



**ACS.CCLP1 EPC
SAFETY ASSESSMENT CRITERIA
INITIAL AND RE-ASSESSMENT.
DOMESTIC.LPG
EXTERNAL PIPEWORK CONNECTIONS**

CCLP1 EPC	Initial and Re-Assessment
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Introduction

Tests competence in:

- installation and commissioning of service pipework; single and multiple supplies
- re-connection and commissioning of existing installation pipework
- installation and commissioning of prefabricated LPG meter installations
- re-lighting of gas appliances.

Comprises:

1. Gas safety legislation and Standards.
2. Gas emergency actions and procedures.
3. Products and characteristics of combustion.
- 3(a). Characteristics of LPG.
- 3(b). LPG supply pressures inc. prefabricated meter installations, operation/positioning of emergency isolation, flow controls/valves.
- 3(c). LPG vessel and cylinder location, safety and sizing (inc. storage vessels and connections).
4. Ventilation.
- 5a. Installation of service pipework
- 5b. Re connection and alteration of existing installation pipework
6. Strength Testing
- 6(a). Tightness testing and purging Installation Pipework in accordance to IGEM/UP/1B
- 6(b). Tightness testing and Purging Service Pipework procedure for Volumes $\leq 0.035\text{m}^3$ operating at 37mbar
- 6(c). Tightness Test Existing MP Service pipework Volumes $> 0.035\text{m}^3$
- 6(d). Purging Volumes $> 0.035\text{m}^3$
8. Unsafe situations, use of emergency notices and warning labels.
12. Chimney Standards.
15. Re-establish existing gas supply and relight appliances/plant.

CBs may adopt Competence and Criteria numbering different to that used in this document.

CB documentation may adopt wording for criteria different to that used in this document, provided the meaning is unaffected.

Range

All IP and LP LPG installations for PDs, RPHs, LAVs and small non-domestic premises.

Scope

All work within the scope of the relevant normative documents listed in TB 000 and where the total volume of the meter $\leq 6 \text{ m}^3/\text{h}$ (where fitted).

Holders of this assessment will not be able to use it as a Core Gas Safety assessment to access appliance or equipment assessments without additionally taking the appropriate Core Gas Safety assessment(s).

Note. EFJLP1 is required for joining PE pipe other than a single transition mechanical fitting as per VESLP1

Pre-requisites**Initial**

In accordance with the requirements of ACS Entry Routes & Changeover Requirements (Guidance Note 8)

Re-assessment

CCLP1 EPC

References and Normative Documents

MIs.

All relevant documents as listed in the Legislative, Normative & Informative Document List (LNIDL), inc.:

- HSL56
- IGEM/G/11 / GIUSP.
- IGEM/UP/17
- IGEM/UP/1b
- BS 7967
- BS 6891
- LGUK CoP 22
- LGUK CoP 25
- LGUK CoP 1 & 2
- TB118
- BS 6400-3
- IGEM/G/5
- **LGUK COP33**

~~ACS.SMB.003.ACRND identifies Normative Documents that should be held by ACs.~~

Abbreviations

AC. Assessment Centre

CB. Certification Body

CSST. Corrugated stainless steel tube

DSEAR. Dangerous Substances and Explosive Atmospheres Regulations

ECV. Emergency control valve

I. Initial

IP. Intermediate pressure

LP. Low pressure

MP Medium Pressure

MIs. Manufacturer's/manufacturers' instructions

OP. Operating pressure

OPSO. Over pressure safety cut-off

Ref. Reference

UPSO. Under pressure safety cut-off.

VP Vapour Pressure

1. Gas safety legislation and Standards

KNOWLEDGE AND UNDERSTANDING		REF	I	R
1.	HS(L)56:			
(i)	Reg.2 General interpretation and application 2(1) to (5)		✓	
(ii)	Reg.3 Qualification and supervision 3(1),(2),(3),& (6)		✓	
(iii)	Reg.4 Duty on employer		✓	
(iv)	Reg.5 Materials and workmanship 5(1) to (3)		✓	
(v)	Reg.6 General safety precautions 6(1) to (9)		✓	
(vi)	Reg.7 Protection against damage 7(1) to (3)		✓	
(vii)	Reg.8 Existing gas fittings 8(1) to (3)		✓	
(viii)				

2. Gas emergency actions and procedures

KNOWLEDGE AND UNDERSTANDING	REF	I	R
Priorities of actions and responsibilities			
1. dealing with gas leakage with fire; safety/fire precautions for vessels		✓	
2. dealing with gas leakage without fire:			
(i) specific gravity and its effect in relation to air e.g. search techniques		✓	
(ii) preventing/reducing dangerous gas concentrations gas in atmosphere and at low level		✓	
(iii) stopping a gas escape downstream of an ECV		✓	
(iv) action if gas continues to escape after turning off supply		✓	
3. advice to occupants		✓	
4. hazardous ignition sources and their elimination		✓	
5. HSL56: Reg.37 Escape of gas 37(1) to (4)		✓	

