Strategic Management Board

ACS.CoCDN1
SAFETY ASSESSMENT CRITERIA CHANGEOVER NON-DOMESTIC TO DOMESTIC NATURAL GAS

CoCDN1

Introduction

Tests gas safety competence in core domestic gas work for those holding ND Core Generic Parts A & B.

Comprises:

1. Gas safety legislation and Standards.
3. Products and characteristics of combustion.
4. Ventilation.
5. Installation of pipework and fittings.
6. Tightness testing and purging.
7. Checking and/or setting meter regulators.
8. Unsafe situations, use of emergency notices and warning labels.
9. Operation and positioning of emergency isolation controls and valves.
10. Checking and setting appliance burner pressures and gas rates.
11. Operation and checking of appliance gas safety devices and controls.
12. Chimney Standards.
13. Chimney inspection and testing
14. Installation of open, balanced and fan assisted chimney configurations.
15. Re-establish existing gas supply and relight appliances.

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 domestic gas fittings.

Pre-requisites

ND Core Generic Parts A & B.

References and normative documents

MIs.

All relevant Documents as listed in the Legislative, Normative & Informative Document List (LINDL), Inc.:

- HSL56
- GIUSP.
- EH40

Where a reference point (REF) is listed in this criteria is only a guide to where the criteria could be resourced, therefore may not be exhaustive.

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

Abbreviations

AIV. Appliance Isolation Valve
AECV. Additional emergency control valve
CB. Certification Body
CFS. Communal Flue Systems
ECV. Emergency control valve
LDF. Leak detection fluid
MIs. Manufacturer's/manufacturers' instructions
MIV. Meter inlet valve
MOP. Maximum operating pressure
ND. Non-domestic
OP. Operating pressure
OQ. Oral questioning
Ref. Reference.

1. Gas safety legislation and Standards

KNOWLEDGE & UNDERSTANDING	REF	I
1. HSL56 - Reg.36 Duties of Landlords 36 (1) to (12)		✓

3. Products and characteristics of combustion

PERFORMANCE CRITERIA	REF	I
1. **inspect flame pictures of selection of burners visually and 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) identify detectors and indicators		✓
(ii) installation – locations		✓
(iii) commission and maintain detectors (audible, readable, visual)		✓
4. **Combustion performance analysis**		✓
(i) inspect appliances of 3 types intended for combustion performance testing to ensure installation, flueing and ventilation are to MIs		✓
(ii) inspect appliances for obvious signs of damage and factors that may affect combustion performance		✓
(iii) check OP and/or heat input of each appliance		✓
(iv) light each appliance and visually inspect combustion performance		✓
(v) check analyser is suitable, correctly assembled and calibrated		✓
(vi) select correct types of sampling probe for each appliance		✓
(vii) turn on analyser and prepare for use to MIs		✓
(viii) correctly position probes for sampling products from each appliance		✓
(ix) adjust position of probe to obtain highest steady value of CO2 or lowest steady value of O2 for each appliance		✓
(x) read and record CO/CO2 ratios for each appliance		✓
(xi) adjust and re-test appliance if CO/CO2 ratio levels are too high		✓
KNOWLEDGE & UNDERSTANDING	**REF**	**I**
1. main constituents of complete and incomplete combustion		✓
2. air required 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 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. identify unsafe situation relating to combustion products that could enter a premises		✓
17. additional allowances for CO levels for gas cookers		✓
18. **Combustion performance analysis**		✓
(i) re-testing appliances when new components have been fitted		✓
(ii) unsafe situation category for flued appliance that fails test		✓
(iii) unsafe situation category for flueless appliance that fails test		✓
(iv) understanding of action levels for gas appliances		✓

(v)	actions if CO/CO2 ratio remains above suitable performance levels after adjustment		✓
(vi)	types of portable combustion analysers Differences between direct CO2 and indirect CO2 reading		✓
19	Awareness of regional differences in Building Regulations regarding CO detection when installing new or replacement fixed combustion appliances.		✓

