



City & Guilds Level 1 Certificates in Introductory Welding, Fabrication, Cutting and Brazing and Soldering Skills (3268)

Version 3.4 (January 2025)

Qualification Handbook

Qualification at a glance

Subject area	4.1 Engineering
City & Guilds number	3268
Age group approved	Ages 14+
Entry requirements	None
Assessment	Practical demonstration/Assignment, oral examination
Grading	Pass/Fail
Approvals	Full approval required
Support materials	Assignment Pack
Registration and certification	Consult the Walled Garden/Online Catalogue for last dates

Title and level	City & Guilds qualification number	Regulatory reference number	GLH	TQT
Level 1 Award in Introductory Manual Metal Arc (MMA) Welding	3268-10	600/3748/9	60	70
Level 1 Award in Introductory Oxy-Acetylene Welding	3268-11	600/3753/2	60	70
Level 1 Award in Introductory Tungsten Inert Gas (TIG) Welding	3268-12	600/3754/4	60	70
Level 1 Award in Introductory Metal Inert Gas (MIG) Welding	3268-13	600/3749/0	60	70
Level 1 Certificate in Introductory Welding Skills	3268-17	601/4170/0	120	140
Level 1 Certificate in Introductory Welding, Fabrication and Cutting Skills	3268-18	601/4168/2	145	210

Version and date	Change detail	Section
3.2 September 2018	Closed pathways identified	Qualification at a glance and Structure
3.1 September 2017	Added TQT details	Qualification at a glance and Structure
	Deleted QCF	Throughout
3.0 October 2014	Handbook updated and new units added	All
3.2 August 2018		
3.3 March 2024	Update of Quality Assurance Statement	Centre Requirements
3.4 January 2025	Handbook transferred to latest version of the template. The section on Quality Assurance has been updated and sections on Inclusion and diversity, and Sustainability have been added.	All

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1 Introduction

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

Area	Description
Who are the qualifications for?	The qualifications at Level 1 are designed for those wishing to enter the industry and for those wanting to gain a welding, metal fabrication, thermal cutting or brazing and soldering qualification for their own personal skills development
What do the qualifications cover?	These qualifications candidates to learn, develop and practice the skills required for employment and/or career progression in the engineering sector..
What opportunities for progression are there?	The qualifications provide knowledge and/or practical skills related to the Level 1 NVQ Certificate in Performing Engineering Operations On completion of these qualifications candidates may progress into employment or to the following City & Guilds qualifications: <ul style="list-style-type: none">• Level 2 Award in Welding Skills (3268-02)• Level 2 Award in Thermal Cutting Techniques (3268-22)• Level 2 Award in Metal Fabrication (3268-23)• Level 2 Certificate in Welding, Fabrication and Cutting Skills (3268-25)• Level 2 Diploma in Engineering (2850)
Who did we develop the qualifications with?	The units in these qualifications are linked to the NVQ Level 1 in Performing Engineering Operations – Using manual metal arc welding equipment.
Is it part of an apprenticeship framework or initiative?	N/A

Structure

Awards

To achieve the **City & Guilds Level 1 Award in Introductory Manual Metal Arc (MMA) Welding (3268-10)**, learners must achieve 7 credits from the mandatory unit.

Unit accreditation number	City & Guilds unit number	Unit title	Credit Value	GLH
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Mandatory units:

Learners must achieve **the** mandatory unit.

H/501/9417	101	Manual Metal Arc Welding	7	60
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To achieve the **City & Guilds Level 1 Award in Introductory Oxy-Acetylene Welding (3268-11)**, learners must achieve 7 credits from the mandatory unit.

Unit accreditation number	City & Guilds unit number	Unit title	Credit Value	GLH
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Mandatory units:

Learners must achieve **the** mandatory unit.

K/501/9418	102	Oxy-Acetylene Welding	7	60
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To achieve the **City & Guilds Level 1 Award in Introductory Tungsten Inert Gas (TIG) Welding (3268-12)**, learners must achieve 7 credits from the mandatory unit.

Unit accreditation number	City & Guilds unit number	Unit title	Credit Value	GLH
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Mandatory units:

Learners must achieve **the** mandatory unit.

M/501/9419	103	Tungsten Inert Gas Welding	7	60
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To achieve the **City & Guilds Level 1 Award in Introductory Metal Inert Gas (MIG) Welding (3268-13)**, learners must achieve 7 credits from the mandatory unit.

Unit accreditation number	City & Guilds unit number	Unit title	Credit Value	GLH
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Mandatory units:

Learners must achieve **the** mandatory unit.

H/501/9420	104	Metal Inert Gas Welding	7	60
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Certificates

To achieve the **City & Guilds** the **Level 1 Certificate in Introductory Welding Skills (3268-17)**, learners must achieve **14 credits** from the optional units (101-104).