3. Products and characteristics of combustion

PERFORMANCE CRITERIA	REF	I	R
1. visually inspect flame pictures of burners to identify those indicating:			
(i) complete combustion		✓	✓
(ii) incomplete combustion		✓	✓
2. identify incomplete combustion:			
(i) around appliance location		✓	✓
(ii) in appliance		✓	
3. CO detectors and indicators:			
(i) identification of detectors and indicators		✓	✓
(ii) installation – locations		✓	✓
(iii) commissioning and maintenance of detectors (audible, readable, visual)		✓	
KNOWLEDGE AND UNDERSTANDING	REF	I	R
1. main constituents of complete and incomplete combustion		✓	
2. air requirements for complete combustion		✓	
3. causes of appliance incomplete combustion at:			
(i) burner		✓	
(ii) combustion space		✓	
(iii) heat exchanger		✓	
(iv) flue		✓	
4. symptoms of CO poisoning		✓	✓
5. advice to give to a person who describes symptoms of being affected by products of combustion or when indicator/detector has activated		✓	✓
6. other sources of CO and CO ₂ in dwellings		✓	✓
7. ambient levels of CO in atmosphere		✓	✓
8. levels of CO within dwellings and effect on electronic detectors		✓	✓
9. causes of activation of CO detectors and indicators		✓	✓
10. ambient levels of CO ₂ in atmosphere		✓	✓
11. critical levels of CO ₂ that could cause vitiation affecting combustion process		✓	✓
12. movement of products of combustion within properties and its effects		✓	✓
13. advice to be given when a CO detector has activated		✓	✓
14.			
15. manufacturing standards for electronic CO detectors (alarms)		✓	
16. identifying unsafe situation of combustion products that could enter a premise.		✓	

3(a). Characteristics of LPG

KNOWLEDGE AND UNDERSTANDING		REF	I	R
1.	types of commercial LPG (propane, butane)		✓	
2.	storage pressures for propane and its relation to temperature		✓	✓
3.	relative density of vapour and its effect in relation to air		✓	✓
4.	vaporisation of liquid and off-takes - effects of temperature		✓	✓
5.	limits (range) of flammability		✓	✓
6.	calorific value		✓	

3(b). Supply pressures inc. install/ replace and commission prefabricated meters, operation and positioning of emergency isolation, flow controls and valves

PERFORMANCE CRITERIA		REF	I	R
1.	LPG regulators:			
(i)	turn off all appliances		✓	✓
(ii)	turn off gas supply		✓	✓
(iii)	zero pressure gauge and connect to appliance test point/outlet of final stage regulator		✓	✓
(iv)	observe OP of regulator at meter outlet as between 32 mbar and 42 mbar for flow between 6 m ³ /h and 0.5 m ³ /h and record all pressures, inc. lock-up pressure		✓	✓
(v)	turn on all remaining appliances and light all burners to provide max. anticipated load		✓	✓
(vi)	read OP and record. Dependant on regulator used, allow no more than 2.5 mbar loss		✓	✓
(vii)	remove gauge; re-seal test point and test for gas tightness		✓	✓
2.	check burner pressure at all other appliances to MIs		✓	✓
3.	check UPSO is working to MIs		✓	✓
4.	check OPSO is installed & sealed with manufacturers mark		✓	✓
5.	Requirements for Pressure Regulators, Automatic Shut off Controls and Safety Devices		✓	✓
6.	confirm MP and LP final stage regulators and check regulator has been appropriately set & sealed with manufacturers mark		✓	✓
7.	prefabricated meter box housings, suitable locations and vent pipe requirements		✓	✓
8.	remove plug / cap from ECV, turn off gas supply, check ECV operates correctly and install prefabricated meter		✓	✓
9.	commission meter		✓	✓
KNOWLEDGE AND UNDERSTANDING		REF	I	R
1.	recognition of supply pressures from gas storage vessels:			
(i)	VP stage		✓	✓
(ii)	MP stage		✓	✓
(iii)	LP stage		✓	✓
2.	operation and positioning of gas storage vessel fittings:			
(i)	pressure relief valve,		✓	✓
(ii)	vapour service shut off valve,		✓	✓
3.	recognition of supply LP and IP pressures in multi-story buildings		✓	
4.	types and sizing of gas regulators		✓	
5.	operation and positioning of ECVs		✓	
6.	operation and positioning of automatic changeover valves		✓	
7.	operation and positioning of first and second stage regulators		✓	✓
7a	Automatic Shut off Controls and Safety devices		✓	✓
7b	Service pipework downstream & subject to 1 ST stage pressure		✓	✓
7c	Under pressure protection		✓	✓
7d	Identify reasons for nuisance shut off of OPSO		✓	✓
8.	identifying causes of over-pressure conditions		✓	
9.	operation, positioning and visible indicators (where applicable) of OPSOs		✓	✓
10.	procedures when OPSO has operated		✓	✓