4. Ventilation

PERFORMANCE CRITERIA		REF	I
1.	calculate free area of 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 inadequate ventilation		✓
KNOWLEDGE & UNDERSTANDING		**REF**	I
1.	requirements for ventilation		✓
2.	siting ventilation (wall, window, floor, ceiling and ducted) direct to outside air, series air vents		✓
3.	restrictions to ventilator/grille locations		✓
4.	installing ventilation grilles and vents		✓
5.	types of grilles and vents		✓
6.	adventitious air supplies		✓
7.	sizing of grilles and vents (free area availability)		✓
8.	**calculating ventilation for:**		
(i)	combustion of open flue appliances		✓
(ii)	compartments (open, balanced and fan assisted flue appliances)		✓
(iii)	Calculating multi–appliance installations (multiple open flue and flueless appliances within same room/space)		✓
9.	ventilation for flueless appliances (inc. cooking, water heating and space heating)		✓
10.	ventilator location for single and multiple DFE space heater installations (inc. flued and flueless)		✓
11.	additional ventilation e.g. extractor fans, cooker hoods, driers etc.		✓
12.	labels and notices		✓
13.	effects of oil or solid fuel appliances on ventilation for DFEs		✓
14.	effects of double glazing, cavity insulation draught proofing on ventilation provision		✓
15.	identification and installation of in tumescent air vents		✓
16.	operation of passive stack ventilation		✓
17.	ventilation for internal kitchens		✓

5. Installation of pipework and fittings. Pipe sizes: 6 mm to 35 mm

PERFORMANCE CRITERIA		REF	I
1.	identify installation pipework safety defects		✓
1a	use of temporary earth continuity bond		✓
KNOWLEDGE & UNDERSTANDING		**REF**	I
1.	flexible and rigid connections		✓
2.	pipe supports, clips and fixing (i)		✓
3.	Press end connections jointing requirements		✓
4.	Pliable corrugated stainless steel tubing and fittings jointing requirements		✓
5.	Requirements for additional emergency control valves		✓
6.	ventilation for pipework in ducts		✓
7.	pipe sizing for appliances– inc. theoretical exercise		✓
8.	**Requirements for pipework:**		
(i)	laid in joisted floors & roof spaces		✓
(ii)	notching and drilling solid timber floor joists		✓
(iii)	installed in solid floors		✓
(iv)	behind dry lined walls		✓
(v)	within timber/light steel frame walls		✓
(vi)	passing through a timber/light steel frame/masonry wall - accommodating movement		✓
9.	external surface mounted pipework		✓
10.	fixing pipework when connected to a meter not securely restrained		✓
11.	fire stopping in buildings containing flats or maisonettes		✓
12.	installing pipework inside a protected area		✓
13.			

14.	pipework for multi-occupancy dwellings		✓
15.	minimum depth/identification of pipework buried below ground		✓
16.	pipework installed under base of a wall or foundations		✓
17.	use of PE pipework		✓
18.	identify unsafe situation of a MP installation where pipework directly enters premises through rear spigot of meter box		✓
19.	Importance & suitable methods to protect stainless steel semi rigid connectors from corrosive products i.e. meter connections & flux		✓
20.	Arrangements for making and sealing holes into meter boxes		✓
21.	Purpose and suitability to the use of a non-contact voltage tester		✓

6a. Tightness testing and purging. Total IV ≤ 0.035 m³ (LP or MP with MIV fitted)