Unit accreditation number	City & Guilds unit number	Unit title	Credit Value	GLH
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Optional units:

Learners must achieve **14 credits** from the optional units.

H/501/9417	101	Manual Metal Arc Welding	7	60
K/501/9418	102	Oxy-Acetylene Welding	7	60
M/501/9419	103	Tungsten Inert Gas Welding	7	60
H/501/9420	104	Metal Inert Gas Welding	7	60

To achieve the **City & Guilds the Level 1 Certificate in Introductory Welding, Fabrication and Cutting Skills (3268-18)**, learners must achieve **21** credits. **14** credits from the mandatory units (106 and 107) and **7** credits from the optional units (101-104).

Unit accreditation number	City & Guilds unit number	Unit title	Credit Value	GLH
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Mandatory units:

Learners must achieve all **two** mandatory units.

Y/506/6251	106	Metal Fabrication	7	43
H/506/6253	107	Thermal Cutting Techniques	7	42

Optional units:

Learners must achieve **7 credits** (1 unit) from the optional units

H/501/9417	101	Manual Metal Arc Welding	7	60
K/501/9418	102	Oxy-Acetylene Welding	7	60
M/501/9419	103	Tungsten Inert Gas Welding	7	60
H/501/9420	104	Metal Inert Gas Welding	7	60

Total Qualification Time (TQT)

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

TQT consists of the following two elements:

- 1) the number of hours that an awarding organisation has assigned to a qualification for guided learning
- 2) an estimate of the number of hours a learner will reasonably be likely to spend in preparation, study or any other form of participation in education or training, including assessment, which takes place as directed by – but, unlike guided learning, not under the immediate guidance or supervision of – a lecturer, supervisor, tutor or other appropriate provider of education or training.

Title and level	GLH	TQT
City & Guilds Level 1 Award in Introductory Manual Metal Arc (MMA) Welding	60	70
City & Guilds Level 1 Award in Introductory Oxy-Acetylene Welding	60	70
City & Guilds Level 1 Award in Introductory Tungsten Inert Gas (TIG) Welding	60	70
City & Guilds Level 1 Award in Introductory Metal Inert Gas (MIG) Welding	60	70
City & Guilds Level 1 Certificate in Introductory Welding Skills	120	140
City & Guilds Level 1 Certificate in Introductory Welding, Fabrication and Cutting Skills	145	210

2 Centre requirements

Approval

Full approval

To offer these qualifications, new centres will need to gain both centre and qualification approval. Please refer to the document **Centre Approval Process: Quality Assurance Standards** 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

Centres must provide access to sufficient equipment in the centre or workplace to ensure candidates have the opportunity to cover all of the practical activities.

Centre staffing

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

- be occupationally competent or technically knowledgeable in the area(s) 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 verifiers

While the Assessor/Verifier (A/V) units are valued as qualifications for centre staff, they are not currently a requirement for these qualifications.

Continuing professional development (CPD)

Centres are expected to support their staff in ensuring that their knowledge remains current of the occupational area and of best practice in delivery, mentoring, training, assessment and quality assurance, and that it takes account of any national or legislative developments.

Quality assurance

Approved centres must have effective quality assurance systems to ensure optimum delivery and assessment of qualifications. Quality assurance includes initial centre approval, qualification approval and the centre's own internal procedures for monitoring quality. Centres are responsible for internal quality assurance and City & Guilds is responsible for external quality assurance. All external quality assurance processes reflect the minimum requirements for verified and moderated assessments, as detailed in the Centre Assessment Standards Scrutiny (CASS), section H2 of Ofqual's General Conditions. For more information on both CASS and City & Guilds Quality Assurance processes visit: the [**What is CASS?**](#) and [**Quality Assurance Standards**](#) documents on the City & Guilds website.

Standards and rigorous quality assurance are maintained by the use of:

- Internal quality assurance
- City & Guilds external quality assurance.

In order to carry out the quality assurance role, Internal Quality Assurers must

- have appropriate teaching and vocational knowledge and expertise

- have experience in quality management/internal quality assurance
- hold or be working towards an appropriate teaching/training/assessing qualification
- be familiar with the occupation and technical content covered within the qualification.

External quality assurance for the qualification will be provided by City & Guilds EQA process. EQAs are appointed by City & Guilds to approve centres, and to monitor the assessment and internal quality assurance carried out by centres. External quality assurance is carried out to ensure that assessment is valid and reliable, and that there is good assessment practice in centres.

The role of the EQA is to:

- provide advice and support to centre staff
- ensure the quality and consistency of assessments and marking/grading within and between centres by the use of systematic sampling
- provide feedback to centres and to City & Guilds.

Learner entry requirements

City & Guilds does not set entry requirements for these qualifications. However, centres must ensure that candidates have the potential and opportunity to gain the qualification successfully.

Age restrictions

These qualifications are not approved for use by candidates under the age of 14, and City & Guilds cannot accept any registrations for candidates in this age group.

