

Qualification Manual

Level 1 Award in

Metrology – Foundation Measurement (500/9936/X)

Level 2 Award in

Metrology – Geometrical Tolerancing (600/3569/9)

Metrology – Portable Co-ordinate Measurement Systems (500/9857/3)

Metrology – Dimensional Measurement (500/9924/3)

Level 3 Award in

Metrology – Dimensional Measurement (500/9948/6)

Metrology – Portable Co-ordinate Measurement Systems (600/3565/1)

Metrology – Geometrical Tolerancing (600/3567/5)

Metrology – Laser Safety (600/3568/7)



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1.0 About EAL

Since 1964, EAL (Excellence, Achievement and Learning) has been awarding superior vocational qualifications and apprenticeship components for engineering, building services and related sectors.

Developed to the highest technical standard, our qualifications are regularly updated to reflect regulatory and technical changes. We support the providers of our qualifications with an unparalleled level of service to ensure that learners are well prepared for the roles they plan to take on.

EAL recognise the value of skills in the work environment as one of the five key drivers of productivity; essential for economic growth and bringing a number of wider social benefits. Through its programme of continuous improvement EAL strives to meet the demand from employers for high performing, high quality products.

In 2012, EAL changed its name from EMTA Awards Limited to **Excellence, Achievement and Learning**, to better reflect its wide reaching position across industry – providing qualifications, not only in Engineering and Manufacturing, but also specialising in Building Services Engineering, Gas Utilisation, Environmental Technologies, Business Services and closely related sectors

1.1 Equal opportunities and diversity

EAL expects its centres to enable Learner's to have equal access to training and assessment for qualifications in line with the Equality Act 2010 and protected characteristics. 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 service and feedback

Customer service 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 services team:

EAL Customer Services Tel: +44 (0)1923 652 400

Email: customercare@eal.org.uk

2.0 Introduction to Qualifications

What are these qualifications?

These qualifications were developed to fill an identified gap in the market for the science of metrology starting with foundation level qualifications. All these VRQ qualifications are designed to have a 'hands on' practical approach to measurement training and to address key knowledge, understanding, questioning and behavioural requirements as such to support improved business benefits. To support this hands on approach the knowledge aspects of the qualifications are covered by a study pack of good practice that with support allows learners to reinforce their knowledge and understanding at their own pace and retain the pack for support after the qualification is completed.

The content and structure of these qualifications have been developed to provide good practice to the practices and processes required when dealing with metrology. The methodology helps to develop the personal skills and attributes that learners need in order to be confident in their ability to work, learn and achieve their full potential at the appropriate Level. Learners can, if they wish progress through the VRQ qualifications to further develop their skills.

These qualifications have been developed in close consultation with education, standards organisations, training organisations, metrologists and industry partners to ensure that these qualifications meet the needs of the engineering and education sectors. In addition, EAL has consulted throughout the development of the qualifications to ensure that the structure and content meet industries and the learner's needs.

Who are these qualifications for?

- Apprentices,
- Graduates,
- Shop Floor Engineers,
- Quality and inspection staff,
- · Designers,
- Process planners,
- Production staff,
- Metrologists,
- Co-ordinate Measurement programmers.

What do this qualifications cover?

These qualifications will enable the learner to gain an understanding of the principles of metrology. Learners will learn core principles around standards and traceabilty, how to apply good practice, question, plan, and analyse data, react to variation and communicate with others. The learners will be able to make judgements about the measurement requirements and be able to apply what they have learnt within the workplace contributing to improvements within the process. Measurement good practice and key behaviours are the main focus of these qualifications.

2.1 Accreditation & Industry Support for these Qualifications

This qualification:

• Is accredited by Ofqual at level 1,2 and 3.

2.2 Achievement of these Qualifications & 'Stand Alone Units'

These qualifications are gained when all the necessary units have been achieved. The centre will then be able to apply for the learner's Certificate. The learner will also receive a Certificate of Unit Credit, listing all the units they have achieved.

