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EUIAS End-point Assessment Specification for

Level 3 Engineering Construction Pipefitter
QAN 610/1777/2

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Updates to this specification

Since the first publication of the EUIAS Engineering Construction Pipefitter (ECP) Specification the following updates have been made.

Version	Date first published	Section updated	Page(s)
V3.0	August 2023	Rebranded	All
V2.0	February 2023	Revised using new EUIAS specification template	All
V1.2	September 2021	Clarification of Gateway requirements for Evidence Record and mini portfolio	9, 10, 17, 19, 22, 68
V1.1	July 2021	Clarification of resources for practical assessment	53
V1.0	June 2021	First published	All

Section 1: At a Glance EPA Summary

Qualification name	EUIAS Level 3 End-point Assessment for Engineering Construction Pipefitter
Ofqual qualification number	610/1777/2
Standard reference	ST0162
Assessment plan	AP02
Standard title	Engineering Construction Pipefitter
Options	n/a
Level	3
Gateway pre-requisites submitted to EUIAS	Apprentice has: • achieved English and mathematics at level 2 • achieved a Level 3 Diploma in Installing Engineering Construction Plant and Systems • produced an Evidence Record and mini portfolio in readiness for the structured professional review
On-programme duration	Typically 36 months
Gateway readiness	Apprentice has met all Gateway pre-requisites. Employer completes, signs and submits Gateway Eligibility Review (GER) form to EUIAS. See Appendix B in ECP Supporting Documents for 'Gateway Eligibility Form.'

End-point assessment duration	Typically 6 months after the gateway
End-point assessment methods and their order	The structured professional review must take place after successful completion of the knowledge test and practical assessment. The knowledge test and practical assessment can be taken in any order.
End-point assessment methods and component grading	Knowledge Test: Fail, Pass, Merit or Distinction Practical Assessment: Fail, Pass, Merit or Distinction Structured Professional Review: Fail, Pass, Merit or Distinction
End-point assessment methods and component weightings	Knowledge Test: 35% Practical Assessment: 55% Structured Professional Review: 10%
Overall Grading	Fail; Pass; Merit or Distinction
Certification	EUIAS request Apprenticeship completion certificates from the ESFA

Objective

The purpose of the Engineering Construction Pipefitter (ECP) end-point assessment (EPA) is to test that an apprentice is fully capable of doing their job before they receive their apprenticeship certificate. It also helps to demonstrate that what an apprentice has learned can be applied in the real world.

The Pipefitter role encompasses the positioning, assembly, fabrication, maintenance, repair and decommissioning of piping systems within engineering construction, on construction sites or at commercial fabrication facilities.

The Pipefitter works with various pipe materials such as ferrous and non-ferrous metals, plastics and composites. These materials can vary from 15 mm to 1200 in diameter and from 5 mm up to 75 mm in thickness dependent upon the content of the pipes and the operating pressures of the systems.

Roles in pipefitting may involve working in hazardous environments such as working:

- at height
- over water
- in confined spaces.

Professional recognition

The apprenticeship standard will meet the professional standards of the Engineering Council for registration as Engineering Technician (Eng Tech) by an appropriate Professional Engineering Institution.

Gateway Readiness

The employer must be satisfied that the apprentice is consistently working at, or above, the level of the occupational standard. Gateway pre-requisites are listed in the summary table above.

Recognition of prior learning (RPL)

EUIAS does not recognise any apprentice prior learning (RPL) or prior achievement (RPA) for the purpose of amending the assessment requirements of any end-point assessments.

Please refer to the EUIAS RPL and RPA policy at www.euias.co.uk/end-point-assessment/policies-and-fees

In order for EUIAS to award an end-point assessment qualification, the apprentice must successfully complete all required assessment components with EUIAS. This means that:

- each of the EPA components must be completed in full with EUIAS
- where an apprentice transfers to EUIAS from another EPAO they have to undertake the entire EPA with EUIAS

- components of the EPA cannot be certificated in isolation
- evidence produced for the portfolio must be related to the time the apprentice is on their apprenticeship programme to demonstrate current practice
- examples used by the apprentice, during the interview, must relate to the time they were on their apprenticeship programme

This does not affect the Gateway requirements which must be met in order for an apprentice to be eligible for end-point assessment.

This does not affect any reasonable adjustments that may be granted.

Section 2: End-point Assessment Components

Component 1: Knowledge Test

Overview

The knowledge test is paper based. Apprentices have 90 minutes to complete the test. It consists of 50 questions.

The multiple-choice questions will have four possible answers. One answer will be correct.

The Pass mark is 30 correct answers.

The Merit mark is 35 correct answers.

The Distinction mark is 43 correct answers.

For this paper:

- a (scientific) calculator is required
- access to the internet or intranet is NOT allowed

Apprentices must take the test in a quiet space, free from distractions and influence, in the presence of an invigilator.

Knowledge Test Knowledge coverage

The criteria that are covered in the Knowledge Test are listed below. Amplification and Guidance for these criteria is provided on pages 19-45.

Number of Questions	Knowledge, Skills and Behaviours
4-6	**K1** Relevant health, safety and environmental legislation, regulations and company-specific requirements for safe working practices and procedures **B7** Maintain a safe, clean and tidy work area

Number of Questions	Knowledge, Skills and Behaviours
1-2	**K2** Importance and benefits of recognised Industry safety passport schemes
3-5	**K3** How to work safely, personal site safety responsibilities and how to respond to and provide solutions to problems and emergencies
5-7	**K4** Engineering practices and principles including reading engineering drawings and marking out techniques **S4** Read, interpret and apply engineering drawing information
7-9	**K5** Mathematical techniques and formula related to the fabrication, development and installation of pipework systems
7-9	**K6** How to correctly select and safely use hand tools, mechanical tools and equipment in differing environments for the fabrication, repair, installation and decommissioning of pipework systems
7-9	**K7** Common and specialist pipe materials such as ferrous, non-ferrous and non-metallic including fittings associated with the pipework components and systems
7-9	**K8** Pipework preparation, fabrication, installation, maintenance, testing and decommissioning techniques commonly used throughout the Engineering Construction industry
1-3	**K9** Appropriate codes, practices and industry standards and their application to ensure quality requirements are met

Knowledge Test Roles and Responsibilities

Role	Responsibility
Invigilator	Is typically provided by the employer or training provider Attend induction training as directed by EUIAS Have no direct connection or conflict of interest with the apprentice, their employer or training provider; in all instances Invigilate and supervise apprentices during tests and in breaks to prevent malpractice
Employer/Training provider	Ensure that the test is scheduled with EUIAS for a date and time which allow the apprentice to be well prepared
EUIAS	Arrange for the test to take place, in consultation with the employer/lead provider Mark knowledge test answers accurately according to the mark scheme and procedures

Component 2: The Practical Assessment

Overview

The Practical Assessment consists of one holistic pipefitting task. The apprentice will be expected to work to the tolerances and specifications as stipulated in an engineering drawing to fabricate, assemble, install, test and then dismantle a piping assembly.

The content of the Practical Assessment will relate to 3 specifications of comparable depth and breadth of which one will be used for the test. During the Practical Assessment, apprentices will be asked questions by the independent assessor to determine the complexity and extent of the apprentice's underpinning knowledge

Step by Step Guide

The table below provides a step-by-step guide on how the practical assessment will be carried out:

Assessors	1 independent assessor, appointed by EUIAS.
Practical structure	The assessment must take a maximum of 8 hours. It cannot be split, other than to allow comfort breaks as necessary or to allow the apprentice to move from one location to another as required. During these breaks, the clock must be stopped and then restarted to ensure that the assessment duration is not reduced. Questioning may occur both during and after the assessment. The time for questioning is included in the overall time
Where will the assessment take place?	The assessment will take place in a strictly controlled environment

