Level 3 EPA Gas Engineering Operative

EPA Specification Section 4 – The Gas Engineering Operative standard with Amplification and Guidance

Contacts

This specification has been designed to provide all the advice and guidance you need to prepare yourself and your apprentices for end-point 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 0779922 option 2

The Gas Engineering Operative standard in detail

The GEO standard consists of:

- Core knowledge (8 elements)
- Core skills (12 elements)
- Behaviours (8 elements)
- Technical Knowledge (12 elements)
- Technical Skills (13 elements)

The following pages list each of the elements of the standard, the assessment method(s) required and amplification and guidance of the range and depth expected.

Core Knowledge

Assessed across Knowledge Test, Gas Safe® Registration (GS), Competency Test (CT), Work Log Review (WLR) and Work Log Interview

CK1 Current Health, Safety and Environmental legislation and regulations applicable to work in the gas industry

CK2 Safe gas and electrical installation, commissioning, decommissioning and or ongoing service and repair procedures of gas installations and appliances needed to establish the safe operation of the equipment and installation in accordance with industry standards

CK3 Gas and electrical theories and procedures involved in the practical installation, commissioning, decommissioning and/or ongoing service and repair of gas installations, appliances and associated equipment

CK4 Relevant electrical/mechanical principles and how they are applied in work processes and procedures

CK5 Up to date energy efficiency advice and guidance to be given to the customer

CK6 Product knowledge to be able to discuss and advise the customer

CK7 Current regulatory compliance, current Gas Safety (Installation and Use) Regulations and the current Electricity at Work Regulations

CK8 Company rules, policies and procedures as defined by the employer

Core Knowledge: Amplification and Guidance
CK1 Current Health, Safety and Environmental legislation and regulations applicable to work in the gas industry • Health & Safety at Work Act • Control of Substances Hazardous to Health procedures • Working at Height Regulations • Provision and Use of Work Equipment Regulations (PUWER) • Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR) • Building Regulations (England & Wales) • Building Standards (Scotland)

CK2 Safe gas and electrical installation, commissioning, decommissioning and or ongoing service and repair procedures of gas installations and appliances needed to establish the safe operation of the equipment and installation in accordance with industry standards

- Demonstration that all installation, commissioning, decommissioning, service and repair work operations is / are carried out in accordance with manufacturer's instructions
- Compliance with the requirements set out in Gas Safety (Installation & Use) Regulation 26 (9):

  "Where a person performs work on a gas appliance, he or she shall immediately thereafter examine —

  (a) the effectiveness of any flue;

  (b) the supply of combustion air;

  (c) its operating pressure or heat input or, where necessary, both;

  (d) its operation to ensure its safe functioning"

CK3 Gas and electrical theories and procedures involved in the practical installation, commissioning, decommissioning and/or ongoing service and repair of gas installations, appliances and associated equipment

- Engineering Correct practical application of the scientific principles aligned to the safe installation, commissioning, decommissioning and / or ongoing service and repair of gas installations and associated equipment. Specifically, these principles are properties of gas, recognition of good and bad combustion, application of the combustion equation for methane
- Ability to follow installation, commissioning, service and repair processes as outlined in manufacturer's instructions
- Correct interpretation of flame picture, and recording of Working Pressure across the appliance range and or pathway
- The correct ventilation requirement criteria are applied to each appliance installation relevant to the situation as found or as described
- Chimneys and Flues meet manufacturer's instructions, are installed
- Safe isolation of electrics procedures is applied
- Electrical systems are deemed safe through the proper completion of preliminary electrical systems checks. Specifically, mains voltage check, polarity check, resistance to earth check, short circuit check and earth loop impedance testing
- The correct process for earth loop impedance testing is applied

CK4 Relevant electrical and mechanical principles and how they are applied in work processes and procedures

- Demonstration of understanding of the operation of electrical and mechanical systems / components, and how these are applied within appliances or control-systems
- Understanding and application of safe working processes, procedures, practices when dealing with electrical or mechanical equipment, as well as controls, systems and functions

CK5 Up to date energy efficiency advice and guidance to be given to the customer

- The provision of energy efficiency advice that is relevant and applicable to each customer's situation
- Demonstration of knowledge of up to date energy efficiency measures, tariffs and options
- Acting within guidelines for the provision of energy efficiency advice as outlined within government produced best-practice guides, publications and relevant company policies

