

L3 EPA Engineering Construction Pipefitter



EPA Specification Section 5.2 – The Practical Observation

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Contacts

This specification has been designed to provide all the advice and guidance you need to prepare yourself and your apprentices for endpoint assessment. However, if you have any further questions please contact the EUIAS Help Desk using one of the following:

**Help Desk email: enquiries@euias.co.uk
Help Desk telephone: 0121 713 8310**

Introduction

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 assessor to determine the complexity and extent of the apprentices underpinning knowledge. This is a skill based practical exercise which will test:

- Knowledge (K4, K5, K6, K7, K8, K9)
- Skills (S1, S2, S3, S4, S5, S6, S7, S8, S10)
- Behaviours (B1, B2, B3, B4, B5, B6, B7, B8, B9)

See Section 4 for the references to the standard.

EUIAS will provide the Practical Assessment brief that the apprentice will be working with.

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 by EUIAS
- The rig to bolt their completed assembly onto. This is provided by EUIAS.

Refer to section 6 for guidance on how to set up a Practical Assessment.

The duration of the Practical Assessment is a maximum of 8 hours, and the actual time allowed will be based on the comparable time that an industry competent worker would take to achieve successful completion of the set task(s). The Practical Assessment will be delivered and assessed by the EUIAS Independent Assessor under strict controlled conditions.

The apprentices should be made aware and should confirm their understanding of the requirements of the grading criteria in order to achieve their full potential in achieving a pass, merit and distinction. If the apprentice does not achieve a 'pass' the apprentice will need to retake this EPA element, further information can be found in Section 5 'Retake and Resit Information'.

The EUIAS Service Delivery team will work with the employer or training provider to schedule the Practical Assessment.

Grading the Practical Assessment

The Practical Assessment is marked out of 100. The grading criteria are described in the following pages.

All pass criteria must be achieved in order to achieve a pass.

The merit and distinction grade for the Practical Assessment are determined by the level and number of criteria achieved

Practical Assessment Grading

The Practical Assessment is graded by the Independent Assessor appointed by EUIAS. The following tables explain the criteria that are applied in order to achieve each grade for the Practical Assessment.

To achieve a **PASS** for the Practical Assessment, a Pass is required in **ALL** relevant criteria:

KSB	K4	K5	K6	K7	K8	K9	S1	S2	S3	S4	S5	S6	S7	S8	S10	B2	B3	B6	B7	B8
All Pass criteria must be achieved	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Achieving all these elements represents a total score of 60 in the Practical Assessment.

A higher score is achieved by achieving Merit and Distinction criteria as described below. Each of the Merit and Distinction criteria gains the apprentice a further 5 marks towards their total percentage score for the Practical Assessment.

To achieve a **Merit** for the Practical Assessment, all Pass criteria must be achieved PLUS a **minimum of three** Merit criteria.

To achieve a **Distinction** for the Practical Assessment, the apprentice must achieve a Merit PLUS a **minimum of two** Distinction criteria.

Practical Assessment Grade	Minimum Criteria Achieved	Minimum marks achieved
Pass	All Pass criteria	60 marks
Merit	Pass PLUS a minimum of 3 Merit criteria	75 marks (60 plus 3 x 5)
Distinction	Merit Plus a minimum of 2 Distinction criteria	85 marks (75 plus 2 x 5)

Note. It is possible to score more than 75 and NOT achieve a Merit because a minimum of three Merit criteria have not been achieved. Similarly, it is possible to score more than 85 and not achieve a Distinction because a minimum of three Merit and two Distinction criteria have not been achieved.

The Practical Assessment carries a weighting of 55% when calculating the final grade.

Indicative 'pass' criteria for the Practical Assessment

The following criteria are indicative of the criteria the assessor will be looking for when the apprentice carries out the Practical Assessment.

Standard	Indicative Pass Criteria
<p>K4 Engineering practice and principles including reading engineering drawings and markings out techniques</p>	<p>Follow requirements given in:</p> <ul style="list-style-type: none"> • isometric drawings • Piping and Instrument Diagrams (P&ID) • General Arrangements • branch making • datum lines
<p>K5 Mathematical techniques and formula related to the fabrication, development and installation of pipework systems</p>	<p>Use appropriate techniques and formula such as:</p> <ul style="list-style-type: none"> • surface areas, circumferences, section areas, pipe diameter, pipe weights • branch pattern development such as template drawings, development formulae, datum lines, mitres. • offsets, rolled offsets to include: run, travel, roll, angles <ul style="list-style-type: none"> • 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.
<p>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</p>	<p>Select and safely use:</p> <ul style="list-style-type: none"> • marking out tools • surfaces such as benches, floor, template paper

