Strategic Management Board

ACS.CoNGLP1
SAFETY ASSESSMENT CRITERIA
INITIAL & RE-ASSESSMENT
DOMESTIC NATURAL GAS TO LPG
GENERIC

CoNGLP1	INITIAL & RE-ASSESSMENT

Range

All LPG fittings.

Comprises:

2. Gas emergency actions and procedures.
3(a). Characteristics of LPG.
3(b). Supply pressures – operation and positioning of emergency isolation, flow control and valves for cylinders.
3(c). LPG cylinder location, safety and sizing.
5. Installation of pipework and fittings.
6(a). Tightness testing and purging (LPG) (PD, LAV and RPH) (installation pipework).
6(b). Tightness testing and purging (LPG) (B).

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

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

Pre-requisites

Initial

CCN1 or
CESP1 or
CMA1 or
QCF or S/NVQ.
N.B. Candidates holding non-domestic Assessment only, e.g. COCN1, CCCN1 or CCLNG1, intending to work on LPG, are required to undertake an appropriate changeover assessment.

Re-assessment

CCN1 or
CoNGLP1/PD/RPH/LAV/B as appropriate.

Notes

Candidates holding CCN1 may undertake a changeover assessment covering one or more of the following sectors. Two or more sector assessments may be packaged to prevent dual assessment of common criteria:

- permanent dwellings (PD)
- residential park homes (RPH)
- leisure accommodation vehicles (LAV)
- boats, yachts and other vessels (B).

N.B. Candidates holding a NG core assessment intending to work on the Limited Scope LPG Sectors, External Pipework or Mobile Cabinet Heaters shall undertake the full core for each sector as appropriate.

NB. Candidates taking further assessments only in boats do not need to undertake the elements covering LPG meters and commissioning of OPSO/UPSO valves.

References and normative documents

MIs.
All relevant documents as listed in the Legislative, Normative & Informative Document List (LINDL), inc.:
IGEM/UP/1B Edition 3
• HSL56
• GIUSP.

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

Abbreviations

AC. Assessment Centre
AIV Appliance Isolation Valve
CB. Certification Body
HP. High pressure
I. Initial
LDF. Leak detection fluid
LP. Low pressure
MIs. Manufacturer's/manufacturers' instructions
MP. Medium pressure
OP. Operating pressure
OPSO. Over pressure safety cut-off
R. Re-assessment
Ref. Reference
UPSO. Under pressure safety cut-off.

2. Gas emergency actions and procedures

KNOWLEDGE AND UNDERSTANDING		REF	I	R
Priorities of actions and responsibilities:				
1.	action to deal with gas leakage with fire: safety/fire precautions with cylinders		√	
2.	**action to deal with gas leakage without fire:**			
(i)	specific gravity and its effect in relation to air e.g. search techniques		√	
(ii)	effective methods of preventing/reducing dangerous concentrations of gas in atmosphere and at low level		√	
3.	advice to occupants		√	
4.	**HSL56:** Reg.9 (5) Emergency controls		√	

3(a). Characteristics of LPG

KNOWLEDGE AND UNDERSTANDING		REF	I	R
1.	types of LPG (propane, butane)		√	
2.	storage pressures for both gas types in cylinders and vessels		√	
3.	specific gravity of LPG vapour and its effect in relation to air and Natural Gas		√	
4.	vaporisation of LPG liquid and off-take - effects of temperature		√	
5.	limits of flammability		√	
6.	calorific value of LPG and its relationship to Natural Gas		√	

3(b). LPG supply pressures -operation and positioning of emergency isolation, flow controls and valves for cylinders

PERFORMANCE CRITERIA		REF	I	R
1.	**LPG regulators:**			
(i)	turn all appliances off		√	√
(ii)	turn gas supply off		√	√
(iii)	zero pressure gauge and connect to an appropriate test point		√	√
(iv)	identify manufacture standard of second stage regulator; re-establish gas supply; observe and record lock up pressure (BS 3016 regulators 37-47 mbar propane/28-38 butane; EN 12864 and EN 13785 regulators 37-50 mbar propane/ 29-40 butane)		√	√
(v)	turn on a burner, light and observe OP and record (BS 3016 regulators 28 mbar ± 5 mbar butane/37 mbar ± 5 mbar propane; EN 12864 and EN 13785 regulators 29 mbar + 6/-9 mbar butane and 37 mbar + 8/-12 mbar propane and 30 mbar ± 5 mbar for road LAV)		√	√