However if they don't manage to complete the full qualification learners can still claim a Certificate of Unit Credit for the units achieved therefore, they still have proof of their ability and could complete the qualification at a later date.

Units can also be taken individually (stand alone). This manual **must** be used in conjunction with the delivery and assessment of any individual units to ensure that assessment requirements and methodologies are consistently applied.

2.3 Relation to Other Qualifications

These qualifications relate to a range of EAL NVQ/VRQ engineering qualifications. Measurement and measurement techniques underpin all engineering activities.

Details of EAL qualifications can be obtained from the EAL Website or alternatively contact:

EAL Customer Services Tel: +44 (0)870 240 6889

Email: <u>customercare@eal.org.uk</u>

2.4 Qualifications Support Materials

The following materials are available for these qualifications:

Tutor packs:

These documents contain the knowledge and the practical assessment criteria. The units also clearly identify the:

- RQF level & Credit value,
- Guided learning hours GLH and a Mininum TQT,
- Title, Unit purpose/aims,
- · Summary of learning outcomes,
- Details of assessments.

Learner packs:

These are the same as the tutor packs but without the answers and are intended to be given to learners as a resource. They also include deliverer plans, slides, workbook and assessment criteria.

EAL have also provided for centres:

EAL standard operating policies and procedures set out the requirements for EAL Centres, contain all necessary documentation and also contain helpful teaching and delivery advice. The EAL standard operating policies and procedures must be adhered to in the delivery of this qualification.

All these materials can be accessed from the EAL Website www.eal.org.uk.

Note: Further delivery support materials will be available in the future for these qualifications.

2.5 Funding for these Qualifications

The following bodies will be able to assist you with your funding gueries.

For England:

Skills Funding Agency.
http://skillsfundingagency.bis.gov.uk/
Cheylesmore House
Quinton Road
Coventry
CV1 2WT

Also, search the Learning Aims Database (LAD) for the qualification code given on the front page of this Manual; this will give an indication of the funding status.

For Wales:

Contact the Welsh Assembly Government http://wales.gov.uk/topics/educationandskills/?lang=en Cathays Park Cardiff CF10 3NQ

For Northern Ireland:

Contact the Department for Employment and Learning http://www.delni.gov.uk/ Adelaide House 39-49 Adelaide Street Belfast BT2 8FD

For all Nations and further guidance:

Contact Semta 14 Upton Road Watford WD18 0JT

Tel: 01923 238441

3.0 Rule of Combination (Qualifications Structure)

These qualifications will be achieved when the learner has successfully completed all units detailed below.

EAL Level 1 Award in Metrology - Foundation Measurement 500/9936/X

Optional Units: Any one unit must be completed:

EAL Code	Unit title:	Level	Credit	GLH	TQT	Ofqual Code
QMFM1/001	Fundamental Principles of Measurement	1	1	8	10	L/601/9535

EAL Level 2 Award in Metrology - Geometrical Tolerancing 600/3569/9

Mandatory Unit: Single unit must be completed:

EAL Code	Unit title:	Level	Credit	GLH	TQT	Ofqual Code
QNPL2/001	Apply Geometrical Tolerances associated with Design, Manufacturing and measurement principles and methods	2	3	24		K/503/5800

EAL Level 2 Award in Metrology - Portable Co-ordinate Measurement Systems 500/9857/3 Mandatory Unit: Single unit must be completed:

EAL Code	Unit title:	Level	Credit	GLH	TQT	Ofqual Code
QPMS2/001	Principles, methods and best practice of Portable Co-ordinate Measurement Systems	2	2	16	20	K/503/5800

EAL Level 2 Award in Metrology – Dimensional Measurement 500/9924/3 Mandatory Unit: Single unit must be completed:

EAL Code	Unit title:	Level	Credit	GLH	TQT	Ofqual Code
QMDM2/001	Geometrical Product Specification _GPS_	2	1	8		K/601/8957
QMDM2/002	Using Measurement Principles and Methods	2	2	16		M/601/8958