What are the tasks that will be covered?	The test will take the form of one holistic pipefitting task where the Apprentice must work to the tolerances and specifications stated in an engineering drawing to fabricate, assemble, install, test and then dismantle a piping assembly. For further details refer to 'Knowledge, Skills and Behaviours (KSBs) Coverage' below pages 19-45.
Who sets the task(s)?	EUIAS will provide the Practical Assessment brief that the apprentice will be working with. A sample brief is provided in Supporting Documents, Appendix D Sample Brief and Supporting Documentation for Practical Assessment
What resources can the apprentice use?	Apprentices will need access to the following resources: • A workshop with a range of hand tools, mechanical tools and equipment for the fabrication, installation and decommissioning of a pipework system • Health and safety equipment • The raw materials and sundries required to produce the fabricated parts. A list of items which should be made available is provided in Supporting Documents, Appendix D Sample Brief and Supporting Documentation for Practical Assessment • The rig to bolt their completed assembly onto. This is provided by EUIAS
How many questions will the apprentice be asked?	The independent assessor: • will ask standardised open questions to assess the related underpinning knowledge. The number of questions is not fixed and is typically between three and nine • may ask follow-up questions in order to seek clarification
What will the questions focus on?	Underpinning knowledge and/or skills and behaviours to ascertain the breadth and depth of knowledge

Grading	Fail, Pass, Merit or Distinction

Practical Assessment Roles and Responsibilities

Role	Responsibility
Independent Assessor, appointed by the EUIAS	Record and report assessment outcome decisions for each apprentice, following instructions and using assessment recording documentation provided by EUIAS. Ensure rig is set up correctly before the assessment
Employer/Training Provider	Provide the venue for the practical assessment which must be suitably equipped to allow the apprentice to attempt the practical assessment Provide all necessary tools and equipment for the apprentice Provide the necessary parts, identified in the 'List of Parts' provided by EUIAS
EUIAS	Arrange for the practical assessment to take place, in consultation with the employer/training provider and independent assessor. Provide the practical assessment brief which includes: • guidance for apprentices and task detail • an engineering drawing • the dimensions tolerances sheet • a list of parts which may be required for the task • a rig to fit the piping assembly to

Role	Responsibility
	• a clamped shoe • Safety Pressure Test Report form

Component 3: The Structured Professional Review

Overview

The Structed Professional Review is the final stage of the end-point assessment. It is assessed via a discussion with a review panel which will consist of at least two Independent Assessors. a quiet space, free from distractions and influence, in the presence of an invigilator.

Step by Step Guide

The table below provides a step-by-step guide on how the Structured Professional Review will be carried out:

Assessors	2 independent assessors, appointed by EUIAS.
Structured Professional Review structure	The Structured Professional Review will take place after successful completion of the Knowledge Test and Practical Assessment **Types of questions**: • The assessor will ask a set of questions to explore the apprentice's level of knowledge, skills and behaviours • Standardised open questions will be asked based on the contents of the Evidence Record and mini portfolio • Additional follow up questions are allowed, to seek clarification. **Locations**: Employer's premises or a suitable venue for example a training provider's premises. **Time**: 90 minutes The **Structured Professional Review** will be: • face to face or remote, as agreed • recorded in writing using a structured professional review record template provided by EUIAS • video recorded using relevant technology such as Microsoft Teams or an audio recording device • conducted under controlled conditions

	The apprentice will have access to their Evidence Record and mini portfolio of evidence throughout the Structured Professional Review Representatives from the apprentice's employer or training provider are not allowed to be present in the room whilst the Structured Professional Review is being conducted. The apprentice will have at least two weeks' notice of the Structured Professional Review.
What topics will be covered?	Questions will cover a typical pipefitting activity: • Understanding and accepting the task • Reading and extracting information from engineering drawings and designs • Recognising and adhering to safety considerations • Preparing the tools, equipment and work area • Performing the task and working to specifications • Working with others or as part of a team • Completing the task • Reporting the task • Recovering tools, area and equipment For further details refer to 'Knowledge, Skills and Behaviours (KSBs) Coverage below pages 19-45.
When will the Evidence Record and mini portfolio of evidence be submitted and referred to?	The **Evidence Record** in Supporting Documents, Appendix F contains guidance on providing evidence for meeting the Eng Tech requirements. Further guidance can be found in the UK-SPEC published by the Engineering Council **The mini portfolio of evidence:** • comprises three different pipefitting jobs which should cover at least two of the following types of pipe: ferrous, plastic, non-ferrous pipe • will be reviewed by the independent assessors before the Structured Professional Review

	• can be referred to by the apprentice to illustrate their answers **Note**: the mini portfolio of evidence is not directly assessed The Evidence Record and mini portfolio must be submitted to EUIAS at Gateway
Grading	Fail, Pass, Merit or Distinction

Evidence Record Requirements

The requirements are as follows:

Evidence Record Document

The apprentice must map their portfolio of evidence to the KSBs as this evidence will be used by the independent assessors to assess the apprentice during the structured professional review. The portfolio mapping document must be clearly referenced and included at the front of the portfolio

The Evidence Record must be submitted alongside a mini portfolio.

The Evidence Record is in two parts:

- Part A – description of evidence in the mini-portfolio cross-referenced to the Engineering Construction Pipefitter (ECP) standard. The apprentice must map their portfolio evidence to the KSBs as this evidence will be used by the independent assessors during the structured professional review
- Part B – Engineering Technician commentary (UK-SPEC ENG TECH).

The mini portfolio should cover three different pipefitting jobs. The jobs chosen are expected to cover at least two of the following types of pipe:

- ferrous pipe
- plastic pipe
- non-ferrous pipe.

For further guidance on mapping refer to Supporting Documents, Appendix F, Evidence Record for the Professional Review

How will the training provider submit the apprentice's portfolio to EUIAS? As part of the pre-requisite gateway requirements the apprentice must have complied and completed an Evidence Record

Structured Professional; Review Roles and Responsibilities

Role	Responsibility
Independent Assessors, appointed by the EUIAS	Record and report assessment outcome decisions for each apprentice, following instructions and using assessment recording documentation provided by EUIAS.
Employer/Training Provider	Ensure that the Evidence Record and mini portfolio has been submitted to EUIAS at Gateway. Ensure the interview based on the portfolio is scheduled with EUIAS for a date and time which allow the apprentice to be well prepared Ensure the apprentice has access to their Evidence Record and portfolio before and on the day of the interview
EUIAS	Arrange for the structured professional review to take place, in consultation with the employer/training provider and independent assessors

Knowledge, Skills and Behaviours (KSBs) coverage, by assessment method

The following pages list each of the elements of the standard and additional amplification and guidance from EUIAS on the range and depth expected

Key to identify the assessment method in the table below:
KT – Knowledge Test
PA – Practical Assessment
SPR – Structured Professional Review

Key	Assessment Elements: Knowledge	Amplification and Guidance
KT **SPR**	• **K1** Relevant health, safety and environmental legislation, regulations and company-specific requirements for safe working practices and procedures	• Health and Safety at Work Act (HASAWA). To include employer and employee duties, PPE • Noise at Work Regulations. To include employer and employee duties, PPE • Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR). Considerations such as knowing what to do when an accident occurs; ensuring reporting takes place • Control of Substances Hazardous to Health (COSHH). Considerations such as lubricating fluid for tools and

Key	Assessment Elements: Knowledge	Amplification and Guidance
		equipment, coefficient lubricants for mechanical bolting e.g. Molykote and copperslip, cutting fluids, welding fume • Classification, Labelling and Packaging (CLP) regulation. Considerations such as identification of basic labelling symbols, associated hazard, advice • Provision and Use of Work Equipment Regulations (PUWER). Legislation regarding equipment such as grinders, hand tools, pipe benders, pressure testing equipment • Personal Protective Equipment at Work Regulations. Considerations such as PPE must be visually examined, must be worn, used in accordance with the instructions, take reasonable care of it, report loss or defect. • Abrasive Wheels Regulations. Considerations such as HAVS, handheld grinders, hand/eye injuries, exposure limits (trigger times) • Lifting Operations and Lifting Equipment Regulations (LOLER). Considerations such as the safe use of lifting equipment, lifting operations colour coding

Key	Assessment Elements: Knowledge	Amplification and Guidance
		• Pressure testing procedures such as: HSE Guidelines (GS4 Safety in Pressure Testing), hydraulic and pneumatic tests, pumps, gauges, hoses, fittings, charts, pressure testing safety • Environmental considerations such as: waste disposal management, environmental conditions (e.g. untidy workplace or poor ventilation) • Manual handling considerations such as: manual handling risks, musculoskeletal disorders, kinetic lifting techniques, team lifting • Method statements. Considerations such as: introduction and scope, key personnel, reference documents, any special requirements, detailed plan of execution, essential equipment, hazards, timing, emergency/environmental arrangements • Risk assessments. Considerations such as generic risk assessments, task/personal risk assessments (e.g. time out for safety, point of work risk assessments, etc), limiting the exposure to risks by identifying all potential hazards then implementing adequate control measures, working at height.

