Strategic Management Board

ACS.TPCP1A
SAFETY ASSESSMENT CRITERIA
INITIAL AND RE-ASSESSMENT
NON-DOMESTIC
NATURAL GAS
TESTING AND PURGING

TPCP1A INITIAL & RE-ASSESSMENT

Introduction

Tests gas safety competencies of an operative in the work of strength testing, tightness testing and direct purging of small, low pressure Natural Gas non-domestic gas installations.

Engineers who hold TPCP1 (covering IGE/UP/1) are deemed to hold TPCP1A, provided they have the required information from IGE/UP/1A available when working.

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.

Range

Any section of pipework, inc. appliance/plant pipework:
- volume ≤ 1 m^3 inc. meter and any allowance for fittings and
- MOP ≤ 40 mbar at outlet of the primary meter regulator and
- supply MOP ≤ 75 mbar and
- of diameter ≤ 150 mm where lengths are limited to maximum in tables in IGE/UP/1A.

For testing larger installations; higher pressures; other gases, refer to TPCP 1.

Pre-requisites

Initial

Any of ND Core Part A; ND Core Part B; COCN1; CCCN1; COCNPI1 LS; CCLNG1 or
any of CCN1; CESP1; CMA1; or CCLP1 with COLPNG1 or
QCF or S/NVQ alternatives.

Re-assessment

TPCP1A.

Exclusions

Testing installations that carry gases other than Natural Gas

Reference and normative documents

All relevant documents as listed in the Legislative, Normative & Informative Document List (LINDL), inc.:
- HSL56
- IGE/UP/1A Edition 2
- IGEM/UP/2 Edition 3
- 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
GRM. Gauge readable movement
I. Initial
IV. Installation volume
LDF. Leak detection fluid

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 testing – new installation and extensions (air or nitrogen)			
(i)	obtain information for values of upstream fault pressure and MIP of section to be tested		√	√
(ii)	carry out survey of installation to detect major defects		√	√
(iii)	expose joints for duration of strength test, where reasonably practicable		√	√
(iv)	ensure all pipework and components have been designed, installed and anchored to withstand 82.5 mbar STP (can be covered by practical or using realistic scenarios)		√	√
(v)	undertake risk analysis on suitability for pneumatic testing		√	√
(vi)	plug or blank off isolation valves and leave open		√	√
(vii)	remove any component not to be included in test (installation of spool pieces etc.)		√	√
(viii)	select and connect medium for pressurising system (dry compressed air or nitrogen)		√	√
(ix)	ensure pressurising medium incorporates adjusted regulators and full flow safety valves to prevent pressurisation above STP		√	√
(x)	select and connect appropriate instruments certificated for calibration to an appropriate point to carry out test		√	√
(xi)	carry out final inspection of pipework prior to test		√	√
2.	Carry out **PNEUMATIC strength** test – new installation and extensions (air or nitrogen)			
(i)	pressurise pipework installation/section slowly and maintain pressure at 82.5 mbar for 5 minutes stabilization		√	√
(ii)	disconnect pressurising medium from pipework at end of stabilization period		√	√
(iii)	carry out strength test for 5 minute strength test duration and observe gauge for full test duration		√	√
(iv)	where pressure drop exceeds 20% STP, test joints, glands etc. for leakage using LDF (details to be recorded by Candidate)		√	√
(v)	after any repairs, repeat strength test		√	√
(vi)	on satisfactory completion of strength test, vent pressure, leave pipework in a safe condition for tightness test		√	√
(vii)	record strength test result on a formal certificate clearly showing MOP		√	√
3.	Prepare for **TIGHTNESS** testing – existing installations (gas)			
(i)	inspect installation to detect any major integrity defects prior to testing		√	√
(ii)	where new pipework is connected to existing and cannot be isolated, test existing pipework as new (OQ)		√	√
(iii)	where tightness test includes pipework between ECV and primary meter regulator, test section at its OP using LDF or gas detector (OQ)		√	√
(iv)	calculate volume of pipework to be tested, pipework exposed to sunlight or high temperatures, allowances for fittings, valves and meter, if appropriate		√	√
(v)	determine total volume of installation		√	√
(vi)	apply correct TTP (OP of pipework)		√	√
(vii)	select gauge and determine typical GRM from appropriate chart		√	√
(viii)	determine MPLR for gas involved from appropriate chart		√	√
(ix)	calculate TTD using appropriate chart		√	√
(x)	take ambient conditions into account when determining when test will take place		√	√
(xi)	by-pass components in system to be tested, take regulators and NRVs etc. into account		√	√
4.	Carry out **TIGHTNESS** test – existing installations (gas)			
(i)	close any appliance and/or section isolation valve		√	√
(ii)	connect suitable pressure gauge to section to be tested		√	√
(iii)	with section valve closed, carry out a let-by test by lowering pressure to 50% OP to prove integrity of valve		√	√
(iv)	monitor pressure for let-by test period		√	√

