesign of existing products using available digital tools where appropriate. It ranges from early concept feasibility, design, and development through to final preparations for delivery to customers.



## Unit Title: **Understanding digital manufacturing**

SCQF Level: **8**

SCQF Credit: **9**

Unit Code: **SEDM8/009**

### Goal of Unit:

To understand how new technologies and net zero targets will impact manufacturing, including the integration of new or modified automation, digital systems, and manufacturing engineering systems.

### Brief Outline:

This is about understanding how new or modified automation and control systems will optimise performance and compliance within engineering and manufacturing process, in order to raise productivity and meet customer specifications.



## Unit Title: **Organising and facilitating meetings**

SCQF Level: **7**

SCQF Credit: **8**

Unit Code: **SEDM8/010**

### Goal of Unit:

To organise and facilitate meetings to achieve objectives in line with organisational requirements.

### Brief Outline:

This is about organising and facilitating meetings with stakeholders to achieve objectives. This also involves booking meetings, preparing and circulating documentation, following up on actions and providing further information as required.

## Unit Title: **Establishing and maintaining effective working relationships**

SCQF Level: **7**

SCQF Credit: **12**

Unit Code: **SEDM8/011**

### Goal of Unit:

To understand, create and maintain positive and effective working relationships with stakeholders to enable their expectations to be met in line with organisational requirements.

### Brief Outline:

This is about identifying internal and external stakeholders and building relationships. It involves maintaining positive relationships by communicating information in an effective and professional manner in line with organisational requirements.

## Unit Title: **Developing meta-skills and personal professionalism**

SCQF Level: **8**

SCQF Credit: **16**

Unit Code: **SEDM8/012**

### Goal of Unit:

To develop meta-skills and personal professionalism through reflective practice, goal setting and active learning to improve own performance in line with organisational requirements.

### Brief Outline:

This is about taking responsibility for the development of own meta-skills and personal professionalism. This involves reflecting on and learning from practice; seeking and acting on feedback; agreeing and working towards own goals for continuous professional development (CPD); and managing own wellbeing.



## Unit Title: **Providing effective leadership**

SCQF Level: **8**

SCQF Credit: **16**

Unit Code: **SEDM8/013**

### Goal of Unit:

To provide positive and effective leadership to teams to enable, objectives, goals, and targets to meet organisational requirements.

### Brief Outline:

This involves leading a team to achieve defined outcomes and targets required by the organisation. This includes identifying team members roles and responsibilities, setting individual and collective objectives, and monitoring and reviewing performance.

## Unit Title: **Managing teams and stakeholders**

SCQF Level: **8**

SCQF Credit: **20**

Unit Code: **SEDM8/014**

### Goal of Unit:

To understand and create positive relationships with stakeholders in order to enable their expectations to be managed in line with organisational requirements. To organise and facilitate meetings in order to achieve project objectives in line with organisational requirements. To lead and manage teams to support the delivery of project outcomes in line with organisational requirements.

### Brief Outline:

This is about communicating and supporting project outcomes and influencing and aligning people to achieve a specific aim within agreed parameters and in line with organisational requirements. This involves identifying the various stakeholders involved with projects and understanding the relationships between the stakeholders. Individuals will also create positive relationships with all stakeholders involved in projects and communicate with them in an effective manner.

## Appendix 2: Learner Registration and Certification

Learners must be registered with EAL on a code which relates to the qualification - this must be completed prior to assessment.

For registration purposes, suffixes are added to the following Units:

SEDM8/002 – A & B

SEDM8/003 – A, B & C

SEDM8/004 – A & B

SEDM8/005 – A & B

SEDM8/006 – A & B

SEDM8/008 – A, B & C

These are to enforce the Rules of Combination in EAL's online Services. The unit content is identical across all suffixes. The rules of combination on page 5 must be followed.

Both learner registration and certification can be completed online at the EAL Website [www.eal.org.uk](http://www.eal.org.uk). For paper based registration and certification please use the appropriate forms. These are located on the EAL Website, for guidance on registration and Certification please refer to the Registration and Certification User Guide.

To register the learner on the chosen qualification code:

Title	Code
EAL Diploma in Engineering and Digital Manufacturing at SCQF Level 8	R709 04

Published by:

EAL  
Unit 2, The Orient Centre  
Greycaine Road  
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