CK6 Product knowledge to be able to discuss and advise the customer

- Understanding of the product range or system upgrades that would be of benefit each customer's circumstances i.e. central heating system upgrades that provide fuel efficiency
- Demonstration of discussions with customers where the product knowledge is provided under best-advice guidelines

CK7 Current regulatory compliance, current Gas Safety (Installation and Use) Regulations and the current Electricity at Work Regulations

Evidence of understanding and correct application of compliance of the following legislative items:

- Gas Safety (Installation and Use) Regulations 1998
- Electricity at Work Regulations 1989

CK8 Company rules, policies and procedures as defined by the employer

- Understanding of the use and application of company rules, policies and procedures as outlined within:
  - Technical Operating Procedures
  - Company Code / Rules of Conduct
  - Company codes of practice
  - Company policies
  - Company vision and values

Core Skills

Assessed across Gas Safe® Registration, Competency Test and Worklog Review and Work Log Interview

CS1 Undertake and document rigorous risk assessments to ensure the safety of all affected by the work activities

CS2 Take personal responsibility for maintaining safety standards and achieving job objectives

CS3 Use and maintain tools, equipment and personal protective equipment (PPE) in a safe and appropriate manner

CS4 Safe gas and electrical installation, commissioning, decommissioning and/or ongoing service and repair of gas installations and appliances needed to establish the safe operation of the equipment and installation accordance with industry standards

CS5 Work with focus and clear purpose in all conditions and locations, covering business requirements, including lone working and safely adapt working methods to reflect changes in working environments

CS6 Work on customer premises/property showing appropriate care and respect whilst focusing on safety

CS7 Use a variety of appropriate and effective communication methods to interact with customers and others to give/receive information accurately, in a timely and positive manner in order to deliver the best possible service

CS8 Identify where situations or conditions are to unsafe standards and take appropriate actions within your range of competency

CS9 Achieve individual and team tasks which align to overall work objectives, be self-motivated and disciplined in the approach to work activities

CS10 Work effectively and efficiently with people from different trades/disciplines, backgrounds and expertise to accomplish an activity in a safe manner, on time, to meet customer expectations

CS11 Identify, organise and use resources effectively and sustainably to complete the task with consideration to cost, quality, safety, security and environmental impact

CS12 Be able to read and follow technical documentation associated with equipment and installation requirements

Core Skills: Amplification and Guidance

CS1 Undertake and document rigorous risk assessments to ensure the safety of all affected by the work activities

- Recording of ongoing risk assessments related to work activities, and
- The application of safety measures required resulting from risk assessment

CS2 Stakeholders

- Demonstration of safety awareness through information recorded on job records and through mentor comments

CS3 Use and maintain tools, equipment and personal protective equipment (PPE) in a safe and appropriate manner

- Safe tool and equipment usage, and selection and deployment of the appropriate PPE demonstrated

CS4 Safe gas and electrical installation, commissioning, decommissioning and/or ongoing service and repair of gas installations and appliances needed to establish the safe operation of the equipment and installation accordance with industry standards

- Installation, commissioning, decommissioning, service and repair work operations being carried out in accordance with manufacturer's instructions
- Compliance with the with the requirements set out in Gas Safety (Installation & Use) Regulation 26 (9):

"Where a person performs work on a gas appliance, he/she shall immediately thereafter examine—

(a) the effectiveness of any flue;

(b) the supply of combustion air;

(c) its operating pressure or heat input or, where necessary, both;

(d) its operation so as to ensure its safe functioning"

CS5 Work with focus and clear purpose in all conditions and locations, covering business requirements, including lone working and safely adapt working methods to reflect changes in working environments

- The planning of activities to successfully achieve job objectives across a range of conditions and locations
- Demonstrate knowledge of the business 'lone working' policy and knowledge of the safety measures to apply when lone working
- Can adapt working methods to suit circumstances of job

CS7 Use a variety of appropriate and effective communication methods to interact with customers and others to give/receive information accurately, in a timely and positive manner in order to deliver the best possible service

