



**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 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.

**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.
- **BS 6891**
- **TB080**

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
<b>Priorities of actions and responsibilities:</b>				
1.	action to deal with gas leakage with fire: safety/fire precautions with cylinders		√	
2.	<b>action to deal with gas leakage without fire:</b>			
(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.	<b>HSL56:</b> 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.	<b>LPG regulators:</b>			
(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 regulator; re-establish gas supply, observe and record lock up pressure is in accordance with BS 6891 or BE EN 1949 (LAV)	BS 6891: 2015 10.3b & Table 7	√	√
(v)	turn on and light sufficient burners and observe and record OP is in accordance with BS 6891 or BE EN 1949 (LAV)	BS 6891: 2015 10.3a & Table 7	√	√

(vi) Criteria removed			
<del>(vii) Criteria removed</del>			
(viii) remove gauge, re-seal test point and test for gas tightness		√	√
<del>2. Criteria removed</del>			
3. Criteria removed			
4. Criteria removed			
<b>KNOWLEDGE AND UNDERSTANDING</b>	<b>REF</b>	<b>I</b>	<b>R</b>
<b>1. recognition of supply pressures from gas storage cylinders:</b>			
(i) HP stage		√	
(ii) LP stage		√	
<b>2. operation and positioning of gas storage cylinder fittings:</b>			
(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. <b>HSL56:</b> Reg.14 Regulators 14 (2) to (7)		√	
7. min./max. outlet pressures for <del>BS 3016</del> , BS EN 12864, & BS EN 13785 & BS EN 16129 regulators as listed in BS 6891	BS 6891: 2015 Table 7 (TB 080)	√	√
8. lock-up pressures for <del>BS 3016</del> , BS EN 12864, & BS EN 13785 & BS EN 16129 regulators	BS 6891: 2015 Table 7 (TB 080)	√	√
9. identification of causes of over pressure conditions		√	√
10. operation, positioning and visible indicators (where applicable) of OPSO		√	√
11. procedures when OPSO has operated (MI's & Gas Supplier data sheets)	MI's	√	√
12. requirement for over pressure shut off (OPSO) devices	BS 6891: 2015 E.1.1	√	√
13. identify situation when UPSO/OPSO commissioning is required		√	√
14. requirement for under pressure shut off (USPO) device on installations supplied by a bulk gas storage vessel	BS 6891: 2015 E.1.1	√	√
15. safety requirements for termination location of limited relief valve	BS 6891: 2015 E.2.2 / E.2.8 Table E2	√	√

### 3(c). Cylinder location, safety and sizing

<b>KNOWLEDGE AND UNDERSTANDING</b>	<b>REF</b>	<b>I</b>	<b>R</b>
<b>1. safety requirements, sizing of cylinders:</b>			
(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)		√	√
<b>2. HSL56:</b>			
(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

<b>PERFORMANCE CRITERIA</b>	<b>REF</b>	<b>I</b>	<b>R</b>
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		√	√
<b>KNOWLEDGE AND UNDERSTANDING</b>	<b>REF</b>	<b>I</b>	<b>R</b>
1. flexible hoses (e.g. colour band on cooker hose) and rigid connections standards suitability and use		√	
2. Installation of flexible hoses, tubing, assemblies and their connections:		√	
i Standards	BS6891: 2015 9.1.8 & Fig 25	√	√

ii	Length	BS6891: 2015 9.1.2, 9.2 & 9.3	√	√
iii	Condition	BS6891: 2015 9.1.4	√	√
iv	Service life	9.1.9	√	√
3.	restrictions to length of hoses from regulator to LP nozzle and pigtailed from cylinders to regulator /change over valves -procedures for replacing pigtailed		√	
4.	pipe sizing to appliance requirements – inc. theoretical exercise	BS6891: 2015 Annexe A	√	
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 m<sup>3</sup>. OP ≤ 37 mbar

Up to 1¼ (steel) and/or 35 mm (copper)