Key	Assessment Elements: Knowledge	Amplification and Guidance
		• Emergency procedures such as: raising the alarm, knowing your fire extinguishers, evacuation procedures, emergency actions, fire prevention, toxic alert systems, knowing where toxic refuges are • First aid procedures such as: knowing who the nominated first aiders are, location of first aid provisions • Pressure Systems Safety Regulations (PSSR) To include employer and employee duties • Pressure Equipment Directive (PED) • Pressure Equipment Regulations (PER)
KT **SPR**	**K2** Importance and benefits of recognised industry safety passport schemes	• Ability to work safely on different sites • Ensure competence of workers • Accessibility to sites • CCNSG (Client Contractor National Safety Group) • CSCS (Construction Skills Certificate Scheme) • ACE Card. (Assuring Competence in Engineering) • EMSS Card (Essential Minimum Safety Standards)

Key	Assessment Elements: Knowledge	Amplification and Guidance
KT **SPR**	**K3** How to work safely, personal site safety responsibilities and how to respond to and provide solutions to problems and emergencies	• Health and Safety legislation such as: PUWER, HASAWA, LOLER, COSHH, RIDDOR. Consequences of not following legal Health and Safety responsibilities • Company or site inductions such as: policies & procedures (such as drug & alcohol, mobile phones, fire & emergency procedures, first aid & medical facilities, site security, traffic and pedestrian management, minimum PPE requirements, loose clothing) • Risk assessments, permits, method statements • Specific site safety procedures such as: evacuation procedures, muster points, safe havens, emergency phone numbers, alarms • First Aid procedures such as first aid training, first aid, personnel • Waste disposal management such as: the disposal of different types of waste including toxic, plastics, wood, metals in conjunction with the sites waste disposal management policy

Key	Assessment Elements: Knowledge	Amplification and Guidance
KT **PA**	**K4** Engineering practices and principles including reading engineering drawings and marking out techniques	• Isometric Drawings, First and third angle projection drawings, 3D and CAD drawings. Information such as measurements, pipe size, fittings, outside diameters, tolerances, pipe falls, coordinates and elevations, hatch lines, penetrations, flows, BOM. (Bill of Materials), specifications, Non-Destructive Examination requirements (NDE), pressure testing requirements, Welding Procedure Specification (WPS), bolt hole orientation, in line item symbols, in line item orientation, pipe off sets and rolling offsets • Piping and Instrument Diagrams (P&ID) such as: symbols, instrumentation, process flows, isolations, branches, reducers • General Arrangements. (GA) such as: locations, overall compositions, structures • Branch Making such as: templates, formulae, equal and unequal, square and lateral, tools and equipment • Datum Lines such as: pipe centre lines, segmenting a pipe, tolerances, references, measurements, dimensions

Key	Assessment Elements: Knowledge	Amplification and Guidance
KT **PA**	**K5** Mathematical techniques and formula related to the fabrication, development and installation of pipework systems	• Surface areas, circumferences, section areas, pipe diameter, pipe weights, cut lengths of pipe, volume of a cylinder, trigonometry, triangle formulas • Branch pattern development such as: template drawings, development formulae, datum lines, mitres • Offsets, rolled offsets such as: run, travel, roll, angles, formulas • Torque values for controlled bolting such as: torque settings, bolts, gaskets, flanges, lubricants, co-efficient, k factor • Knowledge of calculations (but not the calculation) for safe distances in pressure testing, pressure, fittings
KT **PA**	**K6** How to correctly select and safely use hand tools, mechanical tools and equipment in differing environments for the fabrication, repair, installation and decommissioning of pipework systems	• Marking out tools such as scribes, centre punches, Vernier callipers, line of chords, set/plate square, chalk line • Suitable surfaces such as: template paper, suitable clean benches and floors • Hand tools such as: files, saws, hammers, centre, levels, spanners, wraparounds, protractor, pipe stands, alignment tools, nut splitters, pipe wrenches • Mechanical tools and equipment such as: grinders, internal grinders, prepping machines, band saws, sanders, drills,

Key	Assessment Elements: Knowledge	Amplification and Guidance
		hydraulic pipe bending machines, threading machines, impact wrenches, oxy fuel cutting equipment. • Lifting equipment such as: slings, blocks, pull lifts, shackles. • Mechanical joint integrity tools such as: torque wrenches, backing spanners, tensioning tools • Pressure testing equipment such as: test rig, gauges, pumps, hoses, valves, graphs, charts

KT
PA
	K7 Common and specialist pipe materials such as ferrous, non-ferrous and non-metallic including fittings associated with the pipework components and systems	To include the properties and heat effects on the materials listed below:
		• Ferrous metals such as: carbon steel, cast iron, chrome Molybdenum, stainless steel, Duplex and super duplex, Cunifer
		• Non-ferrous metals such as: copper, aluminium, brass, Monel, titanium, Inconel, Hastelloy
		• Non-metallic materials such as:
		  ○ Plastics e.g. ABS, HDPE, PE, PP, PVC, PVC-U.
		  ○ Glass Reinforced Plastic (GRP)
		  ○ Glass Reinforced Epoxy (GRE)
		  ○ Glass
		  ○ Cement

Key	Assessment Elements: Knowledge	Amplification and Guidance

		• Lined or Clad materials such as:
		  ○ Cement lined
		  ○ Glass lined
		  ○ PTFE lined
		  ○ Rubber lined
		  ○ Fibreglass Reinforced Plastic (FRP) lined
		Pipework fittings and components:
		• 90/45-degree elbows (Short radius, long radius) such as: threaded, socket welded, butt welded, crimped, soldered, brazed, compression
		• Tee Pieces such as: lateral and equal lateral, threaded, socket welded, butt welded, crimped, soldered, brazed, compression
		• Integrally reinforced branch connections. Variants such as: equal branched, lateral branched, elbow branched; with connections of: butt welded, socket welded, threaded
		• Stub ends
		• Caps, plugs
		• Unions
		• Cross

Key	Assessment Elements: Knowledge	Amplification and Guidance
		• Adapters • Couplings • Nipples • Flanges, blind flanges, lap joint flanges. Including types of face such as full faced, raised faced, Ring Type Joint (RTJ); Including connection types such as: weld neck, slip on flanges, socket welded, screwed • Reducers such as: eccentric and concentric
KT **PA**	**K8** Pipework preparation, fabrication, installation, maintenance, testing and decommissioning techniques commonly used throughout the Engineering Construction industry	• Risks and hazards associated with pipe shaping, assembly and fabrication. • Use of technical drawings such as: isometric drawings, P&ID, general arrangements, first and third angle projections, orthographic projections. • Creating cutting lists such as: identification of fitting types, deduction of appropriate lengths and welds gaps. • Working to tolerances. • Correct installation of pipework systems such as: spring free installation

Key	Assessment Elements: Knowledge	Amplification and Guidance
		• Safe use of hand and power tools such as: files, spanners, hand saws, grinders, internal grinders, prep machine, pipe clamps, pipe supports, torque wrenches/backing spanners, nut splitters, reciprocating saws. • Bolt tightening sequences. • Gaskets. Including identification of, safe handling, checking for damage, correct installation. • Removal of pipework systems such as: hazards associated with removal of pipework, estimating weights, identifying isolations, safe method of breaking flanges. • Pressure test procedures such as the differences between hydrostatic and pneumatic pressure testing • Pipe chamfer/root face and gaps • Pipe supports such as: hangers, shoes, U-bolts, spring pots, dynamic restraints, sliders, rollers, guides, anchors • Pipework expansion such as: bellows, expansion loops, flexible hoses, sliding joints

Key	Assessment Elements: Knowledge	Amplification and Guidance
KT **PA**	**K9** Appropriate codes, practices and industry standards and their application to ensure quality requirements are met	Have an awareness of company, manufacturer, national and international standards* such as Piping design codes e.g.: • ASME B31 - American Society of Mechanical Engineers (ASME) code for pressure piping • ISO EN 13480 – European metallic industrial piping • ASME Dimensional Standards Flange joint integrity The Manufactures Standardisation Society (MSS) ASTM International – American Society for Testing and Materials Company quality assurance and quality control procedures *A checklist of standards is provided in Supporting Documents, Appendix H

