Strategic Management Board

ACS.TPCP1
SAFETY ASSESSMENT CRITERIA
INITIAL AND RE-ASSESSMENT
NON-DOMESTIC
NATURAL GAS; LPG; OTHER GASES
TESTING AND PURGING

TPCP1	INITIAL & RE-ASSESSMENT

Introduction

Tests gas safety competencies of an operative in pneumatic strength testing, tightness testing and direct purging of non-domestic gas installations.

Candidates who hold TPCP1 are also deemed to hold TPCP1A.

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

Any section of pipework, including appliance/plant pipework for:
- Natural Gas, from the outlet of the ECV
- LPG, from the outlet of the bulk storage vessel or cylinder valve, as appropriate
- other gases on consumers' premises, from outlet of the isolation point from distribution system.

MOP ≤ 16 bar.

Pre-requisites

As this Assessment now confers TPCP1A as well as TPCP1, Candidates shall sit and shall satisfy all criteria even if they hold TPCP1A.

Initial

Any of ND Core Generic Part A; ND Core Generic Part B; COCN1; CCCN1; COCNPI1 LS; CCCN1; CCLNG1 or
any of CCN1 or CCLP1; CESP1; CMA1 or
QCF or S/NVQ alternatives

Re-assessment

TPCP1.

Exclusions

Testing at pressures > 16 bar, where hydrostatic strength testing is required by IGE/UP/1, and purging from fuel gas to fuel gas or steam purging for LPG.

Hydrostatic strength testing and drying of systems is a specialised activity and shall be applied for new pipework where STP > 3.5 bar for diameters > 150 mm or 10.5 bar for diameters ≤ 150 mm.

References and normative documents

All relevant documents as listed in the Legislative, Normative & Informative Document List (LINDL), inc.:
- HSL56
- IGE/UP/1 Edition 2
- IGEM/UP/2 Edition 3
- UKLPG Cop 22
- GIUSP.

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

Abbreviations

AC. Assessment Centre
CB. Certification Body
ECV. Emergency control valve
GT. Gas transporter
GRM. Gauge readable movement
I. Initial
LDF. Leak detection fluid
LR. Leak rate
MIP. Maximum incidental pressure
MOP. Maximum operating pressure
MPLR. Maximum permitted leak rate
ND. Non-domestic
NRV. Non-return valve
OP. Operating pressure
OQ. Oral questioning
PT. Purge time
PV. Purge volume
R. Re-assessment
Ref. Reference
STP. Strength test pressure
TTD. Tightness test duration
TTP. Tightness test pressure.

PERFORMANCE CRITERIA		REF	I	R
1.	Prepare for **PNEUMATIC strength** test – new installation:			
(i)	obtain information for the values of MIP and MOP		✓	✓
(ii)	determine STP		✓	✓
(iii)	thoroughly inspect installation pipework to detect any major integrity defects		✓	✓
(iv)	expose joints for the duration of strength test, where reasonably practicable		✓	✓
(v)	ensure all pipework and components have been designed, installed and anchored to withstand STP		✓	✓
(vi)	undertake a risk analysis on suitability for pneumatic testing		✓	✓
(vii)	plug or blank off isolation valves and leave valves open		✓	✓
(viii)	remove any component not to be included in test (install spool pieces etc.) This may be supported through realistic line diagrams and photographs		✓	✓
(ix)	select and connect correct medium for pressurising system		✓	✓
(x)	ensure pressurising medium has adjusted regulators and full flow safety valves		✓	✓
(xi)	select appropriate instruments certificated for calibration and connect to an appropriate point to carry out test		✓	✓
(xii)	identify and set up exclusion zones around areas of pipework/sections where STP exceeds 1 bar (OQ)		✓	✓
(xiii)	carry out final inspection of pipework, exclusion zones etc., prior to commencing test		✓	✓
2.	Carry out **PNEUMATIC strength** test – new installation:			
(i)	pressurise slowly pipework installation/section. If STP ≤ 2 bar, carry out a check for general integrity at 350 mbar (OQ)		✓	✓
(ii)	for STP > 2 bar, after reaching 2 bar, increase pressure in 10% stages allowing time periods between increments		✓	✓
(iii)	maintain pressure in pipework installation/section at STP during stabilization		✓	✓
(iv)	disconnect pressurising medium from pipework at end of stabilization		✓	✓
(v)	carry out strength test for correct duration and observe test instrument		✓	✓
(vi)	reduce pressure to no greater than 1 bar to enable joints to be tested using LDF where strength test fails (OQ)		✓	✓
(vii)	after any repairs, repeat strength test		✓	✓
(viii)	on satisfactory completion of strength test, vent pressure, leave pipework in a safe condition for tightness test and re-open exclusion zones		✓	✓
(ix)	record strength test result on a formal certificate clearly showing MOP		✓	✓
3.	Prepare for **TIGHTNESS** test – new or extension installations :			
(i)	inspect installation		✓	✓
(ii)	obtain proof of strength testing		✓	✓
(iii)	calculate and record total volume of pipework to be tested, allowances for fittings, if appropriate *(meters are covered in PC.6. Existing installations)*		✓	✓
(iv)	determine correct tightness test pressure (TTP) (OP)		✓	✓
(v)	select correct gauge and determine typical GRM from appropriate chart		✓	✓