- Customer interactions across a range of circumstances
- Communication occasions such as preparing to arrive at the job, listening to customer comments, providing best advice, completing the job, explaining the use of appliances and equipment are carried out in a manner that shows honesty, respect and professionalism
- Communication methods are appropriate in situations where difficult conversations are required i.e. the explaining to the customer why an appliance or system has been deemed to be unsafe

CS8 Identify where situations or conditions are to unsafe standards and take appropriate actions within your range of competency

- Confirmation of understanding and application of the gas industry unsafe situations procedure (publication - IGEM/G/11)

CS10 Work effectively and efficiently with people from different trades/disciplines, backgrounds and expertise to accomplish an activity in a safe manner, on time, to meet customer expectations

- Comments from mentor where other trades / alternative backgrounds are encountered throughout the completion of job activities
- Apprentices can recognise circumstances where activities cannot be accomplished in a safe manner in relation to the circumstances presented by other people who may have influence on the job outcome

CS11 Identify, organise and use resources effectively and sustainably to complete the task with consideration to cost, quality, safety, security and environmental impact

- Carry out tasks in an efficient manner, and apply an awareness of cost-effectiveness on tasks related to the successful completion of the job
- Demonstrates consideration to safety and security in every situation
- Applies business and personal environmental considerations where applicable i.e. the disposal of hazardous waste, application of the company ‘stock’ policy

CS12 Be able to read and follow technical documentation associated with equipment and installation requirements

- Apprentices can demonstrate successful interpretation of data contained within Manufacturer’s instructions, Technical Operating Procedures and standards.
- Apprentices demonstrate an ability to source and interpret technical data from online sources

Behaviours

Assessed in across Gas Safe ® Registration, Competency Test and Worklog Review and Work Log Interview

B1 Ensure personal wellbeing and the safety of customers and others is a priority

B2 Be risk aware showing the desire to reduce risks through systematic monitoring and checking information and the strict compliance with appropriate regulations and normative documents

B3 Demonstrate an awareness of how the work impacts on others in the work environment

B4 Confidently deliver a polite, courteous, professional service to all customers and members of the public whilst **safeguarding customer** welfare and recognising vulnerability, equality and diversity

B5 Undertake Continuous Professional Development to enhance knowledge and skills to maintain competence

B6 Recognise personal and professional limitations and seek appropriate advice when necessary

B7 Display self-discipline and self-motivated approach

B8 Exercise responsibilities in an ethical manner

Behaviours: Amplification and Guidance

B1 Ensure personal wellbeing and the safety of customers and others is a priority

- Dynamic risk-assessment throughout the job, taking account of environmental and human circumstances which may or may not change

B2 Be risk aware showing the desire to reduce risks through systematic monitoring and checking information and the strict compliance with appropriate regulations and normative documents

- Constant application of the correct measures to mitigate risks to self and others
- Recording of risks, mitigating actions, and the application of method statements

B3 Demonstrate an awareness of how the work impacts on others in the work environment

- Records of discussions with customers or other persons present around potential risks, the counter measures applied, and what individuals present must do to comply with the safety requirements of the environment

B4 Confidently deliver a polite, courteous, professional service to all customers and members of the public whilst safeguarding customer welfare and recognising vulnerability, equality and diversity

- Excels in interactions with customers and other

- Recognition of vulnerable customers and the application of the measures or actions appropriate to the circumstances
- Application of the employing business equality and diversity policy

B5 Undertake Continuous Professional Development to enhance knowledge and skills to maintain competence

- Evidence of further training / learning such as new product or new equipment training programmes / courses attended

B6 Recognise personal and professional limitations and seek appropriate advice when necessary

- Evidence of advice sought from mentors, line managers, coaches, manufacturers and other specialists

B7 Display self-discipline and self-motivated approach

- Recognition through review process of attitude and approach to work and to work-life balance

B8 Exercise responsibilities in an ethical manner

- Evidence of judging situations with fairness, taking account of all mitigating factors and the effect of one's actions on other people

Technical Knowledge

Assessed in Knowledge Assessment, Worklog Review and in reference to Gas Safe ® Registration

TK1 Electrical awareness and be able to carry out safe isolation and essential electrical safety checks

TK2 Combustion, combustion analysis, gas properties, carbon monoxide (CO), and types of burners