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

PERFORMANCE CRITERIA		REF	I
1.	**testing new or existing installations with gas or air:**		
(i)	visually inspect the installation to ensure joints made correctly and no open ends		✓
(ii)	check appliances and ensure AIVs are open & any SSOV are open.		✓
(iii)	turn off the gas installation at the appropriate valve: • ECV /AECV for MOP ≤ 75mbar • or MIV for MOP > 75mbar ensuring ECV is open		✓
(iv)	connect the pressure gauge to a suitable pressure test point on the installation or, if testing with air, branch of test T-piece		✓
(v)	If using gas, carry out a let-by test of the closed supply control valve (OQ) related to actions should do with a LP ECV letting by or a MP MIV letting by.		✓
(vi)	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.)		✓
(vii)	close the valve and note the gauge reading		✓
(viii)	test for 1 minute. If pressure rises by more than 0.25 mbar, let-by may be occurring		✓
(ix)	if pressure rise is observed, if LP check valve by disconnecting its outlet union and applying LDF to valve barrel (OQ on actions for a MP supply)		✓
(x)	on satisfactory completion of let-by test, slowly raise the pressure in the installation to between 20 and 21 mbar		✓
(xi)	turn off gas or air supply		✓
(xii)	allow 1-minute stabilisation; if necessary, re-adjust pressure to between 20 and 21 mbar		✓
(xiii)	check for any perceptible movement (fall) of the gauge over the next 2-minute period		✓
(xiv)	for new installations, or existing installations with no appliances connected check there is no pressure drop		✓
(xv)	for existing installations, check any pressure drop is within permissible values and there is no smell of gas		✓
(xvi)	if installation fails test, trace and repair escape and re-test installation		✓
(xvii)	if tightness test is successful, remove pressure gauge and re-seal test point		✓
(xviii)	when connected to gas, test pressure test point; ECV/AECV outlet connection; regulator connections and, where appropriate, MIV connections with LDF		✓
(xix)	purge installation		✓
(xx)	record test results		✓
2.	locate and repair a gas escape		✓
KNOWLEDGE & UNDERSTANDING		**REF**	**I**

1.	selection and reading of pressure gauges		✓
2.	allowed pressure drops for existing installations related to meter size/type, pipe diameter and IV with appliances connected to gas supply and not isolated inc. E6, U6/G4, U16/G10 and where no meter is fitted		✓
3.	identify no perceptible movement on gauge (0·25 mbar water gauge and 0·2 mbar electronic gauge reading to 1 decimal place)		✓
4.	allowed pressure drop for existing installation, inc. ECV but no meter is installed e.g. flat where supply is not individually metered		✓
5.	electronic token meter tamper devices and their effect on tightness testing		✓
6.	dealing with ECV/AECV/MIV that is letting by		✓
7.	actions when smell of gas persists (a) after completion of satisfactory tightness test (b) when ECV/AECV/MIV is turned off, or a leaking installation cannot be repaired		✓
8.	testing pipework of diameter > 35 mm or total IV > 0.035 m³		✓
9.	testing prior to alteration or extension to existing installations		✓
10.	acronyms and symbols		✓
11.	calculating IV and PV exercise for E6, U6 and G4 meters connected to 35 mm diameter pipework and U16 meters connected to any pipework of diameter ≤ 35 mm		✓
12.	purging installations of IV ≤ 0.02 m³ and those of IV > 0.02 m³		✓
13.	Test can be carried out using Air if NG is not available		✓

6b. Tightness testing and purging. Total IV ≤ 0.035 m³ (MP without MIV)

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

Knowledge and Understanding	**REF**	**I**
Tightness testing existing NG installations for 75mbar <MOP ≤ 2bar without a MIV (IGE/UP/1B Edition 3 Appendix 4 A4.3)		
1. Recognise what the gas operative should do in encountering a MP system without a MIV.		✓
2. What procedure would the operative follow if they need to tightness test the installation i.e. Appendix 4 IGEM IGE/UP/1B		✓
Performance Criteria		
1. turn off the gas installation at the ECV		✓
2. connect the pressure gauge to a suitable pressure test point on the installation		✓
3. carry out a let-by test of the closed ECV as follows:		✓
(i) adjust the pressure to between 7 and 10 mbar		✓
(ii) operate the UPSO or excess flow valve reset to balance the pressures either side of the device, then allow it to re-shut		✓
(iii) close the ECV and note the gauge reading		✓
(iv) check for any perceptible movement (rise) of the gauge reading (>0.25 mbar) over the next 1 minute period		✓
(v) if ECV is letting-by the test is suspended, installation made safe and the appropriate Gas Emergency Service Call Centre immediately notified (OQ)		✓
4. Slowly raise the pressure in the installation to between 18 and 19 mbar by opening the ECV then turn off the valve		✓
5. Allow 1minute for temperature and pressure stabilisation, if necessary re-adjust the pressure to between 18 and 19 mbar (the test shall not proceed until a stable reading is obtained)		✓
6. Continue test as from 6a) 1 (xiii) to (xx)		✓

7. Checking and/or setting meter regulators

KNOWLEDGE & UNDERSTANDING	**REF**	**I**
1. identifying MP meter/regulator installation		✓
1a. checking OP using boiler, space heater, cooker and other appliances		✓