Access arrangements and reasonable adjustments

City & Guilds has considered the design of these qualifications and their assessments in order to best support accessibility and inclusion for all learners. We understand however that individuals have diverse learning needs and may require reasonable adjustments to fully participate. Reasonable adjustments, such as additional time or alternative formats, may be provided to accommodate learners with disabilities and support fair access to assessment.

Access arrangements are adjustments that allow candidates with disabilities, special educational needs, and temporary injuries to access the assessment and demonstrate their skills and knowledge without changing the demands of the assessment. These arrangements must be made before assessment takes place.

The Equality Act 2010 requires City & Guilds to make reasonable adjustments where a disabled person would be at a substantial disadvantage in undertaking an assessment.

It is the responsibility of the centre to ensure at the start of a programme of learning that candidates will be able to access the requirements of the qualification.

Please refer to the JCQ access arrangements and reasonable adjustments and Access arrangements - when and how applications need to be made to City & Guilds for more information. Both are available on the **[City & Guilds website](#)**

3 Delivering the qualification

Initial assessment and induction

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

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

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

Inclusion and diversity

City & Guilds is committed to improving inclusion and diversity within the way we work and how we deliver our purpose which is to help people and organisations develop the skills they need for growth.

More information and guidance to support centres in supporting inclusion and diversity through the delivery of City & Guilds qualifications can be found here:

[Inclusion and diversity | City & Guilds \(cityandguilds.com\)](#)

Sustainability

City & Guilds are committed to net zero. Our ambition is to reduce our carbon emissions by at least 50% before 2030 and develop environmentally responsible operations to achieve net zero by 2040 or sooner if we can. City & Guilds is committed to supporting qualifications that support our customers to consider sustainability and their environmental footprint.

More information and guidance to support centres in developing sustainable practices through the delivery of City & Guilds qualifications can be found here:

[Our Pathway to Net Zero | City & Guilds \(cityandguilds.com\)](#)

Centres should consider their own carbon footprint when delivering this qualification and consider reasonable and practical ways of delivering this qualification with sustainability in mind. This could include:

- reviewing purchasing and procurement processes (such as buying in bulk to reduce the amount of travel time and energy, considering and investing in the use of components that can be reused, instead of the use of disposable or single use consumables)
- reusing components wherever possible
- waste procedures (ensuring that waste is minimised, recycling of components is in place wherever possible)
- minimising water use and considering options for reuse/salvage as part of plumbing activities wherever possible.

Support materials

The following resources are available for these qualifications:

Description	How to access
Assignment pack	www.cityandguilds.com

4 Assessment

Assessment of the qualification

Candidates must:

- successfully complete practical assignments: and oral knowledge test for each unit

Assessment strategy

City & Guilds has written the following assignments to use with these qualifications:

- live assignments that can be downloaded from the City & Guilds website

Time constraints

The following must be applied to the assessment of these qualifications:

Qualification registration is valid for five years.

5 Units

Structure of the units

These units each have the following:

- City & Guilds reference number
- title
- level
- guided learning hours (GLH)
- credit value
- unit aim
- learning outcomes, which are comprised of a number of assessment criteria
- range statements
- supporting information
- relationship to NOS/mapping to occupational/apprenticeship standards.

Guidance for delivery of the units

These qualifications comprise a number of **units**. A unit describes what is expected of a competent person in particular aspects of their job.

Each **unit** is divided into **learning outcomes** which describe in further detail the skills and knowledge that a candidate should possess.

Each **learning outcome** has a set of **assessment criteria** (performance and knowledge and understanding) which specify the desired criteria that must be satisfied before an individual can be said to have performed to the agreed standard.

Range statements define the breadth or scope of a learning outcome and its assessment criteria by setting out the various circumstances in which they are to be applied.

Supporting information provides guidance of the evidence requirement for the unit and specific guidance on delivery and range statements. Centres are advised to review this information carefully before delivering the unit.

Unit 101

Manual Metal Arc Welding

Level:	1
Credit:	7
UAN:	H/501/9417
GLH:	60
Relationship to NOS:	This unit is linked to the NVQ Level 1 in Performing Engineering Operations – Using manual metal arc welding equipment.
Aim:	The unit is designed to enable candidates to demonstrate welding skills typically found in industry and associated underpinning knowledge to a level that will enable them to complete welded joints in simple welding positions and prepare them for undertaking qualifications at NVQ level 1 and this award at level 2.