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11.	identification of causes of under-pressure conditions		✓	
12.	operation, positioning and visible indicators of UPSOs		✓	✓
13.	re-setting UPSOs		✓	✓
14.	operation and positioning of limited relief valve		✓	✓
15.	advice to consumer on re-setting UPSO		✓	
16.	over-pressure protection		✓	✓
17.	min. and max. acceptable outlet pressures for new installations outlet pressures for BS EN 12864, BS EN 13785 & BS EN 16129 regulators as listed in BS 6891 BS EN 12864, BS EN 13785 have been withdrawn		✓	✓
18.	lock-up pressure parameters for regulators BS EN 12864, BS EN 13785 & BS EN 16129 regulators BS EN 12864, BS EN 13785 have been withdrawn please see TB 080		✓	✓
19.	installation and maintenance for twin and parallel first stage regulators		✓	
20.	identify situation when UPSO/OPSO valve commissioning is needed		✓	
21.	HSL56:			
(i)	Reg. 9 Emergency Controls 9 (1) to (5)		✓	
(ii)	Reg. 14 Regulators 14(1) to (7)		✓	
22.	max. and preferred pressures for LPG Networks and service pipework		✓	✓
23.	design of pressure regulating installations		✓	✓
24.	regulators: over-pressure and under-pressure protection on LPG networks		✓	✓
25.	where LPG meter must not be located or sited		✓	✓
26.	Meter Notices and labels		✓	✓

3(c). Vessel and cylinder location, safety and sizing (inc. storage vessels and connections)

KNOWLEDGE AND UNDERSTANDING		REF	I	R
1.	types		✓	
2.	sizes		✓	
3.	marking of common vessels commercially available for single supply		✓	
4.	recommended off-take to match appliance demand		✓	
5.	safety and security for single/multiple supplies gas storage vessels and controls		✓	
6.	installation of vessels		✓	
7.	vessel location		✓	
8.	areas where vessels are not to be located		✓	
9.	vessel protection		✓	
10.	general construction of vessels		✓	
11.	general requirements of DSEAR		✓	
12.	accessibility and layout of vessels		✓	
13.	record keeping		✓	
14	safety requirements, sizing of cylinders:			
(i)	sizes and marking of common Propane and Butane cylinders commercially available and recommended off-takes to match appliance demand	LGUK COP33 Section 5.3	✓	✓
(ii)	linking cylinders through manifolds	LGUK COP33 Section 5	✓	✓
(iii)	areas where cylinders are not to be located	LGUK COP33 Section 3	✓	✓
15	Maintenance of Regulators and Changeover devices	LGUK COP33 Section 8.1	✓	✓

4. Ventilation

PERFORMANCE CRITERIA		REF	I	R
1.	calculate free area of a selection of air bricks (inc. terracotta types) and air vents		✓	
2.	identify correct and incorrect types of air vents and grilles e.g. fly screens		✓	
3.	identify installation of inadequate ventilation in both domestic and non-domestic situations for net heat inputs ≤ 70 kW		✓	✓
4.	recognise suitable overhead canopy extraction		✓	✓
KNOWLEDGE AND UNDERSTANDING		REF	I	R
1. ventilation for permanent dwellings (domestic):				
(i)	purpose of ventilation		✓	
(ii)	siting of ventilation (wall, window, floor, ceiling and ducted) direct to outside air, series air vents		✓	
(iii)	restrictions to ventilator/grille locations		✓	
(iv)	adventitious air supplies		✓	
(v)	calculating ventilation for flueless appliances inc.,. cooking; water heating; space heating		✓	
(vi)	ventilation location for single and multiple DFE space heater installations (inc. flued and flueless)		✓	
(vii)	additional ventilation e.g. extractor fans, cooker hoods, driers etc.		✓	
(viii)	calculating ventilation for combustion of domestic open flue appliances (≤ 70 kW)		✓	
(ix)	calculating ventilation for compartments (domestic, open, balanced and flued appliances of heat input ≤ 70 kW)		✓	
(x)	calculating ventilation for multi-appliance installations (multiple open flue and flueless appliances within same room/space)		✓	
(xi)	effects of oil or solid fuel appliances on ventilation for DFEs		✓	
(xii)	effects of double glazing, cavity insulation draught proofing on ventilation provision		✓	
(xiii)	identification and installation of intumescent air vents		✓	
(xiiii)	operation of passive stack ventilation		✓	
(xv)	ventilation for internal kitchens		✓	✓
(xvi)	installation of appliances in cellars		✓	
2. ventilation for non-domestic premises:				
(i)	calculating ventilation at high and low level direct to outside air for open flue appliances of net heat input > 70 kW but ≤ 1.8 MW in plant rooms/open space		✓	
(ii)	calculating ventilation at high and low level direct to outside air for open flue appliances in enclosures		✓	
(iii)	restrictions to ventilator/grille locations for heating appliances		✓	
(iv)	safety interlocks between ventilation fans and gas appliances		✓	
(v)	calculating mechanical ventilation for heating appliances		✓	
(vi)	calculating individual ventilation for laundry application		✓	
(vii)	calculating multi-equipment ventilation for laundry applications		✓	
3. HSE - ventilation of kitchens in catering establishments:				
(i)	replacement air		✓	
(ii)	canopy performance		✓	
4. ventilation for LAVs:				
(i)	determine ventilation for LAV's		✓	
(ii)	drop holes		✓	