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

PERFORMANCE CRITERIA	**REF**	**I**

1. identify unsafe situations		✓
2. classify unsafe situations as ID & AR		✓
3. label unsafe appliance(s)/installation(s)		✓
4.		
5.		
5a. demonstrate procedure for each unsafe situation to GIUSP		✓
5b. complete, explain and issue appropriate warning/advisory notices to appropriate persons		✓
KNOWLEDGE & UNDERSTANDING	**REF**	**I**
1.		
2. identify correct notices and labels to be used for a MP gas supply		✓
3. explain dealing with AR installations/appliances when turning off does not remove the risk		✓
4. explain dealing with situations that do not meet current standards but are not unsafe		✓

9. Operation and positioning of emergency isolation controls and valves

KNOWLEDGE & UNDERSTANDING	**REF**	**I**
1. inside meter positions		✓
2. outside meter positions		✓
3. **multi-occupancy building installations:**		
(i) external risers		✓
(ii) internal risers		✓
(iii) remote meters		✓
(iv) types of isolation valves (AECVs etc.)		✓

10. Checking and setting appliance burner pressures and gas rates

PERFORMANCE CRITERIA	**REF**	**I**
Measure OP of an appliance		
1. assemble and zero a suitable pressure gauge (OQ on electronic gauges)		✓
2. dismantle appliance as required; remove pressure test screw; connect gauge via suitable tubing		✓
3. light appliance, check and record OP and confirm to MIs		✓
4. turn off appliance; remove gauge; replace test point screw; re-establish gas and check test point with LDF		✓
Measure gas rate of an appliance		
1. check and record gas rate using gas meter test dial or index (OQ on Smart Meter)		✓
2. check measured gas rate; confirm to MIs rated appliance input		✓
3. explain requirements for range rated appliances		✓
KNOWLEDGE & UNDERSTANDING	**REF**	**I**
1. reasons for excessive pressure loss at appliance		✓
2. effects of excessive pressure at appliance		✓
3. effects of meter pressure absorption under full load conditions		✓
4. use of electronic pressure gauge (calibration)		✓

11. Operation and checking of appliance gas safety devices and controls

PERFORMANCE CRITERIA. Applies only to those gas safety controls listed in Table 1 detailed in the practical provision (ACS.SMB.005.PP.TABLE1)	**REF**	**I**
1. identify gas safety device/control		✓
2. check operation of each gas safety control/device is to MIs		✓

3.	identify gas safety controls/devices which are not working correctly by operation, testing and/or visual/audible methods		✓
4.	demonstrate diagnosis of faulty gas safety device/control		✓
5.	isolate gas and electricity supplies, where necessary		✓
6.	repair or replace faulty gas safety control/devices		✓
7.	re-establish gas and electrical supplies, where necessary		✓
8.	check work carried out is gas tight		✓
9.	confirm correct operation of repaired/replaced gas safety controls/devices to MIs		✓
10.	explain safe operation of gas safety controls/devices		✓
KNOWLEDGE & UNDERSTANDING		**REF**	**I**
1.	demonstrate (explain) principle of operation of each controls/device		✓
2.	explain sequence of operation of control/devices e.g. liquid expansion thermostat fitted in line with a liquid expansion FSD		✓