(vi)	turn on all remaining appliances and light all burners to provide max. anticipated load		√	√
(vii)	read OP and record (28 mbar butane and 37 mbar propane; ±5 mbar and up to a further – 2·5 mbar for pressure loss). *For road LAV manufactured after Feb. 2003, operating pressure is 30 mbar both gases*		√	√
(viii)	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 working to MIs		√	√
KNOWLEDGE AND UNDERSTANDING		**REF**	**I**	**R**
1.	**recognition of supply pressures from gas storage cylinders:**			
(i)	HP stage		√	
(ii)	LP stage		√	
2.	**operation and positioning of gas storage cylinder fittings:**			
(i)	pressure relief valve		√	
(ii)	cylinder valve		√	
3.	types and sizing of gas regulators		√	
4.	operation and positioning of emergency isolation valves		√	
5.	operation and positioning of automatic changeover valves for cylinders		√	
6.	**HSL56:** Reg.14 Regulators 14 (2) to (7)		√	
7.	min. and max. outlet pressures for BS 3016, EN 12864 and EN 13785 regulators		√	√
8.	lock-up pressure for BS 3016, EN 12864 and EN 13785 regulators		√	√
9.	identification of causes of over pressure conditions		√	√
10.	operation, positioning and visible indicators (where applicable) of OPSO		√	√
11.	procedures when OPSO has operated		√	√
12.	over-pressure protection		√	√
13.	identify situation when UPSO/OPSO commissioning is required		√	√

3(c). Cylinder location, safety and sizing

KNOWLEDGE AND UNDERSTANDING		**REF**	**I**	**R**
1.	**safety requirements, sizing of cylinders:**			
(i)	sizes, marking of common Propane /Butane cylinders, recommended off-takes to match appliance demand		√	
(ii)	linking cylinders through manifolds		√	
(iii)	areas where cylinders and vessels shall not be located		√	
(iv)	safety and security for single supply gas storage vessels and controls (not boats)		√	√
2.	**HSL56:**			
(i)	Reg.6 General Safety Precautions 6 (8)		√	
(ii)	Reg.6 General Safety Precautions 6 (9)		√	

5. Installation of pipework and fittings. Range of pipe sizes: 6 mm to 28 mm

PERFORMANCE CRITERIA		**REF**	**I**	**R**
1.	join copper or stainless steel pipe using appropriate compression fittings, methods and agents		√	
2.	connect replacement HP hoses and fabricate LP hoses using appropriate clips, fittings and agents		√	√
2(a).	reconnect cylinder and remove temporary earth continuity bond			√
3.	check work carried out is gas tight (PC 6(a) and (b) maybe assessed now)		√	√
4.	purge pipework of air		√	√
KNOWLEDGE AND UNDERSTANDING		**REF**	**I**	**R**
1.	flexible hoses (e.g. colour band on cooker hose) and rigid connections standards suitability and use		√	
2.	HP and LP hoses and connections - identification of types, condition and date of manufacture		√	
3.	restrictions to length of hoses from regulator to LP nozzle and pigtails from cylinders to regulator /change over valves -procedures for replacing pigtails		√	
4.	pipe sizing to appliance requirements – inc. theoretical exercise		√	
5.	jointing and cleaning agents for copper pipework		√	
6.	precautions and protection when installing pipework		√	
7.	MP and LP meter locations which do not comply with BS 6400-3		√	√
8.	location and sizing for vent pipes on MP meter installations		√	√
9.	gas meters supplying mobile dwellings and boats		√	√
10.	where primary meters for a multi-occupancy building are grouped together		√	√
11.	notices fitted to meter installations and meter housings		√	√