5a. Installation of Service pipework and fittings in accordance to LGUK CoP22

PERFORMANCE CRITERIA	REF	I	R
External pipework			
1. PE pipe - compression jointing:			
(i) cut PE pipe squarely and de-burr using appropriate tools		✓	✓
(ii) position tube liner within pipe		✓	✓
(iii) position anti-shear sleeve (of correct length) in relation to joint		✓	✓
(iv) assemble compression transitional fitting and tighten joint		✓	✓
(v) check work carried out is gas tight		✓	✓
2 position approved squeeze-off tool and operate on PE pipe		✓	✓
3 make suitable sealed end		✓	✓
3a check work carried out is gas tight		✓	✓
4. select correct material for protecting PE pipe above ground		✓	✓
5. use correct fittings and sealant for making threaded joints		✓	✓
6. join threaded pipe using appropriate fittings, methods and agents		✓	✓
6a (check work carried out is gas tight)		✓	✓
10. replace HP VP hose		✓	
10a check work carried out is gas tight		✓	
12. use of temporary continuity bond correctly		✓	
14. purge pipework of air Apply any protective coating (OQ)		✓	
15. identify external service pipework safety defects		✓	✓
KNOWLEDGE AND UNDERSTANDING	REF	I	R
1. types of copper, galvanized steel and PE pipe and fittings for use above and below ground (Liquid Gas UK COP 22 - Class of pipe for LPG services)		✓	
1a Identification of VP, MP and LP Pipework phases		✓	✓
2. Pipe design and the precautions when installing underground pipework. Routing; bending; adjacent services (Fig 1); building connections; sleeving requirements; depth of cover (Table 1) ; marking & Indication ; records :		✓	✓
2a dealing with existing buried pipework		✓	✓
2b pipework extensions		✓	✓
2c pipe laid in open trenches		✓	✓
2d pipes traversing water or above ground crossing		✓	✓
4. using manifolds to link gas storage vessels up to and including IP		✓	
5. jointing and cleaning agents for copper and galvanised steel pipework		✓	
6. pipe supports, clips and fixing for copper and galvanised steel pipework		✓	
7. sleeving and sealing of pipework		✓	
8. external surface mounted installation pipework		✓	
9. restrictions on use of union, compression and capillary fittings		✓	
10. main equipotential bonding – positioning and min. cross sectional area		✓	
12. ducts purposely designed to contain gas pipes		✓	
16. locations where LPG pipework is not to be installed		✓	✓
17. pipe sizing – inc. theoretical exercise		✓	✓
18. Liquid Gas UK COP 1 Part 2. S3, 4, 5		✓	

19. Liquid Gas UK COP 22. Sections 4 5 & 6		✓	✓
4. Construction of Proprietary Pipework Assemblies		✓	✓
5. Special Requirements for Pipework installed below ground level (buried)		✓	✓
6. Hose and Hose Assemblies		✓	✓
19a use of anti-shear sleeves		✓	✓
19b PE pipe and fittings for non-domestic applications		✓	✓
19c supplying commissioning documentation to responsible person		✓	✓

5b Installation of pipework and fitting in the alteration of existing installation pipework.

Pipe sizes: copper/steel 6 mm to 35 mm, MDPE 32 mm in accordance to BS 6891 and IGEN/ UP/1b

PERFORMANCE CRITERIA	REF	I	R
1. join threaded pipe joints using appropriate fittings, methods and agents		✓	
2. join copper pipe using appropriate mechanical (compression) fittings, methods and agents		✓	
2a join copper pipe using appropriate compression fittings, methods and agents			
2b join copper tube using appropriate capillary end feed fittings, methods and agents		✓	✓
2c connect CSST using appropriate fittings methods and agents		✓	✓
2d fabricate LP hose using appropriate fittings & methods		✓	✓
3. re- connect Internal Installation pipework-using appropriate threaded fittings, clips, and sealing agents		✓	✓
4. use of temporary continuity bond		✓	
5. ensure work carried out is gas tight		✓	✓
6. Purge procedure cross referenced to cc6a			
7. identify installation pipework safety defects		✓	✓
KNOWLEDGE AND UNDERSTANDING	REF	I	R
1. copper pipe and fittings; standards, suitability and use		✓	
1a correct thread sealant for making joints i.e. VP, MP and LP range of pressures		✓	✓