12. Chimney Standards

KNOWLEDGE & UNDERSTANDING		**REF**	**I**
1.	**existing solid fuel chimneys:**		
(i)	suitability – checks required		✓
(ii)	min. size of unlined chimney used for gas fire before terminal is required		✓
(iii)	min. size of side openings for slabbed over chimneys		✓
(iv)	min. cross sectional area of new chimney installations – gas fires		✓
(v)	operation of dampers and restrictor plates		✓
(vi)	effects of other fuels on chimneys and need for cleaning		✓
(vii)	min. void dimensions below appliance connections		✓
(viii)	catchment spaces and standard dimensions /volumes		✓
(ix)	types of flue liners – during construction (salt glazed clay etc.), poured/pumped concrete flue liners, flexible flue liners		✓
(x)	restrictions on use of poured concrete liners		✓
(xi)	sealing and support for flexible flue liners in chimneys		✓
(xii)	inspection of chimneys through loft spaces		✓
(xiii)	chimney heights/appliance types where liners are required		✓
(xiv)	sealing chimney voids		✓
(xv)	fitting bird guards to chimneys		✓
(xvi)	suitable and unsuitable terminals for space heaters inc. radiant, inset and DFE		✓
2.	**pre-cast flue systems:**		
(i)	flue design, standards, operation, routing, connection, termination		✓
(ii)	min. cross sectional area of new gas flue block		✓
(iii)	min. requirement of vertical flue blocks before off-sets		✓
(iv)	jointing material for pre-cast flue blocks		✓
(v)	min. flue size diameter for connecting pre-cast transfer blocks to termination point		✓
(vi)	effects of temperature on installation of pre-cast flues		✓
(vii)	classification of gas appliances i.e. flueless, open flue, room sealed		✓
3.	**chimneys for individual open flue natural draught appliances:**		
(i)	construction and operation of chimney		✓
(ii)	types of chimney material – cement based, and metallic		✓
(iii)	methods of jointing chimney components		✓
(iv)	termination positions for chimney outlets		✓
(v)	ridge terminal positions		✓
(vi)	effects of adjacent structures; basement areas; light wells and retaining walls on terminal positions		✓
(vii)	dealing with downdraught on steeply pitched roofs		✓
(viii)	restrictions to siting and lengths of chimney run to avoid condensation		✓
(ix)	min. up-stand for chimneys passing through tiled or slated roofs		✓
(x)	clearances when passing through combustible material		✓
(xi)	chimneys passing adjacent to combustible material or through other dwellings		✓
(xii)	terminals and/or guards – protection against wildlife		✓
(xiii)	pre-fabricated metal starter box for space heaters		✓
(xiv)	passive stack ventilation systems in houses with open flue natural draught appliances		✓
(i)	sealing flues surrounded by enclosures		✓
4.	**fan draught chimneys for open flue appliances:**		
(i)	requirements prior to installing fans in secondary flues		✓
(ii)	additional requirements when fans are installed in secondary flues		✓
(iii)	fan dilution and shared open flue, fanned draught systems in domestic dwellings		✓

5.	**shared open flue chimneys for natural draught appliances:**		
(i)	two or more appliances connected to same flue		✓
(ii)	appliances with a common flue in same room		✓
(iii)	labelling appliances on shared flues installed on different floors		✓
(iv)	maintenance of shared flue systems		✓
6.	**room sealed natural draught chimney configurations for appliances: Identify 2 positions from (ii) to (v).**		
(i)	balanced flue construction		✓
(ii)	outlet positions horizontal to an opening relating to appliance net input		✓
(iii)	outlet positions below an opening relating to appliance net input		✓
(iv)	outlet positions above an opening relating to appliance net input		✓
(v)	outlet options below gutters, soil pipes, drain pipes and eaves		✓
(vi)	outlet positions in car ports		✓
(vii)	balanced flue terminal guards		✓
7.	**room sealed fanned draught chimney configurations for appliances**:		
(i)	restrictions on lengths, bends etc. for fanned draught room sealed appliances		✓
(ii)	restrictions for outlet positions inc. horizontal and vertical configurations		✓
(iii)	enclosing chimneys		✓
(iv)	proximity of flue duct outlets to boundaries		✓
(v)	identify unsafe situation where a room sealed fanned flue system is enclosed without sufficient inspection facility		✓
8.	**balanced compartments for open flue appliances:**		
(i)	ducted air positioning		✓
(ii)	cross sectional areas of air inlet ducts		✓
(iii)	compartment construction		✓
9.	**room sealed appliances for shared chimneys (SE-ducts, U-ducts and CFS):**		
(i)	types of shared flue systems e.g. SE-ducts, U-ducts and CFS Natural Ventilated (NV), CFS Exhaust Only (EO) CFS Positive Pressure (PP)		✓
(ii)	categories of appliances suitable for installation		✓
(iii)	chimney outlet positions for roof terminals		✓
(iv)	labelling air inlet ducts		✓
(v)	labelling replacement appliances		✓
(vi)	responsibility for the maintenance of shared flue systems		✓
(vii)	requirements for replacement appliances		✓
(viii)	NRV requirements for appliance/exhaust ducts for CFS		✓
(xii)	Identify unsafe situation of room sealed fanned flue system on CFS		✓
10.	**condensing flues:**		
(i)	correct condensate disposal position and terminations for appliances		✓
(ii)	plume management kits		✓
(iii)	differing air inlet duct and terminal positions		✓
(iv)	terminal guards plum kit air inlets		✓
11.	**chimneys for vertex appliances:**		
(i)	construction and operation of vertex chimney		✓
(ii)	min. height of appliance draught break above roof insulation		✓
12.	**exchange of information and planning for chimneys:**		
(i)	requirements of designer, builder, provider or installer when installing gas chimneys		✓
(ii)	chimney certificates		✓
13.	**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)		✓