(v)	if pressure rise is greater than 0.5mbar, repair and replace any valve before proceeding		√	√
(vi)	raise pressure in section to TTP (equals OP)		√	√
(vii)	allow conditions to stabilize for a period equivalent to longer of TTD or 6 minutes		√	√
(viii)	close section isolation valve and observe gauge for TTD		√	√
(ix)	a successful test is obtained if maximum allowable pressure drop is not exceeded		√	√
(x)	if test fails, locate and repair leak and repeat test		√	√
(xi)	if test successful, test all joints within enclosed spaces of 10 m³ or less with LDF or gas detector (OQ)		√	√
(xii)	test has failed if there is a smell of gas or a leak is identified		√	√
(xiii)	test pipework and joints in inadequately ventilated areas with either LDF or gas detector, or test as new pipework (within GRM of gauge used) (OQ)		√	√
(xiv)	replace any items removed from supply and remove any by-passes		√	√
(xv)	re-pressurise and test all disturbed joints with LDF		√	√
(xvi)	document tightness test and record results on a certificate, and provide a copy to pipework owner/operator		√	√
5.	Carry out **TIGHTNESS** test immediately following **STRENGTH** test. New installations {air or nitrogen} (this P/C can be linked with P/C 2 – Pneumatic Strength Test)			
(i)	lower pressure by venting until pressure is TTP (OP)		√	√
(ii)	stabilise for longer of TTD or 6 minutes (minus time taken for strength test)		√	√
(iii)	isolate test medium /air supply		√	√
(iv)	commence tightness test and observe gauge for TTD		√	√
(v)	a pressure drop greater than GRM for gauge used will fail test		√	√
(vi)	if test fails, locate and repair leak and repeat tightness test		√	√
(vii)	replace any items removed from supply and remove any by-passes		√	√
(viii)	re-pressurise and test all disturbed joints with LDF		√	√
(ix)	document tightness test and record results on a certificate, and provide a copy to pipework owner/operator		√	√
6.	Appliance connections – tightness testing pipework between all appliances & their isolation valves (IGE/UP/1B may be used as appropriate) (included in COCN1) This PC is not required for Limited Scope pipe Installer/Commissioners (COCNPI 1LS) - OQ required for un-commissioned appliances			
(i)	carry out let-by test on isolation valve. Allow no perceptible movement of gauge over 2 minutes at OP for pipework volumes less than 0.12 m³		√	√
(ii)	by-pass any regulators on appliance to prevent lock-up		√	√
(iii)	complete test		√	√
7.	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 oxygen analyser used when purging is capable of reading within the range 0 – 21% oxygen (Gasco-seeker can be used for sampling purge)		√	√
(iv)	ensure purging of primary meter has been agreed by its owner prior to purge		√	√
(v)	plan purging carefully		√	√
(vi)	select purge points at extremities of pipework sections to be purged		√	√
(vii)	check procedures to ensure air will not enter GT's or any other distribution network when purging with air are in place		√	√
(viii)	check appropriate warning notices and labels are available and any valve to or from section to be purged is labelled clearly (e.g. Do not operate – purging in progress)		√	√
(ix)	maintain fitted electrical continuity bonds throughout the purging operation		√	√
(x)	situate appropriate and sufficient fire extinguishers near vent points		√	√
(xi)	size purge points, hoses, vent stacks and flame arresters to permit sufficient flow to maintain required purge rate/velocity and are gas tight		√	√
(xii)	check location of vent/fare outlet in open air		√	√
(xiii)	select a suitably sized 'volume or flow meter' and an intrinsically safe gas detector and make available for purge (OQ)		√	√
(xiv)	identify and select any purge gas cylinders required for purge		√	√
8.	Determine **PURGE VOLUME, PURGE FLOW RATE and PURGE TIME**			
(i)	calculate purge volume (PV) of pipework section and purge hose/vent pipe		√	√
(ii)	determine minimum purge flow rate (Qp) through pipework section		√	√
(iii)	calculate maximum purge time (PT), if required		√	√
(iv)	select correct criteria for vent gas testing		√	√
9.	Direct **PURGING** - venting to outside - from air to gas i.e. commissioning			
(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 and read and record in line meter, if required		√	√
(iv)	start sampling of concentration of fuel gas within vent gas using a suitable gas		√	√

	detector at half estimated purge time			
(v)	stop purge by closing vent stack valve when a level of fuel gas as determined is achieved		√	√
(vi)	record in-line meter reading, if applicable		√	√
(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)	seal and label any connected appliances are commissioned or appliance connections appropriately (see note in PC 6)		√	√
(x)	complete appropriate purging certificate		√	√
10.	Direct **PURGING** from gas to air – **DE-COMMISSIONING**			
(i)	turn off any appliance attached to section		√	√
(ii)	turn off section isolation valve		√	√
(iii)	carry out a let-by test on the section(s) isolation valve(s) to prove integrity		√	√
(iv)	check air supply to be used to carry out purge does not exceed system OP		√	√
(v)	open all purge points and connect vent stacks with selected method for measuring flow of purge air		√	√
(vi)	introduce air supply and start timing of purge		√	√
(vii)	start sampling of concentration of air within vent gas using a suitable instrument at half estimated purge time		√	√
(viii)	stop purge by closing air supply when a level of air as determined is achieved		√	√
(ix)	remove all purge equipment, plug open ends, test disturbed joints with LDF, label de-commissioned pipework and complete purging certificate		√	√
KNOWLEDGE & UNDERSTANDING				
1.	**Strength testing and tightness testing**			
(i)	acronyms		√	√
(ii)	symbols		√	√
(iii)	determination of MOP and MIP		√	√
(iv)	identifying volumes of differing meter types		√	√
(v)	procedure where it is not possible to calculate or estimate with any confidence, IV		√	√
(vi)	by-passing system components during tightness test		√	√
(vii)	effects of variations of temperature and atmospheric pressure		√	√
2.	**Direct purging**			
(i)	acronyms and symbols		√	√
(ii)	safety and environmental requirements to be considered prior to purging		√	√
(iii)	procedures to adopt when purging into an internal area		√	√
(iv)	purging branched pipework		√	√
(v)	purging replacement meters		√	√
(vi)	purging procedures for taking pipework out of service		√	√
(vii)	purging with air through compressed air cylinders		√	√
(viii)	planning and procedures for carrying out a purge		√	√
(ix)	procedures when required flow rate of purge is not achieved		√	√
(x)	identification of purge gas cylinders used to carry out purge		√	√