2.	flexible hoses (e.g. colour band on cooker hose) and rigid connections standards, suitability and use		✓	
3.	Installation of flexible hoses, tubing, assemblies and their connections:		✓	✓
i	Standards		✓	✓
ii	Length		✓	✓
iii	Condition		✓	✓
iv	Service life		✓	✓
4.	Press end connections jointing requirements		✓	✓
5.	pipe sizing – inc. theoretical exercise		✓	✓
6.	jointing and cleaning agents for copper and galvanised pipework		✓	
7.	pipe supports, clips and fixing for copper, stainless and galvanised steel pipework		✓	
8.	sleeving and sealing of Installation pipework		✓	✓
9.	precautions and protection when installing pipework		✓	✓
10.	external surface mounted installation pipework		✓	✓
11.	precautions when using naked flames on pipework previously containing LPG		✓	✓
12.	siting and installation for gas controls and isolation valves		✓	✓
13.	making and breaking gas connections on appliances		✓	✓
14.	ducts purposely designed to contain gas pipes		✓	✓
15.	HSL56:			
(i)	Reg.10 Equipotential bonding		✓	
(ii)	Reg.18 Safe use of pipes 18 (1) and (2)		✓	
(iii)	Reg.19 Enclosed pipes 19 (1) to (6)		✓	
(iv)	Reg.20 Protection of buildings		✓	
(v)	Reg.22 Testing and purging of pipes 22 (1) to (3)		✓	
16	MP and LP meter locations which do not comply with BS 6400-3		✓	✓
17.	location and sizing vent pipes on MP meter installations		✓	✓
18.	gas meters supplying mobile dwellings and boats		✓	✓
19.	where a number of primary meters serving multi-occupancy buildings are grouped together		✓	✓
20.	fire stopping in buildings containing flats or maisonettes		✓	✓
21.	pipework inside a protected shaft		✓	✓
22.	ventilation for pipework and protected shafts		✓	✓
23.	notices and labelling fitted to meter installations in meter housings and multi-story buildings		✓	✓
25.	purpose and suitability to using a non-contact voltage tester		✓	✓
26.	The protection of stainless-steel semi rigid pipe from corrosive products i.e. meter connections from flux		✓	✓
27.	Restrictions for making and sealing holes into meter boxes		✓	✓

6 Strength Testing

New Metallic or PE service pipework Operating Pressure of 75mbar (propane)
with air or inert gas in accordance to LGUK CoP22

PERFORMANCE CRITERIA	REF	I	R
1 (i) close ECV at point of entry to dwelling		✓	✓
(ii) isolate LPG supply side; plug or cap open ends		✓	✓
(iii) assemble and zero a suitable pressure gauge (or bourdon gauge) and connect to pipework via inline testing tee		✓	✓
(iv) raise pressure to Strength Test Pressure ($\leq 100\text{mbar} = 0.35\text{bar}$)		✓	✓
(v) allow 5 minutes stabilisation and record gauge reading		✓	✓
(vi) Strength test pipework (STD) for a further ± 5 minutes		✓	✓
(vii) observe reading. Ensure pressure drop is within allowance		✓	✓
(viii) if pressure has fallen more than allowance, test each joint with LDF to locate leakage		✓	✓
(ix) strength test: new service pipework (PAWS) (MOP > 100 mbar \leq 2 bar air or inert gas) Metallic pipework			

6a. Tightness testing

Installation pipework for PD; RPH; LAV and small non-domestic premises.
Total IV $\leq 0.035 \text{ m}^3$. OP $\leq 37 \text{ mbar}$ in accordance to IGEM/UP/1b
Up to 1¼ (steel) and/or 35 mm (copper)

PERFORMANCE CRITERIA	REF	I	R
1. Testing new and existing installations with gas:			
(i) visually inspect the installation to ensure all sections to be tested are connected, all joints are correctly made and no open ends.		✓	✓
(ii) check appliances burner control taps are turned off, ensure AIVs are open and cooker fold down lids are raised to ensure the SSOV is open		✓	✓
(iii) turn off the gas installation at the appropriate valve		✓	✓
(iv) connect the pressure gauge to a suitable pressure test point on the outlet of the supply control valve and the final regulator		✓	✓
(v) carry out a let-by test of the closed supply control valve:			
<ul style="list-style-type: none"> adjust the pressure to between 7 and 10 mbar OQ related to MOP > 75mbar, ensure the regulator on the inlet side of MIV is activated. 		✓	✓
<ul style="list-style-type: none"> reset any UPSO to release upstream pressure and readjust if the pressure exceeds 10 mbar 		✓	✓
<ul style="list-style-type: none"> close the supply control valve where necessary, note the gauge reading 		✓	✓
(vi) check for any perceptible movement (rise) of the gauge reading over the next 1-minute period (if UPSO fitted operate at the end of the 1-minute period)		✓	✓
(vii) if pressure rise is observed, check valve by disconnecting its outlet union and applying LDF to valve barrel		✓	✓
(viii) (OQ if valve does not let by practically)			