EAL Level 3 Award in Metrology – Dimensional Measurement 500/9948/6 Mandatory Unit: Single unit must be completed:

EAL Code	Unit title:	Level	Credit	GLH	TQT	Ofqual Code
QADM3/001	Apply Geometrical Product Specifications and Measurement Principles and Methods	3	2	16		F/601/9550
QADM3/002	Apply co-ordinate principles	3	2	8		J/601/9565
QADM3/003	Apply Process control Principles and Methods	3	1	8		R/601/9584

EAL Level 3 Award in Metrology – Portable Co-ordinate Measurement Systems 600/3565/1 Optional Units: *Any one unit must be completed:*

EAL Code	Unit title:	Level	Credit	GLH	TQT	Ofqual Code
QNPL3/004	Principles, methods and best practice of Portable Co-ordinate Measurement Systems GPS	3	2	16	20	L/503/5353

EAL Level 3 Award in Metrology – Geometrical Tolerancing 600/3567/5 Optional Units: *Any one unit must be completed:*

EAL Code	Unit title:	Level	Credit	GLH	TQT	Ofqual Code
QNPL3/001	Apply Geometrical Tolerances associated with Design, Manufacturing and Measurement Principles and Methods	3	2	16	20	T/503/5346

EAL Level 3 Award in Metrology – Laser Safety 600/3568/7 Optional Units: *Any one unit must be completed:*

EAL Code	Unit title:	Level	Credit	GLH	TQT	Ofqual Code
QNPL3/005	Laser Safety	3	1	8	10	R/503/5354

4.0 Centre & Qualifications Approval

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

Note: For centres that already have the NQF qualification on their centre remit they will automatically have approval to run these qualifications.

For existing EAL Centres to put the qualification on your centre remit:

The approval from can be downloaded from the centre area of the EAL Website or alternatively obtained from the EAL standard operating policies and procedures. Please contact you EQA, or EAL Customer Services (see bellow) if you need any assistance.

For non EAL Centres to gain centre approval to run the qualification:

Please contact the EAL Customer Services Department who will be delighted to hear from you:

Tel: +44 (0)870 240 6889 Fax: +44 (0)870 240 6890

Email: <u>customercare@eal.org.uk</u>

5.0 Profiles & Requirements

The EAL standard operating policies and procedures must be followed along with this section.

5.1 Teaching Staff

Delivery organisation:

- Measurement Expertise; Evidence must be provided of measurement expertise in the subject areas of the level to be delivered,
- NPL Training assessed: The evidence provided will be assessed by an approved NPL experts checking for measurement history both on knowledge and practical delivery,
- Credit check: NPL will undertake a credit check of the organisation applying to be a deliverer,
- Resources: NPL will check the resources of the deliverers to covers the likes of personnel, equipment, ability to deliver within the companies' own premises,
- Certified to deliver each level: Each deliverer within the organisation will be approved to deliver the levels subject to the results of the above criteria,
- Sign NPL License agreement: Each deliverer organisation will be required to sign the NPL license agreement,
- Organise training and assessment at this level: Liaise with NPL to organise training as required through the NPL training system,
- Trainers days: Each deliverer organisation will be required to send a representative to a trainers day twice yearly, one at NPL and the second at a neutral venue to be decided.

Deliverer requirements:

- Experience: Provide evidence of knowledge and understanding at each level not necessarily an expert, would need to prove understanding,
- Approval: The deliverer will require to be approved for each module to be delivered and attend training sessions,
- Work to procedures: The deliverer will be required to work to procedures as per the NPL quality documents. For example this will include standard forms, to monitor progress, feedback, certification, equal opportunities, complaints,
- Liaise with NPL and auditors: The deliverer will be required to liaise with NPL and the allocated auditors. Visits may be planned ahead or the auditor may turn up unannounced to monitor consistency,
- Annual Review: Each deliverer will be subject to an annual review to achieve consistency across all the deliverers. Approval can be suspended subject to results of this review,
- Monitor Progress: The deliverer must monitor progress and provide NPL Training with the relevant approvals and feedback forms,
- Feedback: Must provide feedback to learners, company and NPL,
- Train the trainer sessions: Attend NPL Training update workshops and meetings as required,
- Training Qualifications: (Currently optional) Either have nationally recognised qualifications, working towards a national qualification.