(vi)	determine MPLR for gas involved from appropriate chart		✓	✓
(vii)	calculate TTD using appropriate charts		✓	✓
(viii)	take ambient conditions into account when determining when test will take place (OQ)		✓	✓
(ix)	by-pass components in system to be tested. Take regulators and NRVs etc., into account		✓	✓
(x)	spade off, plug or cap valves to and from section under test and leave open		✓	✓
4.	Carry out **TIGHTNESS** test – new or extension installations using air :			
(i)	raise pressure in section under test gradually to TTP (requirements where TTP exceeds 2 bar) (OQ)		✓	✓
(ii)	allow temperature to stabilize for TTD or for 15 minutes, whichever is longer		✓	✓
(iii)	isolate source of pressure		✓	✓
5.	**Short test** – TTD is less than max. for gauge given			
(i)	monitor gauge for duration of test		✓	✓
(ii)	check gauge movement is less than GRM		✓	✓
(iii)	if gauge movement exceeds GRM, locate leak and repeat test		✓	✓
6.	Prepare for **TIGHTNESS** testing – existing installations using gas			
(i)	inspect installation pipework to detect any major integrity defect prior to testing		✓	✓
(ii)	check all pipework and components have been designed, installed and anchored to withstand TTP		✓	✓
(iii)	ensure test is carried out using safety distances given in Table 2 or carried out when premises are unoccupied where TTP exceeds 1 bar {cross ref. to PC 1. xii}		✓	✓
(iv)	ensure pipework to be tested already contains fuel gas at a positive pressure		✓	✓
(v)	ensure meters, regulators and control valves are included in test at same time as pipework (TTP shall not exceed max. pressure components are designed for)		✓	✓
(vi)	calculate and record, total volume of pipework to be tested, allowances for fittings, valves and meter (if appropriate)		✓	✓
(vii)	determine correct TTP; to be at least OP (assume 21 mbar)		✓	✓
(viii)	select gauge and determine typical GRM from appropriate chart		✓	✓
(ix)	identify category of each area of existing installation to be tested i.e. Type A, B, C, D		✓	✓
(x)	determine MPLR for gas and location category involved from appropriate chart		✓	✓
(xi)	select minimum MPLR from location categories for test		✓	✓
(xii)	calculate TTD using appropriate charts		✓	✓
(xiii)	take ambient conditions into account when determining when test will take place		✓	✓
(xiv)	take into account by-pass components; regulators and NRVs etc.		✓	✓
(xv)	close any appliance isolation valves and/or upstream isolation valves		✓	✓
(xvi)	check pipework for major leaks, using LDF or a gas detector		✓	✓
7.	Carry out **TIGHTNESS** test – existing installations using gas			
(i)	carry out a let-by test of system/section isolation valve by pressuring pipework to 50% through valve and closing off		✓	✓
(ii)	observe gauge for TTD to ensure pressure does not rise (identify security of upstream isolation valve)		✓	✓
(iii)	raise pressure of section under test gradually to final TTP		✓	✓
(iv)	allow temperature to stabilize for longer of TTD or 15 minutes		✓	✓
(v)	isolate source of pressure		✓	✓
8.	**Short test** – TTD is less than max. for gauge given:			
(i)	monitor gauge for duration of test		✓	✓
(ii)	ensure gauge movement is less than GRM		✓	✓
(iii)	if gauge movement exceeds GRM, locate leak and repeat test		✓	✓
(iv)	calculate leak rate (*where size of leak needs to be ascertained)*		✓	✓
9.	Deeming pipework sections safe where leaks cannot be traced *(PAWS)*		✓	✓
(i)	check no smell of gas anywhere on system		✓	✓
(ii)	test pipework within inadequately ventilated areas (e.g. Type A) to MPLR as per new installations with no perceptible gauge movement over TTD		✓	✓
(iii)	check all exposed joints with LDF and/or suitable gas detector		✓	✓
(iv)	check ground over buried pipework by bar holing and use of suitable gas detector		✓	✓
(v)	check all service entries, drains and ducts into buildings where site has buried pipework using suitable gas detector		✓	✓
(vi)	check at no stage has scale on gas detector moved from 0% LFL on 0 - 10% setting		✓	✓
(vii)	where a pipework section is deemed safe through this process, advise customer and obtain agreement to decision		✓	✓
(viii)	advise customer in writing of decision and leak rate (LR) recorded		✓	✓
10.	de-pressurise system, remove any installed spades and gauge, and recheck any disturbed joints with LDF		✓	✓
11.	check joints in inadequately ventilated areas with gas detector after pipework section has been returned to service		✓	✓
12.	record and document results of test		✓	✓