Key	Assessment Elements: Skills	Amplification and Guidance
PA **SPR**	**S1** Comply with appropriate health and safety, risk and quality requirements	Compliance with Health and Safety activities could Include, taking part in or facilitating toolbox talks, filling in the appropriate safety paperwork, such as: • The participation and following of the sites risk assessments and identification of potential hazards • Compliance with the different permit to work systems • Participation and following of method statement documents • The participation in the site/company inductions and toolbox talks • The understanding and compliance of technical drawings • Understanding of the relevant legislation associated with the pipefitting trade • Understanding site safety systems • Understanding and following the site/company quality procedures
PA **SPR**	**S2** Correctly select and safely use tools and equipment for the fabrication, assembly, installation and	This includes: • The safe withdrawal, from stores, of the relevant tools and equipment for the task

Key	Assessment Elements: Skills	Amplification and Guidance

	decommissioning of pipework components and systems	• The reading of manuals and safety procedures appertaining to the task
		• The use of tools and equipment such as:
		  ○ The safe and accurate use of bandsaw, threading machines, handheld threading equipment (banjos), hydraulic pipe bending machines, handheld grinder and internal grinder, reciprocating saws, prep machines, various drills such as pedestal drills, pistol drills, hammer drills, magnetic drills
		  ○ The safe and proper use hand tools such as hacksaws, various files such as the half round file and round file, hammers, combination spanners, pipe wrenches
		  ○ A good understanding of torque wrenches, backing spanners, alignment tools and all other tools and equipment used in the controlled bolting process
		  ○ The safe and accurate use of profile burners and other oxy-fuel cutting equipment
		• The safe use and a good understanding of basic lifting equipment such as strops, chains, blocks, pull lifts, shackles

Key	Assessment Elements: Skills	Amplification and Guidance
PA **SPR**	**S3** Plan, organise and undertake the fabrication, assembly, installation, maintenance and decommissioning of pipework components and systems	• The planning and organising of the task. To include: understanding and complying with the RAMS or and permit to work, completing a personal risk assessment, identifying deficiencies or changes required to the RAMS or permit to work, obtaining of the correct drawings or procedures and of the correct tools and equipment for the task • The setting up of the work area. To include: a safe setting and environment for the task, making sure correct power supplies are connected • The material edge preparation. To include: the safe use of hand tools and power tools, the compliance with the drawings or specifications ensuring that tolerances are followed. The correct metal finishes should be obtained using the correct tools and measurements • Assembly such as: the fabrication of pipe spools from a drawing or specification using a variety of methods and fittings such as welded, threaded or the use of sockets. Bending could also be considered in this process

Key	Assessment Elements: Skills	Amplification and Guidance
		• Installation. To include: the use of flanged pipework using the correct techniques, the safe use of the mechanical joint integrity procedures, the use of the welding process setting up field welds, installing screwed pipework • Specific skills to look for could include: • Reading and understanding technical drawings and isometrics • Accuracy of metal preparation • Use of spanners and torque wrenches • Tension settings • Correct gasket selection • Flange tightening sequences • Isolation procedures • Correct disassembling procedures
KT **PA** **SPR**	**S4** Read, interpret and apply engineering drawing information	• Isometric Drawings, first angle and third angle projection drawings, 3D and CAD drawings. To be able to demonstrate the following: to accurately measure; to fabricate items within tolerance; identify pipe sizes; identify and select fittings; to measure and identify outside diameters; identify and demonstrate pipe falls; follow coordinates and elevations; to

Key	Assessment Elements: Skills	Amplification and Guidance
		match up hatch lines; identify penetrations; identify flows; understand and check BOM (Bill of Materials); understand the specifications; understand and identify what the Non Destructive Testing (NDE) requirements are; identify and undertake the required pressure testing; identify the Welding Procedure Specification (WPS); identify and ensure the correct bolt hole orientation; understand in line item symbols/in line item orientation; identify off sets and rolling offsets • Piping and Instrument Diagrams (P&ID). Such as: demonstrating and understanding of symbols, instrumentation, process flows, isolations, branches, reducers • General Arrangements. (GA). Such as: demonstrating and understanding locations, overall compositions, structures • Branch Making. Such as: demonstrating development of templates, formulae, equal and unequal branches, square and lateral, selecting the tools and equipment to be able to make branches

Key	Assessment Elements: Skills	Amplification and Guidance
		• Datum Lines. Such as: demonstrating the ability to comply with tolerances, references, measurements, dimensions, mark out pipe centre lines and segmenting of a pipe
PA **SPR**	**S5** Shape pipework components using hand and power tools to cut, drill, shape and finish components to the required tolerance, specification and standard	• Preparing pipework for welding following the technical instructions and specifications • Cut pipework using a handsaw, bandsaw and grinders to tolerance and specification • Preparing threaded pipework using hand-held and machine threading equipment • Drilling pipework by using different machines such as pistol drill, magnetic drill, pedestal drill to the required specification and tolerances • Hydraulic and manual bending of pipe and using the correct techniques and bending equipment to tolerance and specification • Manual bending of tubing using the correct techniques and bending equipment to tolerance and specification

Key	Assessment Elements: Skills	Amplification and Guidance
		• The safe and accurate use of thermal cutting equipment such as hand-held oxy fuel, plasma cutting equipment and profile burners. • Branch development preparation equal and lateral, drawing and cutting out branch templates, followed by transferring the branch template to pipe and developing the branch using hand tools to tolerance and specification
PA **SPR**	**S6** Assemble and install pipework using the appropriate methods, techniques and equipment in accordance with the specification	• The assembling methods and techniques used in the controlled bolting process such as correct bolting sequences and use of alignment equipment • The safe and accurate setting up of weld butts, following the specifications for the welder with correct chamfer angles, weld gaps and root faces • The correct use of 'bullet tacks' for thicker walled pipework • The assembling of threaded pipework using the correct fittings and joining compounds; ensuring that the pipework is correctly aligned and within the tolerances stated • The assembling of socket pipework, following the specifications/drawings and ensuring expansion gaps are used;

Key	Assessment Elements: Skills	Amplification and Guidance
		ensuring that the pipework is correctly aligned and within the tolerances stated • When installing the pipework following the correct specifications and technical drawing information such as elevations, orientations and co-ordinations • Utilising basic lifting equipment to position and install the pipework to reduce the manual handling required • The installing of pipe supports such as shoes, U-bolts, spring pots, guides and anchors to the correct specification and technical drawing information
PA **SPR**	**S7** Ensure the integrity of joints in accordance with specifications, in line with specified quality and to precise tolerances	• Knowledge of the legislation associated with joint integrity • Compliance with the technical drawing (Isometric, P&ID) • Hazards and risk assessments • Correct checking and cleaning of the jointing surface • Correct gasket, bolt, washer, bolt lubrication selection as required according to the drawings and specifications • Bolt lubrication and coefficient • Correct gasket insertion and placement

Key	Assessment Elements: Skills	Amplification and Guidance
		• Flange alignment. To include different alignment methods and tools • Correct tensioning tool selection and pre-setting • Correct torque values, safe use of torque wrenches • Controlled bolting • Correct flange bolt sequencing • Using the correct backing spanners • Using the correct tensioning tools • Checking the completed joint for adherence to tolerances and specifications • Following the correct company, site, specification and legislative quality requirements
PA SPR	**S8** Undertake the testing and inspection of the fabricated and or installed pipework using the appropriate techniques	• Following legislative, company, site pressure test procedures and specifications • Different types of pressure testing such as strength/proof tests and leak tests • Awareness of the GS4 HSE pressure testing guidelines • The safe use of pressure test rigs ensuring they are rated appropriately in date and tagged correctly

Key	Assessment Elements: Skills	Amplification and Guidance
		• The safe areas of work including designated testing areas, barriers and signs. • Risks and hazards associated with pressure tests • The safe use of positive displacement pumps and mechanical pumps • The use of hoses ensuring they are rated appropriately in date and tagged correctly • The correct use of pressure recorders ensuring the calibration dates are correct and temperature and time are factored in and recorded • The different types of test medium such as hydrostatic, pneumatic and hydraulic tests • The use of analogue and digital gauges and their accuracy and eccentricities. • The safe use of pressure relief valves • A good knowledge of PUWER and how it relates to testing • Inspection of fabricated and installed pipework by utilising measuring devices, levels, plate squares, theodolites to ensure they meet the required drawings and specifications