Standard	Indicative Pass Criteria
	<ul style="list-style-type: none"> • hand tools • mechanical tools and equipment • lifting equipment • mechanical joint integrity tools • pressure testing equipment
<p>K7 Common and specialist pipe material such as ferrous, non-ferrous and non-metallic including fillings associated with the pipework components and systems</p>	<p>Work with relevant materials such as:</p> <ul style="list-style-type: none"> • ferrous (e.g. carbon steel, stainless steel, Inconel, duplex/super duplex, chrome Molybdenum) • non-ferrous (e.g. copper) • non-metallic (e.g. plastic) • pipework fitting and components (e.g. 90/45 degree elbows, tee pieces, sockets, welded fittings, threaded fittings, flanges)
<p>K8 Pipework preparation, fabrication, installation, maintenance, testing and decommissioning techniques commonly used throughout the Engineering Construction industry</p>	<p>Demonstrate</p> <ul style="list-style-type: none"> • 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

Standard	Indicative Pass Criteria
	<ul style="list-style-type: none"> • use of pipe chamfer/root face and gaps • use of pipe supports and expansion • pressure test procedures • working safely, knowing risks and hazards
<p>K9 Appropriate codes, practices and industry standards and their application to ensure quality requirements are met</p>	<p>Refer to and work in accordance with company, manufacturer, national and international standards, to include</p> <ul style="list-style-type: none"> • ASME and ANSI Standards • quality assurance and quality control procedures.
<p>S1 Comply with appropriate health and safety, risk and quality requirements</p> <p>B6 Work safely in accordance with health, safety and environmental legislation, regulations and company-specific requirements</p> <p>B7 Maintain a safe, clean and tidy work area</p> <p>B8 Check for and identify potential hazards in the workplace and take collective responsibility to maintain a safe working environment</p>	<ul style="list-style-type: none"> • 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
<p>S2 Correctly select and safely use tools and equipment for the</p>	<ul style="list-style-type: none"> • Demonstrate clear knowledge of the tools and equipment selected

Standard	Indicative Pass Criteria
<p>fabrication, assembly, installation and decommissioning of pipework components and systems</p>	<p>for the task</p> <ul style="list-style-type: none"> • 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
<p>S3 Plan, organise and undertake the fabrication, assembly, installation, maintenance and decommissioning of pipework components and systems</p>	<ul style="list-style-type: none"> • Follow any legislation or HSE guidelines before undertaking any task • Ensure that the work area is safe and suitable for the task • 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

Standard	Indicative Pass Criteria
	<p>drawings or specifications</p> <ul style="list-style-type: none"> • Install pipework using the correct fastenings in compliance with drawings and specifications • Safely re-instate the area
<p>S4 Read, interpret and apply engineering drawing information</p>	<ul style="list-style-type: none"> • 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 • 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
<p>S5 Shape pipework components using hand and power tools to cut, drill, shape and finish components to the required tolerance, specification and standard</p>	<ul style="list-style-type: none"> • 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.

Standard	Indicative Pass Criteria
	<ul style="list-style-type: none"> • Ensure that the shaping, holes or cuts comply with the specification • Use the appropriate techniques for the shaping, drilling or cutting • Ensure that the cut, hole or shaping is within the tolerance stated on the specification
<p>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</p> <p>B2 Solve problems within their area of responsibility by applying technical skills and knowledge to define, identify, evaluate and select alternative solutions if required</p>	<ul style="list-style-type: none"> • 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 • Check that the completed assembly or installation of pipework complies with the Drawing or specification • Safely re-instate the work area

Standard	Indicative Pass Criteria
<p>S7 Ensure the integrity of joints in accordance with specifications, in line with specified quality procedures and to precise tolerances</p> <p>B3 Take responsibility as an individual and team member for the quality of the work</p>	<ul style="list-style-type: none"> • 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
<p>S8 Undertake the testing and inspection of the fabricated and or installed pipework using the appropriate techniques</p>	<ul style="list-style-type: none"> • Ensure that the test area is suitable to carry out the test • Ensure that the documentation such as test procedures are followed • 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

Standard	Indicative Pass Criteria
<p>S10 Apply techniques for the temporary or permanent removal of an engineering construction piping related system or component</p>	<ul style="list-style-type: none"> • 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 criterion is worth 5 marks to 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
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