Teaching staff must:

Have 2 years experience in teaching/training,

or

 Are working towards an appropriate teaching/training qualification (e.g. Cert Ed or Learning & Development trainer units),

or

• Hold an appropriate teaching/training qualification (e.g. Cert Ed or Learning & Development trainer units).

Must also have:

- Knowledge and understanding of the occupation covered by this qualification.
- Knowledge and understanding of the structure and content of this qualification.

5.2 Assessors

Assessors must:

Have 2 years experience in assessment (e.g. within an N/SVQ or teaching/training environment),

OI

be working towards an appropriate assessment qualification (e.g. A1/A2),

or

hold an appropriate assessment qualification (e.g. A1/A2),

- Have knowledge and understanding of the occupation covered by the VRQ,
- Have knowledge and understanding of the VRQ's structure and content.

5.3 Quality Assurance Staff

Quality assurance staff must:

· Have experience in quality management/internal verification,

or

hold an appropriate qualification (e.g. V1),

- Have familiarity of the occupation covered by the qualification,
- Have knowledge and understanding of the qualification's structure and content.

5.4 Personnel Conducting the External Assessment

These personnel must:

Have experience in conducting and controlling exam sessions,

or

be supervised, conducting this function, by an individual experienced in conducting and controlling exam sessions.

 Have knowledge, understanding and compliance to EAL examination procedures (see the EAL standard operating policies and procedures).

5.5 Learners

There are no formal entry requirements for these qualifications; although Centres should ensure that the learners have the potential to achieve the units selected within these qualifications. Learners must have the minimum levels of literacy and numeracy to comply with the health and safety aspects of the scheme, the completion of the learning outcomes and the external assessment.

Centres should make learners with particular requirements aware of the practical and theory content of these qualifications and they should be given every opportunity to complete all or some of the units. EAL will consider any reasonable suggestions for and from, those with disabilities that would help them to achieve the learning outcomes without compromising the standards required.

Age Restrictions

There are no age restrictions.

5.6 Physical Resources

The resources required for the assessments are detailed in each of the qualification units.

A room for lectures providing a suitable environment for information transfer should be available.

There must be adequate arrangements for changing and storing clothes, safe keeping of valuables and provision of simple refreshments and toilet/washroom facilities.

Safe working is a key issue and all practical activities must be subject to up to date risk assessments.

All trainees must be properly supervised and wear the correct personal protective equipment.

6.0 Assessment

Due to the levels of these qualifications and the profile of the likely learners it has been decided that a formal multi choice examination is not suitable for assessing the learning undertaken by the learners.

The emphasis of the assessments of these qualifications is in a 'hands on' approach and the final assessment of the units will take the form of practical tasks in the form of welding procedure specifications (WPS) and internally assessed knowledge tests that reflect the learning outcome titles of the units. The EAL standard operating policies and procedures **must** be followed along with this section.

6.1 Internal (Centre Marked) Assessment

These qualifications are assessed via ongoing practical exercises and a knowledge testing assessment using a learner centred workbook. The learner must pass all the internal assessments to achieve the qualification.

Internal assessment involves collecting and evaluating evidence that demonstrates achievement of the learning outcomes (Approval and Feedback form). This will be subject to external verification. Centres are responsible for ensuring that assessment decisions are valid and reliable.

Where the assessment take the form of written/short answer and multiple choice question papers, these should be treated as a formal assessment therefore imposing the necessary restrictions on the learner e.g. no conferring or referring to text books etc.