TK3 Flues and ventilation principles

TK4 The necessary safety checks following gas work on an appliance (regulation 26/9)

TK5 The range and suitability of appliances

TK6 The statutory and normative documentation including building regulations, water regulations and electrical regulations

TK7 Emergency procedures, including gas escapes, report of fumes and for unsafe situations

TK8 A knowledge and understanding of four appliances

TK9 System design, location, controls, flue types for appliances and smart controls

TK10 An awareness of green technologies

TK11 The properties of Liquid Petroleum Gas (LPG)

TK12 An awareness of fuel storage – tanks and bottles (Liquid Petroleum Gas - LPG)

Technical Requirements Knowledge: Amplification and Guidance

TK1 Electrical awareness and be able to carry out safe isolation and essential electrical safety checks

- Competency in carrying out the safe isolation process and the correct electrical safety checks. Specifically, mains voltage check, polarity check, resistance to earth check, short circuit check and earth loop impedance testing

TK2 Combustion, combustion analysis, gas properties, carbon monoxide (CO), and types of burners

- Types of burners; simplex and duplex, pre-aerated, post aerated

TK3 Flues and ventilation principles

- Flue or chimney route, flue or chimney material, termination, sizing and testing methods
- Ventilation calculations and confirmation of ventilation provisions for appliance types and installation circumstances such as location and types of room, other factors within the room i.e. extractor systems

TK4 The necessary safety checks following gas work on an appliance (regulation 26/9)

- Examples of compliance with the requirements set out in Gas Safety (Installation & Use) Regulation 26 (9):

  "Where a person performs work on a gas appliance, he/she shall immediately thereafter examine—

  (a) the effectiveness of any flue;

  (b) the supply of combustion air;

  (c) its operating pressure or heat input or, where necessary, both;

(d) its operation so as to ensure its safe functioning"

TK5 The range and suitability of appliances

- Confirmation of the suitability of appliances or appliance installations in reference to the requirements of manufacturer's instructions

TK6 The statutory and normative documentation including building regulations, water regulations and electrical regulations

- Interpretation of regulations and standards and how they apply to situation
- Knowledge of the statutory and normative documentation that govern gas engineering roles

TK7 Emergency procedures, including gas escapes, report of fumes and for unsafe situations

- Application of the appropriate emergency actions and procedures that apply to each situation where unsafe circumstances were encountered (Whether 'At Risk,' 'Immediately dangerous,' or 'RIDDOR')
- Correct processes followed for dealing with gas escapes

TK8 A knowledge and understanding of four appliances

- Work activities across the stated range of (four) appliance types that consist of the chosen pathway for apprenticeship (See Annex for list of appliance types)

TK9 System design, location, controls, flue types for appliances and smart controls

- Checks that all designs, locations, control systems and the rest meet the requirements of manufacturers instruction's and installation circumstances such as room type and usage

TK10 An awareness of green technologies

- Customer conversations where green technology advice has been given. Areas such as ground source heat pumps, biomass and solar panels are discussed

TK11 The properties of Liquid Petroleum Gas (LPG)

TK12 An awareness of fuel storage – tanks and bottles (Liquid Petroleum Gas - LPG)

- LPG awareness including the combustion properties of Liquid Petroleum Gas, its ventilation requirements, safe tank and bottle storage considerations

Technical Skills

Gas Engineering Operative Technician: Amplification and Guidance

TS1 Carry out safe isolation essential electrical safety checks	**TS9** Reinstate following completion of works cleaning up and making good
TS2 Demonstrate ambient air testing/carbon monoxide/dioxide atmosphere testing	**TS10** Work in compliance with statutory and normative documentation including building regulations, water regulations and electrical regulations
TS3 Carry out flue testing	**TS11** Access and comply with technical guidance, bulletins and safety alerts e.g. Gas Industry Unsafe Situations Procedures (GIUSP)
TS4 Undertake the necessary safety checks following gas work on an appliance (Reg. 26/9)	**TS12** Demonstrate tightness testing, purging and relight procedures on gas installations
TS5 Identify faults and take the appropriate action	**TS13** Demonstrate pipework installations/pipework skills, pressure and flow/pipework sizing, meter installation
TS6 Identify gas safety controls and prove their safe operation	
TS7 Undertake the installation and/or repair and maintenance of appliances	
TS8 Complete records and maintain records accordingly	