Key	Assessment Elements: Skills	Amplification and Guidance
		• QA and QC company procedures such as fabrication control sheets, erection control sheets, pre-test check sheets, post-test checklist, punch lists and snagging
SPR	**S9** Work with others and contribute to effective working relationships within an Engineering Construction environment	• Good communication with work colleagues and clients • A good working knowledge of relevant Health and Safety legislation • Developing effective working relationships with colleagues, clients, management other people on site etc • Good communication of work plans, promoting positive conversations on how the task may effectively be completed • Good concise information given on handovers
PA **SPR**	**S10** Apply techniques for the temporary or permanent removal of an engineering construction piping related system or component	• Hazard and risk assessments • Legislation • Technical drawings (P&ID, Isometrics) • Isolations • Safely break a flanged joint that has residual product in it • Installing slip plates, blind flanges, turning figure 8 spectacle blinds

Key	Assessment Elements: Skills	Amplification and Guidance
		• Cold cutting of pipework such as handheld reciprocating saws, chain mounted reciprocating saws, clam shell/split frame cutters, manual wheeled/rotary pipe cutters • Controlled bolting • Hot bolting • Torque settings • Torque and tensioning tools • Waste disposal management • Removing spool pieces, individual valves or other in line equipment such as pumps, heat exchangers, filters etc
SPR	**S11** Communicate by keeping others informed about work plans or activities which may affect them and seek assistance from others without causing undue disruption to normal work activities	HSE guidelines Method statements Permit to work Signage Roles and responsibilities Handovers Identifying that their work will influence others around them

Key	Assessment Elements: Skills	Amplification and Guidance
		Effectively and efficiently communicating with other personnel who may be above, below or adjacent to their work area to inform them of their work plans Requesting assistance from colleagues and others without wasting their time

Key	Assessment Elements: Behaviours	Amplification and Guidance
SPR	**B1** Work with others to effectively and efficiently complete the allocated tasks	• Sharing workload fairly between team members.
PA **SPR**	**B2** Solve problems within their area of responsibility by applying technical skills and knowledge to define, identify, evaluate and select alternative solutions if required	This could include: • Potential clashes within the pipework systems • Accessibility for equipment on site • Calculations on site runs
PA **SPR**	**B3** Take responsibility as an individual and team member for the quality of the work	• Ensuring work completed meets the required specifications and tolerances

Key	Assessment Elements: Behaviours	Amplification and Guidance
SPR	**B4** Support their own learning and development and that of others through activities such as mentoring and sharing of expertise and knowledge	
SPR	**B5** Act ethically, displaying maturity, honesty, integrity and responsibility	
PA **SPR**	**B6** Work safely in accordance with health, safety and environmental legislation, regulations and company-specific requirements	
KT **PA** **SPR**	**B7** Maintain a safe, clean and tidy work area	• Work area preparation. To include: risk assessments, cable management, slip/trip hazards, removal of waste, clean environment, general safety, efficiency of operating standards, dusty/dirty floor workspaces, safe access and egress • Work area re-instatement. To include: waste disposal policies, consumables, return of tools to stores, continuously ensuring high standards of housekeeping

Key	Assessment Elements: Behaviours	Amplification and Guidance
PA **SPR**	**B8** Check for and identify potential hazards in the workplace and take collective responsibility to maintain a safe working environment	
SPR	**B9** Question unsafe behaviours and incorrect work practices and procedures	

Section 3: Grading and Grading Criteria

Component 1: Knowledge Test

The following grade boundaries apply to the knowledge test:

Grade	Minimum mark	Maximum mark
Fail	0	29
Pass	30	34
Merit	35	42
Distinction	43	50

Component 2: Practical Assessment

Indicative grading criteria for achieving a Pass in the Practical Assessment

The following criteria are indicative of the criteria the assessor will be looking for when the apprentice takes part in the Practical Assessment.

Fail - does not meet pass criteria

Criteria	Indicative Pass Criteria
K4 Engineering **practice and principles** including reading engineering drawings and markings out techniques	Follow requirements given in: • isometric drawings • Piping and Instrument Diagrams (P&ID) • General Arrangements • branch making • datum lines
K5 Mathematical techniques and formula related to the fabrication, development and installation of pipework systems	Use appropriate techniques and formula such as: • surface areas, circumferences, section areas, pipe diameter, pipe weights • branch pattern development such as template drawings, development formulae, datum lines, mitres.

Criteria	Indicative Pass Criteria
	• offsets, rolled offsets to include run, travel, roll, angles • torque values for controlled bolting to include torque settings, bolts, gaskets, flanges, lubricants, co-efficient, k factor • knowledge of calculations for safe distances in pressure testing, pressure, fittings.
K6 How to correctly select and safely use hand tools, mechanical tools and equipment in differing environments for the fabrication, repair, installation and decommissioning of pipework systems	Select and safely use: • marking out tools • surfaces such as benches, floor, template paper • hand tools • mechanical tools and equipment • lifting equipment • mechanical joint integrity tools • pressure testing equipment
K7 Common and specialist pipe material such as ferrous, non-ferrous and non-metallic including fillings associated with the pipework components and systems	Work with relevant materials such as: • ferrous (e.g., carbon steel, stainless steel, Cunifer, duplex/super duplex, chrome Molybdenum) • non-ferrous (e.g., copper)

Criteria	Indicative Pass Criteria
	• non-metallic (e.g., plastic) • pipework fitting and components (e.g., 90/45 degree elbows, tee pieces, sockets, welded fittings, threaded fittings, flanges)
K8 Pipework preparation, fabrication, installation, maintenance, testing and decommissioning techniques commonly used throughout the Engineering Construction industry	Demonstrate • use of technical drawings • creating cutting lists • working to tolerances • correct installation • safe use of hand and power tools • bolt tightening sequences • correct gaskets • removal of pipework system • pressure test procedures • use of pipe chamfer/root face and gaps • use of pipe supports and expansion • pressure test procedures • working safely, knowing risks and hazards

Criteria	Indicative Pass Criteria
K9 Appropriate codes, practices and industry standards and their application to ensure quality requirements are met	Refer to and work in accordance with company, manufacturer, national and international standards, to include • ASME and ANSI Standards • quality assurance and quality control procedures.
S1 Comply with appropriate health and safety, risk and quality requirements **B6** Work safely in accordance with health, safety and environmental legislation, regulations and company-specific requirements **B7** Maintain a safe, clean and tidy work area **B8** Check for and identify potential hazards in the workplace and take collective responsibility to maintain a safe working environment	• Demonstrate a clear knowledge of on-site legislation • Carry out risk assessments to identify on site hazards • Identify and wear the correct PPE for the task • Demonstrate a clear understanding of their own HS&E responsibilities and that of others • Comply with the required HS&E working practices and regulations • Liaise with other relevant parties to inform them of any risks during the task • Re-assess conditions on a regular basis and update the risk assessment when required • Inspect tools and equipment before use • Safely re-instate the work area leaving it safe and ready for others to use

Criteria	Indicative Pass Criteria
S2 Correctly select and safely use tools and equipment for the fabrication, assembly, installation and decommissioning of pipework components and systems	• Demonstrate clear knowledge of the tools and equipment selected for the task • Demonstrate a clear understanding of the legislation and the HSE guidelines associated with the tools or equipment selected for the task • Demonstrate a clear knowledge of the capabilities of the tools selected for fabrication and assembly of pipework • Demonstrate a clear knowledge of the tools and equipment required for installing pipework • Demonstrate a clear knowledge of the tools and equipment required for the disassembly of pipework • Demonstrate a clear understanding of the maintenance of the tools required for the task • Identify potential hazards when selecting tools for the disassembly of pipework
S3 Plan, organise and undertake the fabrication, assembly, installation, maintenance and decommissioning of pipework components and systems	• Follow any legislation or HSE guidelines before undertaking any task • Ensure that the work area is safe and suitable for the task