All learning outcomes of the qualification must be assessed. In order to meet this requirement it is advised that centres should maintain an assessment and feedback record for each learner (Approval and Feedback form). This will detail the evidence evaluated against the learning outcome and the feedback given to the learner. These records along with the learner workbooks must be available to the EAL External Quality Assurer on request subject to prior notice and location.

EAL will monitor and External Quality verify assessment. The EAL standard operating policies and procedures must be followed along with this section.

All workbooks have traceable serial numbers linked to the learners NPL registration.

Appendix 1: Total Qualification Time

In September 2015, Ofqual introduced their new Regulated Qualification Framework (RQF). They did this by publishing new General Conditions of Recognition¹ which require awarding organisations to take a consistent approach to determining the level, and describing the size, of regulated qualifications.

E7.1 of the new General Conditions of Recognition states:

In respect of each qualification which it makes available or proposes to make available, an awarding organisation must assign to that qualification a number of hours for –

- (a) Total Qualification Time, and
- (b) Guided Learning.

In Section J1 of the new General Conditions of Recognition, Ofqual provide the following definitions for Guided Learning and Total Qualification Time as:

Guided Learning - The activity of a Learner in being taught or instructed by - or otherwise participating in education or training under the Immediate Guidance or Supervision² of - a lecturer, supervisor, tutor or other appropriate provider of education or training.

For these purposes the activity of 'participating in education or training' shall be treated as including the activity of being assessed if the assessment takes place under the Immediate Guidance or Supervision of a lecturer, supervisor, tutor or other appropriate provider of education or training.

Total qualification Time - The number of notional hours which represents an estimate of the total amount of time that could reasonably be expected to be required, in order for a Learner to achieve and demonstrate the achievement of the level of attainment necessary for the award of a qualification.

Total Qualification Time is comprised of the following two elements -

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

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¹ https://www.gov.uk/government/publications/general-conditions-of-recognition

² Immediate Guidance or Supervision - The guidance or supervision provided to a Learner by a lecturer, supervisor, tutor or other appropriate provider of education or training –

⁽a) with the simultaneous physical presence of the Learner and that person, or

⁽b) remotely by means of simultaneous electronic communication.

Appendix 2: Qualifications & Credit Framework

This is the framework for creating and accrediting qualifications in England, Wales and Northern Ireland. Assessment routes within these qualifications have a level and credit. The level is indicative of the challenge. The credit value specifies the number of credits that will be awarded to a learner who successfully achieves the assessment route. One credit is equal to 10 hours of learning time. Learning time is defined as the total time taken by the average learner at this level to fully complete the learning outcomes and assessment requirements of a unit. This includes the guided learning hours (GLH) in the classroom/workshop as well as any direct study, homework, practice, preparation and assessment.

RQF Requirements for Centres

The RQF has requirements for centres in relation to the information provided to the relevant funding bodies. Centres will need to:

- Register the centre with the UK Register of Learning Providers (UKRLP) to obtain a UK Provider Reference Number (UKPRN),
- Become a Learner Registering Body (LRB). This will ensure that every individual 'centre reference number' or UKPRN will be identifiable on one system which is the UKRLP,
- Obtain or confirm Unique Learner Numbers (ULNs) for Learners through the Learner Registration Service (LRS).

The ULN will be issued from and held on the Learner Registration Service (LRS). This number will enable credit accumulation and transfer of learner achievement, and will create a Learner Record. The use of the ULN is mandated by government funding bodies. The ULN may not be applicable for all learners, for example if the learner is not a UK national. The ULN relates to England, Wales and Northern Ireland only. Scotland has a similar number, the Scottish Candidate Number (SCN).

Further details of the ULN and LRS can be obtained from the Learner Records Service.

If you have any further queries or concerns please visit the EAL Website <u>www.eal.org.uk.</u> or contact our Customer Services department who can assist you.

Tel: +44 (0)870 240 6889 Fax: +44 (0)870 240 6890

Email: customercare@eal.org.uk

Appendix 3: Functional Skills & Essential Skills Wales

Essential Skills Wales (ESW)

Essential skills Wales are a suite of qualifications to replace Key Skills in Wales. There are currently three ESW qualifications:

- Application of number (Aon),
- Communication,
- Information communication technology (ICT).