13.	Appliance connections – tightness testing pipework between all appliances and their isolation valves *(IGE/UP/1A or IGE/UP/1B may be used as appropriate)* **NB. Operatives holding other ACS Cores may have already demonstrated competence in this area**			
(i)	carry out a let-by test on isolation valve. No perceptible gauge movement is allowed over 2 minute period at OP for pipework volumes ≤ 0.12 m³		✓	✓
(ii)	by-pass any regulators on appliance to prevent lock-up		✓	✓
(iii)	complete selected test		✓	✓
14.	Prepare for **DIRECT PURGING**			
(i)	obtain evidence of a tightness test on pipework system		✓	✓
(ii)	obtain an accurate plan and description of pipework system		✓	✓
(iii)	ensure purging of meter has been agreed by its owner prior to purge (OQ)		✓	✓
(iv)	select purge points at extremities of pipework sections to be purged		✓	✓
(v)	carry out procedures to ensure air will not enter GT's or any other distribution network when purging with air		✓	✓
(vi)	ensure appropriate warning notices and labels are available		✓	✓
(vii)	ensure appropriate and sufficient fire extinguishers are situated near vent points		✓	✓
(viii)	take in account specific requirements when purging LPG (OQ)		✓	✓
(ix)	ensure purge points, hoses, vent stacks and flame arresters are correctly sized to permit sufficient flow to maintain required purge rate/velocity		✓	✓
(x)	check location of vent/fare outlet in open air		✓	✓
(xi)	select suitably sized in-line flow meter and an intrinsically safe gas detector and check they are available for purge		✓	✓
(xii)	identify and select any purge gas cylinders required for purge		✓	✓
15.	Determine **PURGE VOLUME, MINIMUM PURGE RATE, PURGE TIME**			
(i)	calculate purge volume (PV) of pipework section and purge hose/vent pipe		✓	✓
(ii)	determine min. purge flow rate (Q_p)		✓	✓
(iii)	calculate maximum purge time (PT)		✓	✓
(iv)	select correct criteria for vent gas testing		✓	✓
16.	Direct **PURGING from air to gas**			
(i)	open all purge points and connect vent stacks with selected method for measuring flow of purge gas		✓	✓
(ii)	open purge section isolation valve to admit gas		✓	✓
(iii)	start timing of purge		✓	✓
(iv)	start sampling of concentration of fuel gas within vent gas using a suitable gas detector at half estimated purge time (LPG shall be flared)		✓	✓
(v)	close vent stack valve when pre-determined level of fuel gas is reached		✓	✓
(vi)	record in-line flow meter reading		✓	✓
(vii)	explain procedure when concentrations are not achieved within purge time		✓	✓
(viii)	remove all purge equipment, plug open ends and test disturbed joints with LDF or gas detector		✓	✓
(ix)	commission connected appliances or seal and label their connections appropriately		✓	✓
(x)	complete appropriate purging certificate		✓	✓
17.	Direct **PURGING from gas to air – DE-COMMISSIONING**			
(i)	turn off section isolation valve		✓	✓
(ii)	carry out a let-by test on section(s) isolation valve(s) to prove integrity		✓	✓
(iii)	check air supply to be used to carry out purge does not exceed system OP		✓	✓
(iv)	open all purge points and connect vent stacks with selected method for measuring flow of purge air		✓	✓
(v)	introduce air and start timing of purge		✓	✓
(vi)	start sampling of concentration of air within vent gas using a suitable instrument at half estimated purge time		✓	✓
(vii)	close air supply valve when pre-determined level of aird is achieved		✓	✓
(viii)	remove all purge equipment, plug open ends, test disturbed joints with LDF, label de-commissioned pipework and complete purging certificate		✓	✓
KNOWLEDGE & UNDERSTANDING		**REF**	**I**	**R**
1.	**Strength testing and tightness testing**			
(i)	acronyms		✓	✓
(ii)	symbols		✓	✓
(iii)	determination of MOP and MIP		✓	✓
(iv)	strength testing – pneumatic and hydrostatic		✓	✓
(v)	strength testing PE pipework		✓	✓
(vi)	tightness testing PE pipework where TTP exceeds 1 bar (creep factors)		✓	✓
(vii)	identifying volumes of differing meter types		✓	✓
(viii)	dealing with installations containing sections at differing MOP		✓	✓
(ix)	extended tightness testing		✓	✓
(x)	awareness of the four basic categories of pipework locations for existing installations		✓	✓

(xi) by-passing system components during tightness test		✓	✓
(xii) effects of variations of temperature and atmospheric pressure		✓	✓
(xiii) combining strength testing and tightness testing		✓	✓
2. **Direct purging**			
(i) acronyms and symbols		✓	✓
(ii) safety and environmental considerations prior to purging		✓	✓
(iii) venting or flaring purge		✓	✓
(iv) procedures for purging branched pipework		✓	✓
(v) procedures for purging large replacement meters		✓	✓
(vi) purging when taking large pipework out of service		✓	✓
(vii) purging with air through compressed air cylinders		✓	✓
(viii) planning and procedures for carrying out purge		✓	✓
(ix) procedures when required flow rate of purge is not achieved		✓	✓
(x) indentify requirements of purge gas cylinders used to carry out purge		✓	✓
(xi) purging small volumes of pipework and appliance trains directly into well ventilated internal areas without use of a purge hose and vent stack		✓	✓