Learning outcome

The learner will:

LO1 Produce beads on plate in the PA flat position

Assessment criteria

The learner can:

AC1.1 use manual metal arc welding techniques safely to produce beads on a plate in simple welding positions

AC1.2 check joints are aligned and welds are sound and of uniform appearance

AC1.3 identify defects in the weld using visual checks

Learning outcome

The learner will:

LO2 Produce a lap fillet weld in the PB horizontal/vertical position

Assessment criteria

The learner can:

AC2.1 use manual metal arc welding techniques safely to produce a lap fillet weld in simple welding positions
AC2.2 check joints are aligned and welds are sound and of uniform appearance
AC2.3 identify defects in the weld using visual checks

Learning outcome

The learner will:

LO3 Produce a tee fillet weld in the PA flat position

Assessment criteria

The learner can:

AC3.1 use manual metal arc welding techniques safely to produce a tee fillet weld in simple welding positions
AC3.2 check joints are aligned and welds are sound and of uniform appearance
AC3.3 identify defects in the weld using visual checks

Learning outcome

The learner will:

LO4 Produce a tee fillet weld in the PB horizontal/vertical position

Assessment criteria

The learner can:

AC4.1 use manual metal arc welding techniques safely to produce a tee fillet weld in simple welding positions
AC4.2 check joints are aligned and welds are sound and of uniform appearance
AC4.3 identify defects in the weld using visual checks

Learning outcome

The learner will:

LO5 Produce a corner weld in the PA flat position

Assessment criteria

The learner can:

AC5.1 use manual metal arc welding techniques safely to produce a corner weld in simple welding positions
AC5.2 check joints are aligned and welds are sound and of uniform appearance
AC5.3 identify defects in the weld using visual checks

Learning outcome

The learner will:

LO6 Know the process and health & safety requirements for manual metal arc (MMA) welding

Assessment criteria

The learner can:

AC6.1 identify the health and safety hazards associated with MMA welding

AC6.2 state the effects of exposure to the electric arc

AC6.3 indicate types of fire extinguisher

AC6.4 state the effects of exposure to welding fume

AC6.5 identify the personal protective equipment (PPE) and clothing to be worn during MMA welding

AC6.6 identify the welding specific requirements for MMA welding

- identify main components and controls
- electrical connections
- type of current

AC6.7 identify the consumables used for MMA welding

- types of electrode
- function of covering

AC6.8 identify the quality specific requirements for MMA welding

- defects associated with the process
- types of joint configurations
- the factors that affect weld quality
- post-welding activities

Unit 102

Oxy-Acetylene Welding

Level:	1
Credit:	7
UAN:	K/501/9418
GLH:	60
Relationship to NOS:	This unit is linked to the NVQ Level 1 in Performing Engineering Operations – Using manual oxy-fuel gas welding equipment.
Aim:	The unit is designed to enable candidates to demonstrate welding skills typically found in industry and associated underpinning knowledge to a level that will enable them to complete welded joints in simple welding positions and prepare them for undertaking qualifications at NVQ level 1 and this award at level 2.

Learning outcome

The learner will:

LO1 Produce beads on plate in the PA flat position

Assessment criteria

The learner can:

AC1.1 use oxy-acetylene welding techniques safely to produce beads on a plate in simple welding positions

AC1.2 check joints are aligned and welds are sound and of uniform appearance

AC1.3 Identify defects in the weld using visual checks

Learning outcome

The learner will:

LO2 Produce a lap fillet weld in the PB horizontal/vertical position

Assessment criteria

The learner can:

- AC2.1 use oxy-acetylene welding techniques safely to produce a lap fillet weld in simple welding positions
- AC2.2 check joints are aligned and welds are sound and of uniform appearance
- AC2.3 identify defects in the weld using visual checks
-

Learning outcome

The learner will:

- LO3 Produce a brazed tee fillet joint in the PA flat position

Assessment criteria

The learner can:

- AC3.1 use oxy-acetylene welding techniques safely to produce a brazed tee fillet joint in simple welding positions
- AC3.2 check joints are aligned and welds are sound and of uniform appearance
- AC3.3 identify defects in the weld using visual checks
-

Learning outcome

The learner will:

- LO4 Produce a brazed tee fillet joint in the PB horizontal/vertical position

Assessment criteria

The learner can:

- AC4.1 use oxy-acetylene welding techniques safely to produce a brazed tee fillet joint in simple welding positions
- AC4.2 check joints are aligned and welds are sound and of uniform appearance
- AC4.3 identify defects in the weld using visual checks
-

Learning outcome

The learner will:

- LO5 Produce a corner weld in the PA flat position

Assessment criteria

The learner can:

- AC5.1 use oxy-acetylene welding techniques safely to produce a corner weld in simple welding positions
- AC5.2 check joints are aligned and welds are sound and of uniform appearance
- AC5.3 identify defects in the weld using visual checks
-

Learning outcome

The learner will:

LO6 Know the process and health & safety requirements for manual oxy-acetylene welding

Assessment criteria

The learner can:

AC6.1 identify the health and safety hazards associated with oxy-acetylene welding

- hazards
- precautions

AC6.2 indicate types of fire extinguisher

- colour
- type
- applications

AC6.3 identify types of safety signs

- prohibition
- warning
- mandatory
- emergency

AC6.4 identify the personal protective equipment (PPE) and clothing to be worn during oxy-acetylene welding