13. Chimney inspection and testing

PERFORMANCE CRITERIA		REF	I
1.	**inspect chimney visually throughout its length to verify (both correct and incorrect installations):**		
(i)	fitness for intended appliance		✓
(ii)	serves only one room or appliance		✓
(iii)	terminal position meets current legal requirements		✓
(iv)	joint between terminal and chimney system is weather tight		✓
(iv)(a)	chimney pipe adapter is correct		✓

(v)	adequate support		✓
(vi)	clearance from obstructions		✓
(vii)	no corrosion or cracking		✓
(viii)	use of bends meets current requirements		✓
(ix)	appliance draught diverter is correctly installed and in good condition		✓
(x)	secondary flue correctly positioned and in good condition		✓
(xi)	starter block correctly sized and positioned		✓
(xii)	catchment space correct and free from debris		✓
(xiii)	joints correctly made		✓
(xiv)	no visual signs of spillage of combustion products		✓
(xiv)(a)	ridge terminal and flue adapter are correct, in good condition and properly connected		✓
(xv)	correct space allocated between flue and combustible material		✓
(xvi)	flexible flue liner is correctly sealed at base and terminal position		✓
(xvii)	seals on balanced natural and fan assisted flues are in good condition and correctly installed		✓
(xviii)	balanced flue appliance seals are in good condition and correctly installed		✓
(xix)	connection into a pre-lined chimney (clay)is correct		✓
2.	**natural draught chimneys, metallic flexible flue liners:**		
(i)	annular space around flue and void at base of chimney is correctly sealed (supplementary OQ(s) on effects/hazards of unsealed flue liners and voids)		✓
(ii)	flexible flue liner is correctly clamped and sealed at base and terminal position		✓
(iii)	identify incorrect use of flue liners (supplementary OQ(s) on application of flexible flue liners)		✓
3.	**plastic flue pipe systems:**		
(i)	plastic flue is classified		✓
(ii)	join plastic flue pipe using correct methods, agents and fittings		✓
4.	**chimneys for vertex appliances:**		
(i)	classify balanced/fan assisted and vertex flue systems		✓
(ii)	cut flue duct square, assemble, adjust and seal to MIs		✓
(iii)	fit correct flue terminal guard		✓
(iv)	number of bends within flue length is to MIs (fan assisted)		✓
(v)	seals on balanced natural and fan flues are in good condition and correctly installed		✓
(vi)	balanced flue appliance seals are in good condition and correctly installed		✓
(vii)	vertex flue system operates correctly (supplementary OQ(s) on operation of vertex flues)		✓
(viii)	min. height of flue break above roof insulation is correct		✓
(ix)	calculate ventilation for a vertex flue to MIs		✓
5.	record incorrect flue installations		✓
2.	**apply flue flow test (smoke test)(open flue/chimney systems only):**		
(i)	check adequate air supply for combustion is available to appliance requirements		✓
(ii)	close windows and doors in room or compartment where flue is to be tested		✓
(iii)	pre-warm chimney, if necessary		✓
(iv)	position smoke pellet correctly at base of chimney being tested		✓
(v)	check smoke is seen to discharge from correct chimney or terminal only		✓
(vi)	check no entry of smoke into room/compartment or any other room/compartment, roof space or any part external to chimney		✓
(vii)	rectify any fault found and re-test chimney		✓
3.	**apply spillage test with appliance connected and in operation:**		
(i)	close windows, adjustable vents and doors in room/compartment containing appliance to be tested		✓
(ii)	check ventilation and turn off any mechanical ventilation supplied to room other than combustion air		✓
(iii)	operate/open any fans or passive stack ventilation systems – extract fans, radon extract fans, circulating fans, ceiling paddle fans etc.		✓
(iv)	with appliance in operation at its set input setting, apply smoke match to appropriate position in appliance to MIs		✓
(v)	check smoke is correctly pulled into appliance chimney		✓
(vi)	rectify any fault found and re-test appliance (OQ re testing for spillage with all interconnecting doors open with all fans in operation)		✓
4.	identify defective chimney installations		✓
5.	**check room sealed fan assisted positive pressure appliance installation:**		
(i)	identify positive pressure appliance		✓
(ii)	fit appliance case correctly (case screws, seals, items trapped between case seal and appliance etc.)		✓