TS1 Carry out safe isolation essential electrical safety checks

- Select correct point of isolation
- Utilise Mains approved test equipment
- Apply correct means of isolation
- Test at the correct phases of the isolation process
- Re-test the test-kit to prove working
- Utilise Safe Isolation workflow diagram where appropriate
- Use of the correct safe Isolation kit
- Comply with regulation 14 of the Electricity at Work Regulations

TS2 Demonstrate ambient air testing, carbon monoxide and dioxide atmosphere testing

- Utilise appropriate testing equipment and procedures to record results of testing
- Correct application of the Gas Industry Unsafe Situations Procedure when testing results demonstrate failure of conditions or atmospheres
- Apply the requirements of RIDDOR where required

TS3 Carry out flue testing

- For new and existing flues or chimneys
- Builders openings, masonry and pre-cast flue chimneys
- New factory-made metal flues / chimneys
- Flue tests appropriate to appliance types
- Flue Test as per company procedures
- Recognition of termination points, distances and hazards

TS4 Undertake the necessary safety checks following gas work on an appliance (Reg. 26/9)

- Completion of the checks required as stated previously:

  "Where a person performs work on a gas appliance, he/she shall immediately thereafter examine—

  (a) the effectiveness of any flue

  (b) the supply of combustion air

  (c) its operating pressure or heat input or, where necessary, both

  (d) its operation so as to ensure its safe functioning"

TS5 Identify faults and take the appropriate action

- Application of a logical fault–finding process
- Correct fault diagnosis following logical process
- Repair of faults
- Ordering of correct part(s) where fault cannot be rectified during initial visit
- Application of the Gas Industry Unsafe Situations Procedure where fault diagnosis uncovers unsafe circumstances
- Apply the requirements of RIDDOR where required

TS6 Identify gas safety controls and prove their safe operation

- Demonstration of understanding the operation of the gas safety controls per appliance type
- Correct test procedures for gas safety controls applied across the range of appliance types

TS7 Undertake the installation and/or repair and maintenance of appliances

- Carry out appliance installations in full accordance with manufacturer's instructions
- Ensuring flueing and ventilation requirements are met
- Maintain and repair appliances utilising safe working techniques, and operate in compliance with manufacturer's instructions and company technical procedures

TS8 Complete records and maintain records accordingly

- Evidence of completed:
- Job Reports including test results
- Method statements
- Risk assessments
- Unsafe situation and/or RIDDOR reports and labels

TS9 Reinstate following completion of works cleaning up and making good

- All hazardous waste removed from work area in accordance with company or COSHH procedures
- Work areas is left as found
- All appliances affected by work operations are inspected and confirmed as returned to safe operation

TS10 Work in compliance with statutory and normative documentation including building regulations, water regulations and electrical regulations

- Health & Safety at Work Act
- Control of Substances Hazardous to Health procedures
- Working at Height Regulations
- Provision and Use of Work Equipment Regulations (PUWER)
- Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR)
- Building Regulations (England & Wales)
- Building Standards (Scotland)
- Gas Safety (Installation & Use) Regulations
- Electricity at Work Act

TS11 Access and comply with technical guidance, bulletins and safety alerts e.g. Gas Industry Unsafe Situations Procedures (GIUSP)

- Evidence of accessing and interpreting technical guidance and standards
- Evidence of research to locate the appropriate technical guidance
- Knowledge of standards and guidance that apply to the role of Gas Engineering Operative

TS12 Demonstrate tightness testing, purging and relight procedures on gas installations

- Evidence of the application and the recording of the outcome of the tightness testing procedure relevant to all jobs and work types
- Installations and appliances are purged by the passage of the appropriate volume of gas and through the application of the correct procedure to ensure safety during purging and relight operations

TS13 Demonstrate pipework installations/pipework skills, pressure and flow/pipework sizing, meter installation

- Pipe installation work to include:
    - Pipework sizing calculations
    - The use of fittings
    - Pipe bending
    - Meter work during installations (safe removal and capping)
    - Pressure and flow of gas

- Standing and working pressure – results and recording
- Heat Input calculations