AC6.5 identify the welding specific requirements for oxy-acetylene welding

AC6.6 state the gas connections in an oxy-acetylene welding system

AC6.7 state the influence the selection of nozzle size

AC6.8 state the factors that influence the selection of size of filler rod

AC6.9 state the correct storage conditions for filler rods

AC6.10 state the function of flux

AC6.11 identify types of joint configurations

AC6.12 state the defects associated with the process

- methods of cleaning
- means of avoiding

AC6.13 state the purposes of tack welding

AC6.14 identify the factors that affect weld quality

- use of incorrect nozzle size
- use of incorrect gas pressures
- incorrect welding technique
- inadequate cleanliness of joint
- damage/contamination on filler rod

Unit 103

Tungsten Inert Gas Welding

Level:	1
Credit:	7
UAN:	M/501/9419
GLH:	60
Relationship to NOS:	This unit is linked to the NVQ Level 1 in Performing Engineering Operations – Using manual TIG welding equipment.
Aim:	The unit is designed to enable candidates to demonstrate welding skills typically found in industry and associated underpinning knowledge to a level that will enable them to complete welded joints in simple welding positions and prepare them for undertaking qualifications at NVQ level 1 and this award at level 2.

Learning outcome

The learner will:

LO1 Produce beads on plate in the PA flat position

Assessment criteria

The learner can:

AC1.1 use tungsten inert gas welding techniques safely to produce beads on a plate in simple welding positions

AC1.2 check joints are aligned and welds are sound and of uniform appearance

AC1.3 identify defects in the weld using visual checks

Learning outcome

The learner will:

LO2 Produce a lap fillet weld in the PB horizontal/vertical position

Assessment criteria

The learner can:

- AC2.1 use tungsten inert gas welding techniques safely to produce a lap fillet weld in simple welding positions
- AC2.2 check joints are aligned and welds are sound and of uniform appearance
- AC2.3 identify defects in the weld using visual checks
-

Learning outcome

The learner will:

- LO3 Produce a tee fillet weld in the PA flat position

Assessment criteria

The learner can:

- AC3.1 use tungsten inert gas welding techniques safely to produce a tee fillet weld in simple welding positions
- AC3.2 check joints are aligned and welds are sound and of uniform appearance
- AC3.3 identify defects in the weld using visual checks
-

Learning outcome

The learner will:

- LO4 Produce a tee fillet weld in the PB horizontal/vertical position

Assessment criteria

The learner can:

- AC4.1 use tungsten inert gas welding techniques safely to produce a tee fillet weld in simple welding positions
- AC4.2 check joints are aligned and welds are sound and of uniform appearance
- AC4.3 identify defects in the weld using visual checks
-

Learning outcome

The learner will:

- LO5 Produce a corner weld in the PA flat position

Assessment criteria

The learner can:

- AC5.1 use tungsten inert gas welding techniques safely to produce a corner weld in simple welding positions
- AC5.2 check joints are aligned and welds are sound and of uniform appearance
- AC5.3 identify defects in the weld using visual checks
-

Learning outcome

The learner will:

LO6 Know the process and health & safety requirements for tungsten inert gas (TIG) welding

Assessment criteria

The learner can:

AC6.1 identify the health and safety hazards associated with TIG welding

AC6.2 state the effects of an enriched inert gas atmosphere

- hazards
- precautions

AC6.3 identify safety features that protect bystanders

AC6.4 identify the personal protective equipment (PPE) and clothing to be worn during TIG welding

AC6.5 state the storage, handling and safe use of compressed inert gas cylinders

AC6.6 identify the welding specific requirements for TIG welding

AC6.7 identify main components and controls for the process

- welding plant (d.c. power source)
- welding current control
- welding lead
- welding torch
- electrode
- nozzle
- ignition switch/foot control
- welding return
- welding earth
- shielding gas supply
- shielding gas type
- shielding gas pressure regulator
- shielding gas flow meter

AC6.8 identify the type of current for the process

AC6.9 identify the electrical connections for the process

AC6.10 identify the consumables used for TIG welding

- electrodes
- shielding gas
- filler wires

AC6.11 state the variables associated with the process

- welding current
- travel speed
- shielding gas flow rate

AC6.12 state maintenance requirements

- electrode

AC6.13 state the function and types of material

- nozzle
- electrode
- collet

AC6.14 state shielding gas requirements

AC6.15 state the defects associated with the process

- methods of cleaning
- means of avoiding

Unit 104

Metal Inert Gas Welding

Level:	1
Credit:	7
UAN:	H/501/9420
GLH:	60
Relationship to NOS:	This unit is linked to the NVQ Level 1 in Performing Engineering Operations – Using manual MIG/MAG welding equipment.
Aim:	The unit is designed to enable candidates to demonstrate welding skills typically found in industry and associated underpinning knowledge to a level that will enable them to complete welded joints in simple welding positions and prepare them for undertaking qualifications at NVQ level 1 and this award at level 2.