6.	**check room sealed fan assisted positive pressure appliance case seals for possible leakage of products of combustion:**		
(i)	set appliance controls to their highest setting and light burner		✓
(ii)	check case seal initially by running a hand around boiler case and back plate (OQ re corroded/damaged back plate)		✓
(iii)	light a match/taper and position flame very close to case seal or any possible leakage point		✓
(iv)	move match/taper around entire seal inc. bottom of case		✓
(v)	identify any leakage of products of combustion		✓
KNOWLEDGE & UNDERSTANDING		**REF**	**I**
1.	**room sealed positive pressure combustion chamber appliances:**		
(i)	causes of leakage of products of combustion		✓
(ii)	checks prior to fitting case inc. back plate inspection, appliance case screws, case seals etc.		✓
(iii)	installation and spillage testing new or used appliances when MIs are not available		✓
2.	Actions required where fumes, smells or spillage have been reported/encountered		✓

14. Installation of open, balanced and fan assisted chimney configurations

PERFORMANCE CRITERIA		**REF**	**I**
Open flue chimney installation – identify correct and incorrect installations:			
1.	**cement based and metallic rigid:**		
(i)	chimney jointing		✓
(ii)	chimney adapters		✓
(iii)	chimney bends		✓
(iv)	chimney supports		✓
(v)	spacing between chimney and combustible material		✓
(vi)	ridge terminals and ridge tile adaptor		✓
(vii)	flueing into a pre-lined chimney (clay lined)		✓
2.	**flexible flue liners:**		
(i)	joining at base and at chimney outlet using appropriate adaptors		✓
(ii)	clamping at chimney outlet position		✓
(iii)	sealing of annular space between liner and chimney		✓
(iv)	sealing of voids at chimney base – pipework etc.		✓
3.	plastic flue pipe - flue pipe jointing		✓
Balanced and fan assisted chimney systems – identify correct and incorrect installations			
1.	**natural draught:**		
(i)	flue duct cuts		✓
(ii)	assembled, adjusted and sealed to MIs		✓
(iii)	flue terminal guards against balanced flue terminal		✓
2.	**fan assisted:**		
(i)	number of bends within flue duct length is to MIs		✓
(ii)	calculate ventilation for a vertex system		✓
KNOWLEDGE & UNDERSTANDING		**REF**	**I**
1.	insulation of chimneys for open flue appliances		✓
2.	condensing appliance chimneys		✓
3.	chimney maintenance		✓
4.	guards for balanced flue terminals		✓
5.	effects and hazards of inadequately sealed flue liners		✓
6.	incorrect applications of flue liners		✓
7.	identify difference between vertex systems and vertical room sealed chimney configurations		✓
8	unsafe situation of room sealed fanned flue system not adequately secured at the appliance		✓
9	Awareness of regional differences and requirements for non-combustible materials passing through exterior walls in high risk residential buildings (HRRB)		✓

15. Re-establish existing gas supply and relight appliances

PERFORMANCE CRITERIA		**REF**	**I**
1.	check installation is gas tight		✓
2.	re-establish gas supply		✓

3.	**visually check appliance(s) and re-light inc.:**		
(i)	purge system and appliance(s) of air		✓
(ii)	re-light appliance(s)		✓
(iii)	confirm satisfactory operation of user controls		✓
(iv)	visually inspect appliance installation(s) for unsafe situations		✓