Criteria	Indicative Pass Criteria
	• Select the correct tools for the task and make sure they are safely connected • Interpret relevant technical drawings and comply with any tolerances • Prepare the materials and equipment ready for assembly • Ensure that any materials and consumables required are suitable for the task • Assemble components and fittings accurately and in compliance with drawings or specifications • Install pipework using the correct fastenings in compliance with drawings and specifications • Safely re-instate the area
S4 Read, interpret and apply engineering drawing information	• Read and correctly interpret a range of technical information provided to plan and conduct the work • Demonstrate a clear understanding of the purpose and use of the technical information provided for the work • Use, refer to the technical information provided to check, confirm the work conducted meets the required company standards and specifications

Criteria	Indicative Pass Criteria
	• Where necessary, question and clarify any information which is not clearly understood • Carry out checks to show that the task complies with the technical drawing and meets the required specifications
S5 Shape pipework components using hand and power tools to cut, drill, shape and finish components to the required tolerance, specification and standard	• Follow Health and Safety guidelines before the task • Complete a risk assessment and identify potential hazards before the task • Ensure that the work area is suitable for the task to be undertaken. • Select the correct tools for the task and make sure they are safely connected • Select the correct tools for the material • Interpret any drawings or specifications associated with the task. • Ensure that the shaping, holes or cuts comply with the specification • Use the appropriate techniques for the shaping, drilling or cutting

Criteria	Indicative Pass Criteria
	• Ensure that the cut, hole or shaping is within the tolerance stated on the specification
S6 Assemble and install pipework using the appropriate methods, techniques and equipment in accordance with the specification including welded, threaded, bolted and clamped jointing solutions **B2** Solve problems within their area of responsibility by applying technical skills and knowledge to define, identify, evaluate and select alternative solutions if required	• Identify any potential hazards associated with the task and carry out a risk assessment • Follow all the appropriate legislation regarding the task • Prepare the work area before the task and ensure that is suitable for the task to go ahead • Select the correct tools for the task and make sure they are safe and fit for purpose • Interpret drawings and specifications for the job and follow the tolerances identified • Accurately mark out pipework in compliance with any specifications • Assemble components in compliance with the drawing and follow the tolerances using appropriate techniques • Install pipework safely, using the correct mechanical joint equipment or by setting up welding pipework using the correct techniques

Criteria	Indicative Pass Criteria
	• Check that the completed assembly or installation of pipework complies with the Drawing or specification • Safely re-instate the work area
S7 Ensure the integrity of joints in accordance with specifications, in line with specified quality procedures and to precise tolerances **B3** Take responsibility as an individual and team member for the quality of the work	• Follow Health and Safety guidelines before the task • Complete a risk assessment and identify potential hazards before the task • Ensure that the work area is suitable for the task to be undertaken. • Interpret any drawings associated with the task • Select the correct tools for the task and make sure they are safely connected • Select the correct gaskets and bolts for the joint • Identify the correct torque value of the joint • Ensure that the joint is aligned according to the specification
S8 Undertake the testing and inspection of the fabricated and or installed pipework using the appropriate techniques	• Ensure that the test area is suitable to carry out the test • Ensure that the documentation such as test procedures are followed

Criteria	Indicative Pass Criteria
	• Select that the correct test medium is used • Suitable barriers must be put up and other people near the test area are informed of the task • Ensure that the test rig is suitable and that all joints are securely made up • Ensure that the gauges are fit for purpose and are free from any dirt • Ensure the temperature and weather is suitable for the test
S10 Apply techniques for the temporary or permanent removal of an engineering construction piping related system or component	• Identify any potential hazards that may arise when removing any pipe related systems • Identify isolation points • Interpret technical drawings such as P&IDs to identify where the removal will take place • Ensure isolations are in place before removal of any pipe related system or component • Ensure that the removal of the piping related system or component can be done safely

Indicative grading criteria for Merit and Distinction for the Practical Assessment

Each Merit criterion is worth 5 marks and each Distinction criterion is worth 5 marks towards the overall score for the Practical Assessment

Indicative Merit criteria (each worth 5 marks)	Indicative Distinction criteria (each worth 5 marks)	Relevant elements of the standard where the criteria may be demonstrated
M1 Occasionally exceeds the health and safety requirements and endeavours to identify and suggest improvements	**D1** Goes above and beyond health and safety requirements and consistently identifies and suggests improvements	K6, K9, S1, S2, B6, B8
M2 Occasionally exceeds standards in their pipefitting skills, knowledge and behaviours, and is able to identify issues and resolve them as and when they occur	**D2** Consistently exceeds the required standard in their pipefitting skills, knowledge and behaviours, and identifies issues and resolves them before they occur	K6, K8, S5, S6, S7, S8, S10, B2
M3 Consistently meets and occasionally exceeds the required levels of accuracy when working against engineering specifications and may offer suggestions for continuous improvement when prompted	**D3** Consistently exceeds the specified levels of accuracy when working against engineering specifications and consistently seeks to continuously improve methods and means of executing given pipefitting tasks	K4, K5, S4, B2

Indicative Merit criteria (each worth 5 marks)	Indicative Distinction criteria (each worth 5 marks)	Relevant elements of the standard where the criteria may be demonstrated
M4 Displays a comprehensive command across the full range of knowledge requirements and when prompted, applies this to problem-solve and improve the quality of their own work	**D4** Full command of first principles which are autonomously applied in order to solve and improve quality of own work and overall process	K4, K5, S5, S6, S7, S8, S10, B2

Component 3: Structured Professional Review

Indicative grading criteria for achieving a Pass in the Structured Professional Review

The following criteria are indicative of the criteria the assessor will be looking for when the apprentice takes part in the Structured Professional Review.

Fail - does not meet pass criteria.

Criteria	Indicative Pass Criteria
K1 Relevant health, safety and environmental legislation, regulations and company-specific requirements for safe working practises and procedures	• A working knowledge of Health and Safety legislation associated with the tasks to be undertaken and its impact on day to day operations • A working knowledge of on-site safety procedures which apply to the scope of work to be undertaken • A clear understanding of risk assessments permits and other safety documentation • A clear understanding of company specific policy procedures and can explain them • A good working knowledge of specific site evacuation • procedures and safe site-specific practices

Criteria	Indicative Pass Criteria
K2 Importance and benefits of recognised industry safety passport schemes	• Knowledge of industry safety passport schemes, such as • CCNSG (Client Contractor National Safety Group). • CSCS (Construction Skills Certificate Scheme). • ACE Card. (Assuring Competence in Engineering). • EMSS Card (Essential Minimum Safety Standards). • Understand the benefits • Ability to work safely on different sites. • Ensure competence of workers. • Accessibility to sites.
K3 How to work safely, personal site safety responsibilities and how to respond to and provide solutions to problems and emergencies	• Can explain the common types of hazards associated with the relevant pipefitting tools and equipment • Can explain what the employers and the employee's responsibilities are and how this may have an impact on the scope of work to be undertaken • Can explain the consequences of not following the site safety responsibilities and not reporting incidents • Can explain the effects of any potential hazards on people property and the environment and the effects of not wearing the correct PPE

Criteria	Indicative Pass Criteria
	• A clear understanding of the purpose of undertaking Risk Assessments
S1 Comply with appropriate health and safety, risk and quality requirements **B6** Work safely in accordance with health, safety and environmental legislation, regulations and company-specific requirements **B7** Maintain a safe, clean and tidy work area **B8** Check for and identify potential hazards in the workplace and take collective responsibility to maintain a safe working environment **B9** Question unsafe behaviours and incorrect work practises and procedures	• A working knowledge of Health and Safety legislation associated with the tasks to be undertaken and its impact on day to day operations. • A working knowledge of on-site safety procedures which apply to the scope of work to be undertaken. • A clear understanding of risk assessments permits and other safety documentation. • Can explain and has a clear understanding of company specific policy procedures. • Has a good understanding of QA and QC systems
S2 Correctly select and safely use tools and equipment for the fabrication, assembly, installation and decommissioning of pipework components and systems	• A good working knowledge of the health and safety legislation regarding the use of tools and equipment • Can describe the potential hazards of using the tools and equipment associated with pipe fitting