(ix)	on satisfactory completion of let-by test slowly raise the pressure in the installation to the appropriate tightness test pressure indicated in Table 4 (IGEM/UP/1B Edition 3)		✓	✓
(x)	close the supply control valve		✓	✓
(xi)	allow 1-minute stabilisation; if necessary, re-adjust pressure to the tightness test pressure - do not proceed until a stable reading has been achieved		✓	✓
(xii)	check for no perceptible movement (fall) of the gauge over the next 2-minute period		✓	✓
(xiii)	if an installation fails test, trace and repair escape and re-test installation (OQ)		✓	✓
(xiv)	if tightness test is successful, remove pressure gauge and re-seal test point		✓	✓
(xv)	when connected to gas test pressure test point; ECV/AECV outlet connection; regulator connections and, where appropriate, MIV connections with LDF		✓	✓
(xvi)	purge installation		✓	✓
(xvii)	record test results		✓	✓
2.	Locate and repair a gas escape		✓	✓
KNOWLEDGE & UNDERSTANDING		REF	I	R
1.	Selection and reading of pressure gauges		✓	✓
2.	Locating escapes		✓	✓
3.	Actions for dealing with valves letting by		✓	✓
3a.	Effects of flexible connections used to connect cylinders on let-by tests		✓	✓
4.	Use of electronic pressure gauge (calibration requirements)		✓	✓
5.	Air test pressure requirements for butane/propane installations		✓	✓
6.	Installation test pressures for propane/butane		✓	✓
7.	Permissible pressure drops for existing LPG installations with appliances IGEM/UP/1B Edition 3 (Appendix 8)		✓	✓
8.	Actions to be taken where a cylinder valve is found to be faulty		✓	✓
9.	Actions to take ensure lock up does not affect the tightness test		✓	✓
10.	Additional requirements for re-testing installations that may contain air or a gas/air mixture following an initial test		✓	✓

6b Carry out tightness test procedure for New LP Service pipework with air (Test B) Volumes > 0.035m³ operating at 37mbar in accordance to LGUK CoP22

PERFORMANCE CRITERIA				
(i)	OQ related to Strength Testing connect inline test tee and attach appropriate pressure gauge		✓	✓
(ii)	Introduce air into system until regulator locks up and UPSO activated.		✓	✓
(iii)	isolate pressure source and reduce pressure to tightness pressure		✓	✓
(iv)	stabilization as per calculation		✓	✓
(v)	note reading on gauge		✓	✓
(vi)	Test for TTD		✓	✓
(vi)	note reading; if there is no discernable pressure drop, i.e. < GRM the installation is sound		✓	✓
(vii)	if a drop is discernable, eliminate leak and repeat test		✓	✓
(viii)	complete a Let by test (Test A)		✓	✓
(ix)	remove test tee; turn on tank outlet valve and test all joints with LDF or suitable gas detector		✓	✓

6 c Tightness Testing Existing MP pipework with LPG Volumes > 0.035m³
in accordance to LGUK CoP22

PERFORMANCE CRITERIA				
(i)	Close Downstream valve		✓	✓
(ii)	connect an inline test tee and attach an appropriate gauge		✓	✓
(iii)	open tank outlet valve to charge service pipework to lock-up pressure		✓	✓
(iv)	close tank outlet valve and reduce pressure to that given in relevant table		✓	✓
(v)	Allow for stabilization period and record pressure		✓	✓
(vi)	Test for TTD minutes drop shall be less than GRM		✓	✓
(vii)	note reading; if there is no discernable pressure drop and no smell of gas, installation is sound		✓	✓
(vii)	if a drop is discernable, re-pressurise system and test all visible joints with LDF. Eliminate leak and repeat test until passes		✓	✓
(viii)	complete a Let by test (Test A)		✓	✓
(ixi)	remove test tee; turn on tank outlet valve and test all joints in short VP section upstream of first stage regulator and other joints made after tightness test, with LDF or suitable gas detector		✓	✓