EAL offer these qualifications at levels one to three. These qualifications are 'stand alone' and are portfolio based; however these can be embedded into other qualifications but must remain a transferable skill.

DCELLS are currently reviewing Working with Others; Improving Ones own Learning and Problem Solving which will become part of a suite of six qualifications along with Application of Number, Communication and Information Communication Technology. These qualifications will available from September 2010. Currently the wider Key Skills are available until September 2012.

For further information essential skills Wales please visit the EAL website.

Functional skills

If individuals don't achieve a level two functionality while at school; they will have other opportunities to do so at college, within an apprenticeship, or in an adult course on day release from work, whatever their age.

Functional Skills qualifications will replace existing Key Skills qualifications.

Functional Skills qualifications will be:

- a constituent of new Diplomas at every level,
- a replacement for Communication, AoN and ICT Key Skills qualifications part of Apprenticeship Frameworks,
- part of Foundation Learning.

Each qualification is separate and assessed independently. The qualifications have been designed so that, at level two, learners are able to apply their skills confidently in a range of different contexts.

Functional Skills are already part of the Regulated Qualification Framework (RQF) and have been allocated a credit value of five at the two Levels.

They will be accredited onto the National Qualifications Framework (NQF) for full rollout from September 2010.

For further information on functional skills and essential skills Wales and please vast the EAL website at www.eal.org.uk/

Appendix 4: Relation to National Occupational Standards

EAL's Units are mapped to national occupational standards as shown:

EAL Code	Unit Title	
QMFM/001	Fundamental Principles of Measurement	O45NPEO1A
QNPL2/001	Apply Geometrical Tolerances associated with Design, Manufacturing and measurement principles and methods	
QPMS2/001	Principles, methods and best practice of Portable Co-ordinate Measurement Systems	O45NTS2-09
QMDM2/003	Geometrical Product Specification GPS	O45NBIT2-18 O45NTS2-04 O45NTS2-08
QMDM2/003	Uing Measurement Principles and Methods	O45NBIT2-18 O45NBIT24 O45NBIT3-25
QADM3/001	Apply Geometrical Product Specifications and Measurement Principles and Methods	045NETS3-12
QADM3/002	Apply co-ordinate principles	045NETS3-12
QADM3/003	Apply Process control Principles and Methods	O45NETS3-19
QNPL3/004	Principles, methods and best practice of Portable Co-ordinate Measurement Systems GPS	
QNPL3/001	Apply Geometrical Tolerances associated with Design, Manufacturing and Measurement Principles and Methods	
QNPL3/005	Laser Safety	

Appendix 5: Learner Registration & Certification

Learners must be registered with EAL on a code which relates to the qualification - this must be completed prior to assessment. Both learner registration and certification can be completed on line at the EAL Website www.eal.org.uk. For paper based registration and certification use forms CRF1, and CAF1A. These are located in the EAL standard operating policies and procedures.

To Register the Learner on the Chosen Qualification/Pathway Code:

Qualification Title	Code
EAL Level 1 Award in Metrology – Foundation Measurement (RQF)	500/9936/X
EAL Level 2 Award in Metrology – Geometrical Tolerancing (RQF)	600/3569/9
EAL Level 2 Award in Metrology – Portable Co-ordinate Measurement Systems (RQF)	500/9857/3
EAL Level 2 Award in Metrology – Dimensional Measurement (RQF)	500/9924/3
EAL Level 3 Award in Metrology – Dimensional Measurement (RQF)	500/9948/6
EAL Level 3 Award in Metrology – Portable Co-ordinate Measurement Systems (RQF)	600/3565/1
EAL Level 3 Award in Metrology – Geometrical Tolerancing (RQF)	600/3567/5
EAL Level 3 Award in Metrology – Laser Safety (RQF)	600/3568/7