Criteria	Indicative Pass Criteria
	• A good understanding of the tools, equipment and techniques and how they are used to carry out operations • Can explain the importance of maintaining of all tools and equipment
S3 Plan, organise and undertake the fabrication, assembly, installation, maintenance and decommissioning of pipework components and systems	• Can explain the requirement of Health and Safety legislation in the planning of tasks • Can explain method statements or job plans that take place before any operational task • A good working knowledge of site specifications and procedures • Can explain the safe process of uninstalling pipework components and systems
S4 Read, interpret and apply engineering drawing information	• Can explain the content and use of the different types of engineering drawings and how they are applied during work activities • Can identify tolerances on pipe drawings and can comply with them

Criteria	Indicative Pass Criteria
	• A good knowledge of welding specifications and can apply them to the preparation of pipework • Can identify pipework components from technical drawings. • Can interpret different specifications, procedures and guidance notes and can apply them to daily work activities
S5 Shape pipework components using hand and power tools to cut, drill, shape and finish components to the required tolerance, specification and standard	• Can explain the requirements of Health and Safety legislation and can describe the hazards associated with the shaping process • Can describe the relevant specifications and technical drawings including tolerances and weld specifications and how they apply to the shaping process • Can identify the correct tools and equipment for the shaping process and can explain how they are used • Can explain how to check how the required shaping has complied with the technical drawing • Can describe how to shape different components in preparation for the joining process

Criteria	Indicative Pass Criteria
S6 Assemble and install pipework using the appropriate methods, techniques and equipment in accordance with the specification including welded, threaded, bolted and clamped jointing solutions **B2** Solve problems within their area of responsibility by applying technical skills and knowledge to define, identify, evaluate and select alternative solutions if required	• Can explain the requirements of Health and Safety legislation and can describe the hazards associated with the assembling and installation process. • Can describe the relevant specifications and technical drawings including tolerances and weld specifications and how they apply to the assembling and installation process. • Can describe the correct tools and equipment that may be used in the assembling and installation process. • Can describe the different methods of pipe fabrication and installation and the different types of joining processes. • Can describe how to check if the assembly and installation methods have complied with the relevant specification or technical drawing
S7 Ensure the integrity of joints in accordance with specifications, in line with specified quality procedures and to precise tolerances	• Can explain the requirements of Health and Safety legislation and can describe the hazards associated with the joint integrity process

Criteria	Indicative Pass Criteria
B3 Take responsibility as an individual and team member for the quality of the work	• Can describe the relevant specifications and technical drawings including tolerances and weld specifications and how they apply to the joint integrity process • Can identify the correct tools and equipment for the joint integrity process and can explain how they are used
S8 Undertake the testing and inspection of the fabricated and or installed pipework using the appropriate techniques	• Can explain the requirements of Health and Safety legislation and can describe the hazards when undertaking testing • Can describe the relevant procedures, specifications and technical drawings used when undertaking testing • Can identify the correct tools and equipment for the testing and inspection process and can explain how they are used
S9 Work with others and contribute to effective working relationships within an Engineering Construction environment	• Describe the importance of developing good, effective and productive relationships with different people in the work environment • Can explain the appropriate type of communication such as verbal or written and how we can get clear information to others

Criteria	Indicative Pass Criteria
	• Can describe the responsibilities you have to yourself and others within the engineering construction environment
S10 Apply techniques for the temporary or permanent removal of an engineering construction piping related system or component	• Can explain the requirements of Health and Safety legislation and can describe the hazards associated with the removal of an engineering construction piping related system or component • Can describe the relevant procedures, specifications and technical drawings and how they apply to the temporary or permanent removal of an engineering construction piping related system or component • Can identify the correct tools and equipment for the removal process and can explain how they are used. • Can describe the safe methods of on-site waste disposal • Can explain the importance of pipe supports in the process of the temporary or permanent removal of an engineering construction piping related system or component

Criteria	Indicative Pass Criteria
S11 Communicate by keeping others informed about work plans or activities which may affect them and seek assistance from others without causing undue disruption to normal work activities	• Can explain how to approach colleagues in an appropriate way so is conducive to good working practices • Can explain the importance of a good clear concise handover • Can describe the different types of communication problems that may affect working relationships
B1 Work with others to effectively and efficiently complete the allocated tasks	
B4 Support their own learning and development and that of others through activities such as mentoring and sharing of expertise and knowledge	
B5 Act ethically, displaying maturity, honesty, integrity and responsibility	

Indicative grading criteria for Merit and Distinction for the Structured Professional Review

Each Merit criterion is worth 3 marks and each Distinction criterion is worth 2 marks towards the overall score for the Structured Professional Review.

Indicative Merit criteria (each worth 3 marks)	Indicative Distinction criteria (each worth 2 marks)	Relevant elements of the standard where the criteria may be demonstrated
M1 Can explain instances where they have raised concerns and can describe their subsequent actions	**D1** Able to show instances where they have been able to proffer or implement improvements to workplace safety and explain why these improvements have been successful	K1 K3 S1 B3 B5 B6 B8 B9
M2 Can explain the engineering first principles and techniques. Can explain the roles and responsibilities of allied trades and explains where the work of these trades will impact upon their tasks	**D2** Can explain in detail the technical specialisms of allied trades and explain where the work of these trades will impact upon their tasks and what steps need to be taken to ensure de-confliction	K1 K2 S1 S2 S3 S4 S5 S6 S8 S9 S10 S11 B1 B3
M3 Able to articulate where their work contributes to the overall commercial aims and objectives of the customer	**D3** Recognises the overall impact of them not working to the standard	K3 S1 S3 S6 S8 S9 S10 S11 B1 B2 B3 B6

Indicative Merit criteria (each worth 3 marks)	Indicative Distinction criteria (each worth 2 marks)	Relevant elements of the standard where the criteria may be demonstrated
M4 Can describe a range of common fault diagnosis techniques and recognises where these are best applied **M5** Can justify why the specific techniques was selected to identify and rectify faults	**D4** Contrasts the strengths and weaknesses of common fault diagnosis techniques **D5** Explains their actions and describes what other options may have been available and why these were not deemed suitable or pursued.	K1 K3 S1 S2 S3 S5 S6 S7 S8 B2 B6
M6 Provides evidence of instances where they may have been exposed to unsafe/undesirable behaviours and how they dealt with these occurrences	**D6** Recognises the impact of nonconformance on workplace behaviours and organisational culture.	K1 K3 S1 S2 B1 B3 B5 B6 B8 B9
M7 Can explain in detail why engineering specifications are required and how they are applied to work-based activities	**D7** Able evidence where they have offered suggestions regarding how the specified engineering specifications could have been modified to improve the work process and quality of the end product	S2 S4 S6 S7 S8 S11 B3 B9

Indicative Merit criteria (each worth 3 marks)	Indicative Distinction criteria (each worth 2 marks)	Relevant elements of the standard where the criteria may be demonstrated
M8 Can explain in detail and can demonstrate where they have acted as an effective team member	**D8** Can explain how they can personally contribute to the productivity and dynamics of the team.	K1 K3 S1 S3 S9 S11 B1 B3 B4 B7 B8 B9

Overall grading

Each assessment method is marked separately and awarded either a fail, pass, merit or distinction.

The Knowledge Test grade is based on the percentage score achieved. The grade and mark for both the Practical Assessment and the Structured Professional Review is based on the number and level of criteria achieved.

Components	Pass	Merit	Distinction	Overall EPA weighting
Knowledge Test	60%	70%	85%	35%
Practical Assessment	60% All pass criteria achieved	75% A pass plus minimum of 3 merit criteria achieved	85% A merit plus minimum of 2 distinction criteria achieved	55%
Structured Professional Review	60% All pass criteria achieved	75% A pass plus minimum of 5 merit criteria achieved	85% A merit plus minimum of 2 distinction criteria achieved	10%

The overall EPA grade is determined by

- Combining the individual assessment percentages to give an overall percentage taking in to account each methods' weighting
- Using the number of passes, merits and distinctions awarded across the assessment methods.