6d Purging in accordance to LGUK CoP22

PERFORMANCE CRITERIA			
1 Prepare for direct purge			
a/	obtain evidence of a tightness test on pipework system	✓	✓
b/	obtain an accurate plan and description of pipework system	✓	✓
c/	select purge points at extremities of pipework sections to be purged	✓	✓
d/	carry out procedures to ensure purge gas will not enter Installation pipework	✓	✓
e/	ensure appropriate warning notices and labels are available	✓	✓
f/	ensure appropriate and sufficient fire extinguishers are situated near vent points	✓	✓
g/	take in account specific requirements when purging LPG (OQ)	✓	✓
h/	ensure purge points, hoses, vent stacks and flame arresters are correctly sized to permit sufficient flow to maintain required purge rate/velocity	✓	✓
i/	check location of vent/flare outlet in open air	✓	✓
j/	select suitably sized in-line flow meter and an intrinsically safe gas detector and check they are available for purge	✓	✓
k/	identify and select any purge gas cylinders/ equipment required for purge	✓	✓
2 Purge parameters			
a/	determine the purge volume of pipe and fitting	✓	✓
b/	calculate the purge volume of pipework section + purge hose/vent pipe	✓	✓
c/	determine min. purge velocity	✓	✓
d/	calculate maximum purge time	✓	✓
e/	use a correct methodology for vent gas testing	✓	✓
3 Complete a Direct Purge Air or Nitrogen to Gas			
a/	open all purge points and connect vent stacks with selected method for measuring flow of purge gas	✓	✓
b/	open purge section isolation valve to admit gas	✓	✓
c/	start timing of purge	✓	✓
d/	start sampling of concentration of fuel gas within vent gas using a suitable gas detector at half estimated purge time	✓	✓
e/	close vent/flare stack valve when pre-determined level of fuel gas is reached	✓	✓
f/	record in-line flow meter reading	✓	✓
g/	explain procedure when concentrations are not achieved within purge time	✓	✓
h/	remove all purge equipment, plug open ends and test disturbed joints with LDF or gas detector	✓	✓
I /	complete appropriate purging certificate		
4 Direct Purging of LPG to Air			
a/	carry out all preparation work	✓	✓
b/	Calculate purge volume , flow rate & purge time.	✓	✓
c/	Isolate gas supply & carryout let by test	✓	✓
d/	open purge points and vent point valves	✓	✓
e/	admit purge air at correct flow rate	✓	✓
f/	monitor flow pressure	✓	✓
g/	sample purge point after 50% of calculated purge time has elapsed	✓	✓
h/	after purge time has elapsed and a satisfactory vent gas test has been achieved close vent points. OQ if a satisfactory purge is not achieved.	✓	✓
i/	remove purge hose and vent stack	✓	✓
5 The recording of pressure & tests results		✓	✓
KNOWLEDGE AND UNDERSTANDING		REF	I R

1.	types of copper, galvanised steel and PE pipe and fittings for above and below ground suitability		✓	
1a	Identification of 3 Vapour Pipework phases?		✓	✓
1b	correct thread sealant for making joints i.e. range of pressures		✓	✓
2.	pipe sizing - including theoretical exercise (excludes network)		✓	
2a	Dealing with existing metallic buried pipework		✓	✓
2b	precautions for pipework crossing water courses.		✓	✓
2c	precautions for pipework crossing above ground.		✓	✓
3.	Pipe work design, precautions when installing underground pipework, routing, bending, adjacent services, Jointing, building connections, sleeving, depth of cover, marking and recording		✓	
4.	use of anti-shear sleeves		✓	
5.	precautions for, and using squeeze-off equipment on PE pipework		✓	✓
9.	PE pipe and fittings for non-domestic applications		✓	✓
10.	recognition of suitable PE fusion welds		✓	✓
12.	general requirements for Pneumatic tightness testing (Test B)		✓	✓
13.	combining a Strength and Tightness Test		✓	✓
14.	GRM & TTD		✓	✓
15.	TTD Calculation factors for new and existing Installations.		✓	✓
16.	calculate TTD for an installation where it is acceptable to use a water gauge.		✓	✓
17.	test equipment requirement where the GRM is 30 mins but a TTD of 90mins is required.		✓	✓
18.	Identify when a let by test is required		✓	✓
19.	Resetting of a UPSO valve during testing		✓	✓
20.	Appropriate purging methods, Direct and Indirect <ul style="list-style-type: none"> • Air – Nitrogen • Air - LPG • LPG – Air • LPG -Nitrogen 		✓	✓
21.	planning, procedures and site precautions for carrying out a purge		✓	✓
22.	Identify Purge equipment requirements <ul style="list-style-type: none"> • Valves, • purge points, • purge mediums or equipment i.e. fans or Nitrogen • vent gas testing apparatus • purge hoses & Vent Stack nominal bore • flame stacks and arrestors 		✓	✓
23.	Minimum flare stack requirements & separation distance		✓	✓
24.	vent gas testing and relationship to Purge Time (PT)		✓	✓
25.	acceptable % concentration of vent gas testing and measuring devices		✓	✓
26.	option & procedure to follow if a direct purge is not completed i.e. purge velocity not achieved		✓	✓
27.	planning , supervision & site precautions & information required for purging		✓	✓
28.	Test pressure (using propane) for existing pipework operating at Nominal working pressure		✓	✓
29.	procedure where tightness test is not completed immediately after the strength test (PE pipe pressure exceeds 350mbar)		✓	✓
30.	example calculate TTD for a Nitrogen Test on an existing Installation including fittings: pipework IV = 0.25m3 but fittings unknown		✓	✓

31.	volume of Nitrogen required to complete a purge		✓	✓
32.	test procedure used to cover operating pressure above 4 bar		✓	✓
33.	General need for continuity of supplies		✓	✓
34.	Twin stream systems		✓	✓
35.	Active monitoring systems		✓	✓
36.	Testing and service requirements		✓	✓