PERFORMANCE CRITERIA		REF	I	R
<b>1.</b>	<b>Testing new and existing installations with gas:</b>			
(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		√	√
<b>KNOWLEDGE &amp; UNDERSTANDING</b>			<b>I</b>	<b>R</b>
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		REF	I	R
<b>PD54823: 2016 Small craft – LPG systems</b>				
<b>1 LPG installation system tests with appliances connected (using air)</b>				
(i)	test with air from gas regulator connection to closed burner valves at appliances	PD 54823 10.2.3 (a)	√	√
(ii)	cap off all other open points but the one point to insert air	PD 54823 10.2.4. (b)	√	√
(iii)	connect a suitable calibrated "U" gauge and a in line test tee if needed.	PD 54823 10.2.4. (c)	√	√
(iv)	introduce air into system to a test pressure 3 x NOP for gas to be used (≤150 mbar) and isolate pressurising source.	PD 54823 10.2.4. ( C & d)	√	√
(v)	allow 5 minutes pressure equilibrium & note the reading	PD 54823 10.2.4. (e)	√	√
(vi)	observe gauge for further 5 minutes	PD 54823 10.2.4. (g)	√	√
(vii)	pressure should remain constant	PD 54823 10.2.4. (h)	√	√
(viii)	if pressure has fallen check each joint with LDF and retest	PD 54823 10.2.4. (i)	√	√
(ix)	A non-discernible drop is achieved and recorded	PD 54823:2016 10.2.4 (J)	√	√
(iix)	A Tightness testing of the high pressure side should be completed at this point	10.3 to 10.3.2 a, b, c, d, e, f, g & h	√	√
<b>2 Commissioning testing, appliances can be disconnected or Isolated off on their shut off valve , the system purged of air and charged with LPG .</b>		PD10.2.5 D 54823		
a	purging the supply line	Annex D, D1	√	√
b	Testing of the LPG supply line	Annex D D.2 D .2.1.	√	√
(i)	turn off all appliances and isolate supply	D.2.5. a)	√	√
(ii)	connect U gauge to test fitting, if present, or in-line test tee	D.2.5. b)	√	√
(iii)	gradually turn on main shut-off valve until regulator reaches lock-up pressure; close main shut-off valve	D.2.5. c). 1, 2	√	√
(iv)	light one appliance and note drop in gauge. When pressure falls to 5 mbar, close appliance tap and isolation valve	D.2.5. c). 3.	√	√
(v)	allow 5 minutes stabilisation, record reading on gauge	D.2.5. c). 4.	√	√
(vi)	allow further 2 minutes, then re-record reading on gauge	D.2.5. c). 5	√	√
(vii)	if reading in(vi) is not higher than reading in (v), there is no let-by leakage	D.2.5. d). 6, 1,2,3,	√	√
(viii)	What if a discernible pressure drops occurs or there is a smell of gas	D.2.5. e) 1, 2 & 3	√	√
<b>2. Testing of the LPG supply line with appliances PD 54823:2016 Annex D2</b>				
(i)	In preparation turn off all appliances but leave on all appliance isolation valves; ensure any cooker fold down lids with SSOV are raised – isolate supply	D.2.4	√	√
(ii)	connect U gauge to test fitting, if present, or in-line test tee	D.2. 5 (a & b)	√	√
(i)	turn on main shut-off valve to lockup pressure, then close supply valve;	D.2. 5 (c 1 & 2)	√	√

(iv)	light one appliance; allow pressure to fall to 30 mbar for propane or 20 mbar for butane.	D.2. 5 (c 3 ) note 1 & 2	✓	✓
(v)	switch off appliance and leave for 2 5 minutes temperature stabilization – record pressure	D.2. 5 (c 4 )	✓	✓
(vi)	Wait a further 2 minutes and again record the U gauge reading	D.2. 5 (c 5 )	✓	✓
(vii)	there should be no discernible pressure drop in system(pipework only) or within given values (with appliances connected and tested)	D.2. 5 (c 6 )	✓	✓
(viii)	After proving the installation is acceptable	D.2.5.( h )	✓	✓
(ix)	test joints made after test, with LDF	D.2.5. (i)	✓	✓
4.	Tightness testing the high pressure side at this point if needed	10.3 to 10.3.2 a,b,c,d,e,f,g & h	✓	✓
<b>KNOWLEDGE AND UNDERSTANDING</b>		<b>REF</b>	<b>I</b>	<b>R</b>
1.	correct reading of pressure gauges	D.2.1	✓	✓
2.	use of electronic pressure gauge (calibration)	D.2.2	✓	✓
3.	locating escapes	D.2. 5 (e 1,2 & 3 )	✓	✓
4.	dealing with valves letting by, temperature rise or anomalies caused by cylinder hose pressures equalizing.	D.2. 5 (c 6 )	✓	✓
5.	determining permissible pressure loss	Annex D Table D1	✓	✓
6.	tightness testing principles	Section 10 and Annex D	✓	✓