Learning outcome

The learner will:

LO1 Produce beads on plate in the PA flat position

Assessment criteria

The learner can:

AC1.1 use metal inert gas welding techniques safely to produce beads on a plate in simple welding positions

AC1.2 check joints are aligned and welds are sound and of uniform appearance

AC1.3 identify defects in the weld using visual checks

Learning outcome

The learner will:

LO2 Produce a lap fillet weld in the PB horizontal/vertical position

Assessment criteria

The learner can:

AC2.1 use metal inert gas welding techniques safely to produce a lap fillet weld in simple welding positions
AC2.2 check joints are aligned and welds are sound and of uniform appearance
AC2.3 identify defects in the weld using visual checks

Learning outcome

The learner will:

LO3 Produce a tee fillet weld in the PA flat position

Assessment criteria

The learner can:

AC3.1 use metal inert gas welding techniques safely to produce a tee fillet weld in simple welding positions
AC3.2 check joints are aligned and welds are sound and of uniform appearance
AC3.3 identify defects in the weld using visual checks

Learning outcome

The learner will:

LO4 Produce a tee fillet weld in the PB horizontal/vertical position

Assessment criteria

The learner can:

AC4.1 use metal inert gas welding techniques safely to produce a tee fillet weld in simple welding positions
AC4.2 check joints are aligned and welds are sound and of uniform appearance
AC4.3 identify defects in the weld using visual checks

Learning outcome

The learner will:

LO5 Produce a corner weld in the PA flat position

Assessment criteria

The learner can:

AC5.1 use metal inert gas welding techniques safely to produce a corner weld in simple welding positions
AC5.2 check joints are aligned and welds are sound and of uniform appearance
AC5.3 identify defects in the weld using visual checks

Learning outcome

The learner will:

LO6 Know the process and health & safety requirements for metal inert gas (MIG) welding

Assessment criteria

The learner can:

AC6.1 identify the health and safety hazards associated with MIG welding

AC6.2 state the effects of exposure to the electric arc

- hazards
- precautions

AC6.3 indicate types of fire extinguisher

- colour
- type
- applications

AC6.4 state the effects of exposure to welding fume

- hazards
- precautions

AC6.5 identify the personal protective equipment (PPE) and clothing to be worn during MIG welding

AC6.6 identify the welding specific requirements for MIG welding

AC6.7 identify main components and controls for the process

- welding plant (d.c. power source)
- wire feed unit/wire reel
- wire feed speed control
- voltage control(s)
- welding lead
- welding gun
- contact tip/tube
- welding return
- welding earth
- shielding gas supply
- shielding gas type
- shielding gas pressure regulator
- shielding gas flow meter

AC6.8 identify the type of current for the process

AC6.9 identify the electrical connections for the process

AC6.10 identify the consumables used for MIG welding

- electrode wire
- shielding gas
- contact tip/tube

AC6.11 state the variables associated with the process

- arc voltage
- wire feed speed
- shielding gas flow rate
- travel speed

AC6.12 state maintenance requirements

- contact tip/tube burn-back

- changing the electrode wire

AC6.13 identify modes of metal transfer

- dip/short circuit
- globular
- spray
- pulse

AC6.14 state the defects associated with the process

- methods of cleaning
- means of avoiding

Unit 106

Metal Fabrication

Level:	1
Credit:	7
UAN:	Y/506/6251
GLH:	43
Relationship to NOS:	This unit is linked to the NVQ Level 1 in Performing Engineering Operations – Carry out sheet metal cutting, forming and assembly activities.
Aim:	The unit is designed to enable candidates to demonstrate metal fabrication skills typically found in industry and associated underpinning knowledge to a level that will enable them to produce fabricated components with various features and prepare them for undertaking qualifications at NVQ level 1 and this award at level 2.

Learning outcome

The learner will:

LO1 Be able to measure and mark out in preparation for metal fabrication

Assessment criteria

The learner can:

AC1.1 select and use measuring and marking out **equipment**

AC1.2 mark out a range of **profiles** within **tolerance**

Range

AC1.1 **Equipment:** dividers, square, scribe, protractor, straight edge, tape measure, rule, centre punch, dot punch, marking medium, Vernier callipers

AC1.2 **Profiles:** circular, rectangular, radial, irregular

AC1.2 **Tolerance:** +/- 3 mm

Learning outcome

The learner will:

LO2 Be able to set up, prepare and shut down equipment for metal cutting, forming and joining

Assessment criteria

The learner can:

AC2.1 select and set up **metal fabrication equipment and tools**

AC2.2 check metal fabrication equipment is **safe for use**

AC2.3 safely shut down selected equipment and tools are safely stored away

Range

AC2.1 **Metal fabrication equipment:**

Cutting: guillotine (treadle or powered), bench guillotine, pedestal drill

Forming: folders, fly press

Joining: spot welder

AC2.1 **Tools:** hand drills, hammers, mallets, stakes, tin snips, electric nibblers, electric shears, riveters, de-burring, files, sanders, hand punches

AC2.2 **Safe for use:** electrical checks, visual equipment checks

Learning outcome

The learner will:

LO3 Be able to produce a selection of fabricated components

Assessment criteria

The learner can:

AC3.1 produce fabricated **components** with various **features**

AC3.2 check completed work meets the required standard and is within **tolerance**

Range

AC3.1 **Components:** flat plates, boxes, trays

AC3.1 **Features:** holes, bends, flanges, cut outs, riveted, spot welded

AC3.2 **Tolerance:** +/- 3 mm

Learning outcome

The learner will:

LO4 Know the process requirement for metal fabrication

Assessment criteria

The learner can:

AC4.1 identify the health and safety **hazards** associated with metal fabrication

AC4.2 identify the main **health and safety requirements** for fabrication

AC4.3 identify fabricating **equipment** and **tools**
AC4.4 outline the basic metal **cutting principles**
AC4.5 outline the basic metal **forming principles**
AC4.6 outline the basic metal **joining principles**
AC4.7 state the cause of metal fabrication **defects**
AC4.8 describe the safe shut down of the selected **equipment**
AC4.9 describe the procedures for ensuring **tools** are safely stored away

Range

AC4.1 Hazards: trips and falls, sharp edges, manual handling, electrical

AC4.2 Health and safety requirements: eye protection, personal protective equipment, fire extinguishers, safety signs

AC4.3 Metal fabrication equipment:

Cutting: guillotine (treadle or powered), bench guillotine, pedestal drill

Forming: folders, fly press

Joining: spot welder

AC4.3 Tools: hand drills, hammers, mallets, stakes, tin snips, electric nibblers, electric shears, riveters, de-burring, files, sanders, marking out equipment, hand punches

AC4.4 Cutting principles: cutting by shear, chip forming

AC4.5 Forming principles: bend allowances, spring-back

AC4.6 Joining principles: riveting allowances, resistance welding

AC4.7 Defects: surface tooling marks, burrs, lack of fusion, misshaped holes

Unit 106 Metal Fabrication

Evidence requirements:

Please refer to the Practical Assessment Handbook for full details of evidence requirements for this unit.

Unit range:

Materials type and thicknesses are identified within the range and are assessed by tasks in the Practical Assessment Handbook.

Guidance:

1. Low carbon steel is the recommended material for this unit, but the use of other materials or a mix of materials is acceptable
2. The three practical assessments are to be carried out on 1 mm to 3 mm thick materials
3. Acceptance to be assessed by visual examination and measurement of component condition
4. Knowledge questions consist of 15 set oral questions for each qualification based on qualification handbook knowledge requirements:
 - Five metal fabrication generic health and safety questions (pass mark = 5/5)
 - Ten metal fabrication process specific questions (pass mark = 5/10)
5. Demonstrate safe working practices whilst performing activities.

Unit 107

Thermal Cutting Techniques

Level:	1
Credit	7
UAN:	H/506/6253
GLH:	42
Relationship to NOS:	This unit is linked to the NVQ Level 1 in Performing Engineering Operations – Cutting and shaping platework components.
Aim:	The unit is designed to enable candidates to demonstrate welding skills typically found in industry and associated underpinning knowledge to a level that will enable them to make a selection of cuts using thermal cutting in different positions and profiles and prepare them for undertaking qualifications at NVQ level 1 and this award at level 2.

Learning outcome

The learner will:

LO1 Be able to measure and mark out in preparation for thermal cutting

Assessment criteria

The learner can:

AC1.1 select and use **equipment** for measuring and marking out

AC1.2 mark out a range of **profiles** within **tolerance**

Range

AC1.1 **Equipment:** rules, squares, dividers, protractors, centre punch, dot punch, scribes, chalk

AC1.2 **Profiles:** rectangular, circular, holes, bevels, radius (internal and external), irregular profiles

AC1.2 **Tolerance:** +/- 3 mm

Learning outcome

The learner will:

City & Guilds Level 1 Awards and Certificates in Introductory Welding, Fabrication, Cutting and Brazing and Soldering (3268)

LO2 Be able to set up, prepare and shut down equipment for thermal cutting

Assessment criteria

The learner can:

AC2.1 select and set up the appropriate **thermal cutting equipment**

AC2.2 check the equipment selected is **safe to use**

AC2.3 safely shut down the selected equipment

Range

AC2.1 **Thermal cutting equipment:**

Oxy-fuel gas cutting: equipment, safe storage of cylinders, hazards from hot metal/sparks, types of gases, cylinder types and identification, flashback arrestors, hose types and identification, connector types and identification, hose check valves, cutting torches, torch cutting guides, nozzles