The overall mark for the ECP standard is based on the marks and weightings in individual elements as follows:

Final Percentage =

(Assessment method 1 percentage x weighting) +

(Assessment method 2 percentage x weighting) +

(Assessment method 3 percentage x weighting)

The overall grade for the ECP standard is based on the overall mark and grades achieved in individual elements as follows:

Overall EPA percentage	>=85%	>=70%	>=60%	>=0%
	AND	AND	AND	AND
Number of passes, merits and	minimum of 2 merits and 1 distinction	minimum of 2 merits	minimum of 3 passes	at least 1 fail
	=	=	=	=
Final grade awarded	**Distinction**	**Merit**	**Pass**	**Fail**

Example 1

Apprentice A achieved

- Knowledge Test: 72% (Merit)
- Practical Assessment: 70% (Pass)
- Structured Professional Review: 90% (Distinction)

The overall percentage is calculated as

(72 x 0.35) + (70 x 0.55) + (90 x 0.10) = 72.7%

The apprentice would achieve a **merit** because

- Their overall percentage is greater than 70%
- They have achieved a minimum of 2 merits (merit, pass, distinction).

Example 2

Apprentice B achieved

- Knowledge Test: 96% (Distinction)
- Practical Assessment: 70% (Pass)
- Structured Professional Review: 70% (Pass)

The overall percentage is calculated as
(96 x 0.35) + (70 x 0.55) + (70 x 0.10) = 79.1%
The apprentice would achieve a **pass** because

- Their overall percentage is greater than 70% but they have **not** achieved a minimum of 2 merits, so they cannot achieve a merit
- Their overall percentage is greater than 60% and they have achieved minimum pass for all 3 elements, so they can achieve a pass.

Section 4: Resits and retakes

Apprentices who fail one or more EPA method(s) can take a re-sit or a re-take at their employer's discretion. The apprentice's employer needs to agree that a re-sit or re-take is appropriate. A re-sit does not need further learning, but a re-take does. Apprentices should have a supportive action plan to prepare for a re-sit or a re-take.

The retake must only be carried out after one month has elapsed since the first scheduled date of the EPA element. The employer and EUIAS agree the timescale for a re-sit or re-take. A re-sit is typically taken within 2 months of the EPA outcome notification. The timescale for a re-take is dependent on how much re-training is required and is typically taken within 3 months of the EPA outcome notification.

Re-sits and re-takes are not offered to apprentices wishing to move from pass to a higher grade.

An apprentice will get a maximum EPA grade of pass for a re-sit or re-take, unless EUIAS determines there are exceptional circumstances.

The EUIAS resit and re-take policy can be found at
https://www.euias.co.uk/end-point-assessment/policies-and-fees/

Section 5: Practice Guidance

Preparing for the Knowledge Test

While on-programme, the employer and or training provider should brief the apprentice on the areas to be assessed by the knowledge test, as detailed in Section 2. It is good practice to identify the areas within the learning programme where the relevant knowledge is delivered and ensuring that apprentices are aware that elements from each of these criteria might come up in the test.

The knowledge test is aligned to the standard rather than a specific job role that the apprentice may be doing. The questions have been written to reflect the relevant Engineering Construction Pipefitter core and pathway as a whole and are not focussed on specific plant, machinery, or employer-specific processes.

In readiness for end-point assessment, the apprentice should complete a practice knowledge test. This should be undertaken in advance of the live knowledge test, with enough time to mark the test, and provide feedback to the apprentices. See Appendix C in ECP Supporting Documents for ‘Practice knowledge test.’.

For maximum effect, ensure the test is taken in exam conditions similar to those that will be experienced in a live test.

Preparing for the Practical Assessment

Where possible, the employer/training provider should provide the apprentice with the opportunity to carry out a practice practical assessment as close to the real assessment described in Section 2 of the specification (Component 2).

The employer/training provider should prepare a practical task similar to (but not identical to) the tasks being used for the live assessment. A sample brief for the practical assessment is included in Supporting Documents, Appendix D Sample Brief and Supporting Documentation for Practical Assessment.

To make the practice more realistic, a tutor or supervisor should adopt the role of assessor and use the appropriate grading criteria from Section 5 to ‘assess’ the

apprentice. Included in the Supporting Documents is a document to record the results of the assessment, Appendix E Checklist and Summary Records for Practice Practical Assessment.

Preparing for the Structured Professional Review

The practice interview should take place between the apprentice and a person acting the role of the independent assessor. The apprentice should draw on evidence in their portfolio during the discussion.

Guidance on the Evidence Record

The Evidence Record must be submitted alongside a mini portfolio at the Gateway meeting.

The Evidence Record is in two parts:

- Part A – description of evidence in the mini-portfolio cross-referenced to the Engineering Construction Pipefitter (ECP) standard
- Part B – Engineering Technician commentary (UK-SPEC ENG TECH).

Mini portfolio

Before the apprentice starts their end-point assessment, they must compile a mini-portfolio which covers three different pipefitting jobs. The jobs chosen should cover at least two of the following types of pipe:

- ferrous pipe
- plastic pipe
- non-ferrous pipe.

The mini portfolio must contain at least one piece of evidence to cover each of the required ECP skills and behaviours. No other evidence should be included.

Quality vs Quantity

The apprentice should be supported in selecting evidence for their Evidence Record. They must gather evidence on the full range of KSBs required for the structured professional review.

The Evidence Record must be sufficient to evidence the apprentice can apply the KSBs required in a variety of tasks.

Choose the best pieces of evidence that have been mapped for each KSB covered by the structured professional review.

Examples of acceptable evidence:

- workplace documentation/records, for example job task sheets/job card/times sheets, equipment maintenance /service records related to the apprentice
- witness statements signed and dated by coaches/trainers
- any employer contributions should focus only on direct observation of evidence (for example witness statements) rather than opinions
- annotated photographs/diagrams
- video clips (maximum total duration 10-minutes); the apprentices must be in a view and identifiable

The above is not a definitive list. The apprentice can include other relevant evidence sources. The portfolio must not contain any methods of self-assessment.

Evidence must be:

- produced by the apprentice (authentic)
- relevant to the standard (K, S or B) that it is mapped to
- produced during the time the apprentice is carrying out their on-programme training

What the apprentice can do

The apprentice should:

- be familiar with the structure of their Evidence Record and mini portfolio
- know the KSBs covered by the Structured Professional Review
- know the grading criteria
- ensure there is evidence to cover every KSB in the Structured Professional Review
- practise mapping evidence and completing the evidence mapping grid.

The role of the employer/training provider

Employer/training providers are expected to support the apprentice in preparing their portfolio by:

- clarifying responsibility for supporting the apprentice to select and map evidence for the portfolio, including employer coaches/mentors where applicable
- advising on which pieces of evidence to select to ensure that when looked at as a whole, they provide coverage of all the required elements of the standard assessed in the interview
- supporting the mapping of evidence and production of a portfolio mapping document
- authenticating evidence as valid
- signing off the portfolio
- submitting the portfolio to EUIAS as part of Gateway.

What to expect in the practice structured professional review based on the Evidence Record and mini portfolio.

The practice structured professional review provides the apprentice with the opportunity to practice discussing their KSBs gained throughout their on-programme and by referring to evidence from their Evidence Record and mini portfolio. A suitable person should be chosen to play the part of the assessor. A practice structured professional review template is provided to use to prepare the appropriate questions to ask and to record the apprentices' performance. See Appendix G in ECP Supporting Documents - Practice Structured Professional Review based on the Evidence Record and mini portfolio.

As part of the practice exercise, apprentices should have access to their Evidence Record and mini portfolio to support their responses.

Section 6: Authenticity and security of apprentice work

The apprentices must be advised by their training provider and employer that copying of any work (whether it is from another apprentice or from internal, external documents or source) and presenting it as their own will be deemed as malpractice and will lead to their work being disqualified. Apprentices must not share their work or allow any person to copy their work as this is not allowed and would also be deemed as malpractice.

In signing off the portfolio, training providers and employers must be satisfied that the evidence in the portfolio is:

- **adequate**: evidence must cover all relevant KSBs within the assessment plan. Adequate does not mean a large quantity of evidence. The evidence should focus on quality rather than quantity
- **authentic**: apprentices must be able to confirm and talk about the evidence that they submit with the independent assessor, appointed by the EUIAS. It is vitally important apprentices only submit evidence relating to them
- **appropriate**: all evidence must be relevant to the KSBs assessed during the professional discussion
- **recent and up to date**: all evidence must be linked to KSBs must be recent and current which demonstrate the apprentice's competence. The independent assessors, appointed by the EUIAS will assess current competencies, and the apprentice must map the evidence to demonstrate the relevant work to the KSB. Apprentices must gather the evidence during their on-programme training