6a. Tightness testing (PD, LAV and RPH). Total IV ≤ 0.035 m³. OP ≤ 37 mbar

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:			
	• adjust the pressure to between 7 and 10 mbar		√	√
	• reset any UPSO to release upstream pressure and re adjust if the pressure exceeds 10 mbar		√	√
	• 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 no perceptible movement is observed then the valve is not letting by			
(viii)	if pressure rise is observed, check valve by disconnecting its outlet union and applying LDF to valve barrel (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)	test pressure test point; ECV/AECV outlet connection; regulator connections and, where appropriate, MIV connections with LDF		√	√
(xvi)	purge installation		√	√
(xvii)	record test results		√	√
KNOWLEDGE & UNDERSTANDING		**REF**	**I**	**R**
1.	Correct 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		√	√

6(b). Testing for tightness for LPG installations in boats, yachts and other vessels

PERFORMANCE CRITERIA: As BS 5482 – 3: Annex C	REF	I	R	PERFORMANCE CRITERIA: EN ISO 10239	REF	I	R
1. **testing before appliances are connected (U gauge using air) – C.6**				1. **testing with appliances connected (using air) EN ISO 10239**			
(i) cap all open points except one to admit air using test tee		√	√	(i) test with air from gas regulator connection to closed burner valves at appliances		√	√
(ii) attach test tee to BS 5482 - 3		√	√	(ii) ensure shut off valve is open		√	√
(iii) assemble and attach gauge		√	√	(iii) connect suitable gauge		√	√
(iv) using air, raise pressure to 45 mbar; isolate source		√	√	(iv) introduce air into system to a pressure 3 times operating pressure (not more than 150 mbar)		√	√
(v) allow 5 minutes stabilisation		√	√	(v) allow 5 minutes for pressure equilibrium		√	√
(vi) note reading		√	√	(vi) observe gauge for a further 5 minutes		√	√
(vii) allow 2 minute test period		√	√	(vii) pressure should remain constant to ± 5 mbar		√	√
(viii) check reading		√	√	(viii) if pressure has fallen more than 5 mbar, check each joint with LDF and re-test		√	√
(ix) if pressure has fallen, check each joint with LDF and re-test		√	√				
2. **complete installation/let by test of cylinder main shut off valve:**							
(i) turn off all appliances and isolate LPG supply						√	√
(ii) connect a pressure gauge to test fitting, if present, or in line test tee						√	√
(iii) gradually turn on main shut-off valve until regulator reaches lock-up pressure; close main shut-off valve						√	√
(iv) light one appliance and note drop in pressure. When pressure falls to 5 mbar, close appliance tap and isolation valve						√	√
(v) allow 5 minute stabilisation, then record reading on gauge						√	√
(vi) allow a further 2 minutes, then re-record reading on gauge						√	√
(vii) if reading in (vi) is not higher than reading in (v), there is no let-by						√	√
3. **entire system (inc. appliances):**							
(i) turn off all appliances but leave on all appliance isolation valves; ensure any cooker fold down lids with SSOV are raised – isolate LPG supply						√	√
(ii) connect pressure gauge to test fitting, if present, or inline test tee						√	√
(iii) turn on main shut-off valve to lock up pressure; close valve, allow 5 minutes stabilisation						√	√
(iv) light an appliance; allow pressure to fall to 37 mbar (propane) or 28 mbar (butane)						√	√
(v) turn off appliance and leave for 2 minutes; record pressure on gauge						√	√
(vi)							
(vii) there should be no discernible pressure drop in system(pipework only) or within given values (with appliances connected and tested)						√	√
(viii) test joints made after tightness test with LDF						√	√
KNOWLEDGE AND UNDERSTANDING					**REF**	**I**	**R**
1. correct reading of pressure gauges						√	√
2. use of electronic pressure gauge (calibration)						√	√
3. locating escapes						√	√
4. dealing with valves letting by						√	√
5. determining permissible pressure loss as per BS 5482-3						√	√
6. tightness testing principles						√	√