8. Unsafe situations, use of emergency notices and warning labels

PERFORMANCE CRITERIA		REF	I	R
1.	identify unsafe situations		✓	✓
2.	classify unsafe situations as ID & AR		✓	✓
3.	label unsafe appliance(s)/installation (s) appropriately		✓	✓
KNOWLEDGE AND UNDERSTANDING		REF	I	R
1.	explain dealing with ID installations/appliances		✓	✓
2.	explain dealing with AR installations/appliances		✓	✓
2a	explain dealing with AR installations/appliances when turning off does not remove the risk		✓	✓
3	explain dealing with situations that do not meet current standards but are not unsafe		✓	✓
4.				
5.				
6.	identify correct notices and labels to be used :			
(i)	MP gas supply		✓	
(ii)	warning notice forms		✓	✓
(iii)	advisory notices – appliance use, appliance shut off work in progress, electrical bonding, landlords' records		✓	✓
7.	Situations reportable under RIDDOR explain reporting to HSE		✓	✓
8.	HSL56: Reg. 34 Use of appliances 34 (1) to (3)		✓	
9.	GIUSP			
(i)				
(ii)	scope		✓	✓
(iii)	gas incidents		✓	
(iv)	non-domestic installations		✓	

12. Chimney Standards

KNOWLEDGE AND UNDERSTANDING		REF	I	R
1.	where solid fuel chimneys can be visually inspected without removal of an appliance:			
(i)	operation of dampers and restrictor plates		✓	✓
(ii)	suitable and unsuitable terminals for space heaters inc. radiant, inset and DFE		✓	✓
2.	open flue/chimney configurations:			
(i)	construction and operation of an open flue/chimney		✓	
(ii)	types of open flue/chimney material - cement based, metallic		✓	
(iii)	methods of jointing open flue pipe /chimney components		✓	
(iv)	termination positions for chimney outlets		✓	
(v)	ridge terminal positions		✓	
(vi)	restrictions on use of bends on open flues/chimneys		✓	

(vii)	sealed compartments for open flue appliances		✓	
(viii)	fan assisted open flues		✓	
3.	condensing flues: plume management kits			
4.	pre-cast flue systems:			
(i)	termination procedures for pre-cast flues		✓	
(ii)	flueing through loft spaces		✓	
5.	room sealed natural draught and fanned draught chimney configurations for appliances			
(i)	restrictions for chimney outlet positions inc. horizontal and vertical configurations		✓	✓
(ii)	restrictions on lengths, bends etc, for fanned balanced flues		✓	
(iii)	visual inspection of enclosing chimneys		✓	
(iv)	proximity of flue duct outlets to boundaries		✓	
(v)	identify unsafe situation: A room sealed flue system installed within an enclosure without means of an inspection facility		✓	✓
5a	room sealed appliances for shared chimneys (SE-ducts, U-ducts and Communal Flue Systems (CFS):			
(i)	Recognising types of shared flue systems and operation of SE-ducts, U-ducts and CFS Natural Ventilated (NV), CFS Exhaust Only (EO), CFS Positive Pressure (PP)		✓	✓
(ii)	identify unsafe situation of room sealed fanned flue system on CFS		✓	✓
6.	non-domestic heating appliance flueing:			
(i)	terminal types and positions for open/natural draught flues/chimneys		✓	✓
(ii)	fan diluted flues dilution/air intakes/discharge points		✓	✓
(iii)	flueing for balanced compartments		✓	✓
(iv)	common flue/ chimney requirements –suitable materials for large chimneys		✓	✓
(v)	flue dampers and stabilisers		✓	✓
7.	non-domestic catering flueing:			
(i)	Identify correct and incorrect systems for equipment (Type A & B appliances)		✓	✓
8.	non-domestic laundry exhaust duct:			
(i)	identify criteria to calculate individual exhaust duct requirements		✓	
(ii)	siting of exhaust ducts and preferred termination procedures		✓	✓
9.	flueing standards for LAVs			
(i)	termination positions for open flues		✓	
(ii)	restrictions for balanced flue termination positions		✓	✓
10.	HSL56:			
(i)	Reg.27 Flues (1) to (4)		✓	
(ii)	Reg.30 Room-sealed appliances (1) to (3)		✓	
(iii)	Reg.32 Flue dampers (2) and (3)		✓	

15. Re-establish existing gas supply and relight appliances/plant

PERFORMANCE CRITERIA		REF	I	R
1.	check installation is gas tight		✓	✓
2.	re-establish gas supply		✓	✓
3.	check appliance(s) visually and re-light inc.:			
(i)	purge system and appliances of air		✓	✓
(ii)	re-light appliance(s)		✓	✓
(iii)	confirm satisfactory operation of user controls		✓	✓
(iv)	inspect appliance installation(s) visually for unsafe situations		✓	✓
KNOWLEDGE AND UNDERSTANDING		REF	I	R
1.	describe action when an un-commissioned appliance is identified		✓	✓
2.	confirm actions if pipework and appliance(s) are not tested (commissioned) when gas supply is re-established		✓	✓
3.	HSL56: Reg.33 Testing of appliances 33(1) to (3)		✓	✓
4.	Actions required where fumes, smells or spillage have been reported/encountered		✓	✓
5.	recognise correct gas cooker hose for use in multi - occupancy premises		✓	✓