Plasma cutting equipment, compressed gas supply, types of gases, hazards from hot metal/sparks, cutting guides, nozzles

AC2.2 **Safe to use:** electrical connections, earthing, gas leaks, safe storage

Learning outcome

The learner will:

LO3 Be able to make a selection of cuts using thermal cutting techniques

Assessment criteria

The learner can:

AC3.1 produce cuts in different **positions** and **profiles**

AC3.2 produce cuts in a range of **material forms**

AC3.3 check completed work meets the required standard and is within **tolerance**

Range

AC3.1 **Positions:** flat (down-hand)

AC3.1 **Profiles:** rectangular, circular, holes, bevels, radius (internal and external), irregular profiles

AC3.2 **Material forms:** plate, rolled sections

AC3.3 **Tolerance:** +/- 3 mm

Learning outcome

The learner will:

LO4 Know the process requirement for thermal cutting

Assessment criteria

The learner can:

AC4.1 identify the health and safety **hazards** associated with thermal cutting

AC4.2 identify the main **health and safety requirements** for thermal cutting

AC4.3 identify the main **components** and **controls** for the process

AC4.4 outline the basic **principles** of thermal cutting

AC4.5 state the cause of thermal cutting **defects**

AC4.6 describe the shutting down procedures

Range

AC4.1 **Hazards:** burns, fire, glare, explosion, fumes

AC4.2 **Health and safety requirements:** fume extraction, eye protection, personal protective equipment, fire extinguishers, safety signs

AC4.3 **Components:** cylinders, cutting torch, flashback arrestors, pressure regulators, hose-check valves, cutting nozzles, compressors, plasma nozzles, plasma shrouds

AC4.3 **Controls:** gas pressures, flame conditions, nozzles sizes, travel speed

AC4.4 **Principles:** exothermic reaction, kerf size, equipment choice related to material thickness, material preparation and effect on cut quality, flame types, plasma generation

AC4.5 **Defects:** partial cut through, excessive dross, drag lines

Unit 107 Thermal Cutting Techniques

Evidence requirements:

Please refer to the Practical Assessment Handbook for full details of evidence requirements for this unit.

Unit range:

Profiles are identified within the range and are assessed by tasks in the Practical Assessment Handbook.

Guidance:

1. Components should be produced from 6 mm to 12 mm thick low carbon steel
2. Low carbon steel is the recommended material for this unit, but the use of other materials or a mix of materials is acceptable
3. Material forms identified within the Practical Assessment Handbook
4. Acceptance to be assessed by visual inspection and measurement of the completed component
5. Knowledge questions consist of 15 set oral questions for each qualification based on qualification handbook knowledge requirements:
 - Five thermal cutting generic health and safety questions (pass mark = 5/5)
 - Ten thermal cutting process specific questions (pass mark = 5/10)
6. Demonstrate safe working practices at all times whilst performing activities.

Appendix 1 Relationships to other qualifications

Literacy, language, numeracy and ICT skills development

These qualifications 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 **Centre document library** on **www.cityandguilds.com** or click on the links below:

Centre Handbook: Quality Assurance Standards

This document is for all approved centres and provides guidance to support their delivery of our qualifications. It includes information on:

- centre quality assurance criteria and monitoring activities
- administration and assessment systems
- centre-facing support teams at City & Guilds/ILM
- centre quality assurance roles and responsibilities.

The Centre Handbook should be used to ensure compliance with the terms and conditions of the centre contract.

Centre Assessment: Quality Assurance Standards

This document sets out the minimum common quality assurance requirements for our regulated and non-regulated qualifications that feature centre-assessed components. Specific guidance will also be included in relevant qualification handbooks and/or assessment documentation.

It incorporates our expectations for centre internal quality assurance and the external quality assurance methods we use to ensure that assessment standards are met and upheld. It also details the range of sanctions that may be put in place when centres do not comply with our requirements or actions that will be taken to align centre marking/assessment to required standards. Additionally, it provides detailed guidance on the secure and valid administration of centre assessments.

Access arrangements: When and how applications need to be made to City & Guilds 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 document library** also contains useful information on such things as:

- conducting examinations
- registering learners
- appeals and malpractice.

Useful contacts

Please visit the **Contact us** section of the City & Guilds website.

City & Guilds

For almost 150 years, we have worked with people, organisations and economies to help them identify and develop the skills they need to thrive. We understand the life-changing link between skills development, social mobility, prosperity and success. Everything we do is focused on developing and delivering high-quality training, qualifications, assessments and credentials that lead to jobs and meet the changing needs of industry.

We partner with our customers to deliver work-based learning programmes that build competency to support better prospects for people, organisations and wider society. We create flexible learning pathways that support lifelong employability because we believe that people deserve the opportunity to (re)train and (re)learn again and again – gaining new skills at every stage of life, regardless of where they start.

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