

## Overview

This national occupational standard is for gas engineers who are required to carry out strength testing, tightness testing and direct purging of small, low pressure industrial and commercial natural gas installations. This standard covers the work activities of planning, de-commissioning and commissioning gas installations.

## Performance criteria

- You must be able to:*
- Plan and prepare work activities for strength testing, tightness testing and direct purging
  1. Produce a risk assessment and method statement which incorporates safety provisions in the work site, access to the work site, movement of the workforce, members of the public, and the movement and safe storage of materials, tools and equipment for the job
  2. Survey the work site, pre-strength testing, tightness testing and direct purging, for any damage or defects to existing building features, advise the property owner and record the outcomes
  3. Identify, agree and record the customer's job requirements in line with statutory and industry requirements
  4. Protect the work site and the building fabric against possible damage being caused during the strength testing, tightness testing and direct purging process
  5. Confirm the siting of the gas supply and the provision of ventilation meets the requirements for strength testing, tightness testing and direct purging
  6. Check and confirm all materials, tools and test equipment necessary for the de-commissioning, strength testing, tightness testing and direct purging process are available as required and are fit for purpose
  7. Confirm that the gas supply, earthing supply and the provision of ventilation meet the industry standards' requirements for the installation
  8. Carry out all necessary checks and tests to confirm the gas supply meets the industry requirements for the installation
  9. Check existing installation for any unsafe appliances and system components and apply the gas industry unsafe situations procedures as required
- De-commission gas systems and components to industry standards and manufacturers' instructions
10. Check that conditions within the gas system will permit safe de-commissioning
  11. Select and use the correct tools and equipment for de-commissioning activities
  12. Use designated safe isolation methods, tests, and procedures to de-commission gas systems and components
  13. Take precautionary actions to ensure that temporarily de-commissioned appliances, gas systems, or components do not present a safety hazard

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14. Permanently remove and disconnect appliances and gas system components as required
15. Measure, calculate and record gas system installation volumes for direct purging activities to carry out permanent de-commissioning of the installed gas system
16. Use purging procedures to confirm the safe permanent de-commissioning of the installed gas system by purging of gas with air

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17. Confirm the complete pipework installation complies with the manufacturers' specification and industry standards
18. Carry out preparatory work for strength testing, tightness testing and direct purging to meet industry standards
19. Check that conditions within the gas system will permit safe strength testing, tightness testing and direct purging
20. Select and use the correct tools and equipment for strength testing, tightness testing and direct purging activities
21. Measure, calculate and record gas system installation volumes for strength testing, tightness testing and direct purging activities
22. Ensure ventilation for strength testing, tightness testing and direct purging activities meets industry standards' requirements
23. Remove and bypass existing gas appliances and gas components as required
24. Ensure existing gas systems are clean and free of debris
25. Carry out the strength testing, tightness testing and direct purging process minimising damage to customer property and building features
26. Use strength testing procedures to confirm the integrity of the newly installed gas system
27. Follow approved procedures if the installation fails the strength test
28. Use tightness testing procedures to confirm the integrity of the new and existing gas system and , where applicable, new and existing appliances to ensure the installation doesn't exceed the maximum permissible pressure drop allowed for the installation
29. Follow approved procedures if the installation fails the tightness test
30. Replace any gas appliances and components removed from the pipework installation and remove bypasses as required
31. Measure, calculate and record gas system installation volumes for direct purging activities
32. Use purging procedures to confirm the safe supply of gas to the installed gas system and appliances, following approved procedures in

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the case of a failure

33. Instruct the property occupier on the correct operation of the gas system, valves and components and provide them with their copy of the any literature

34. Take precautionary actions to prevent the unauthorised use of un-commissioned gas appliances, gas systems and components by isolation procedures and use of warning notices

Use and communicate data and information to carry out de-commissioning, strength testing, tightness testing and direct purging to industry standards and manufacturers' instructions

35. Liaise with the property occupier and other people who will be affected by the work during the planning, de-commissioning, strength testing, tightness testing and direct purging processes to minimise disturbance to the job

36. Use normative documents, industry standards, British Standards and information from manufacturers' instructions applicable to the gas system and the appliance to ensure the work is done to the specification

37. Advise of any delays to the work, unsafe situations and required remedial actions to those who require the information

38. Check that the customer is satisfied with the finished job

39. Complete documentation confirming the safe strength testing, tightness testing and direct purging of gas systems and components

40. Complete gas system de-commissioning records

Resolve problems within own area of responsibility and competence which could affect de-commissioning, strength testing, tightness testing and direct purging

41. Rectify problems within own area of responsibility and competence and report deficiencies in gas and earthing input services

42. Resolve problems in accordance with approved procedures when  
a) pre- tightness testing and direct purging checks and tests reveal gas system or component defects

b) gas systems and components being tightness tested and purged do not meet design requirements

c) the gas system and components cannot be restored to full performance

## Knowledge and understanding

*You need to know and understand:* General Knowledge

1. Regulations and guidance governing health and safety in the workplace, environmental protection and the use of risk assessments
2. Legislation covering the general responsibilities of the operative for their own safety and that of others
3. The limits of your own autonomy and responsibility

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4. The health, safety and environmental factors which need to be incorporated in risk assessment for non-domestic strength testing, tightness testing and direct purging process
5. Safe access and working at heights
6. The tools and equipment necessary to provide safe access to work at heights, or in confined spaces
7. The methods of working which protect the building décor, customer property and existing systems and components
8. The tools, equipment, materials and components required for de-commissioning, strength testing, tightness testing and direct purging processes – ordering, supplying, advising, checking and delivery procedures
9. The care and maintenance requirements of tools and equipment, and checks for safe condition
10. How to safely secure and store tools, equipment, materials and components to minimise loss or wastage
11. The potential hazards that could arise from all de-commissioning, strength testing, tightness testing and direct purging activities and the checks to be carried out before work takes place
12. The steps to take should materials, components, tools and equipment not be available at the site to commence the de-commissioning, strength testing, tightness testing and direct purging activity
13. How to access and correctly interpret the required information including normative documents, industry standards guidance documents, British Standards and manufacturers' instructions applicable to the gas system and appliance, to ensure the work is done to industry standards
14. Safe isolation methods, tests, and procedures to de-commission gas systems or components

15. The procedures for temporary and permanent de-commissioning of gas systems including use of temporary continuity bonds
16. The precautions to ensure that de-commissioned gas systems do not prove a safety hazard
17. Measures to prevent de-commissioned gas systems being brought into operation utilising safety and warning notices
18. Purging procedures to confirm the safe permanent de-commissioning of the installed gas system by purging of gas with air
19. The need to liaise with others whose procedures or routines may be affected by the suspension of the gas system operation
20. The points in the de-commissioning, strength testing, tightness testing and direct purging process where co-operation and liaison with other trades and property occupier may be required
21. The industry practices and work standards for fabricating and installing gas pipework, valves, systems and components to comply with the manufacturers' specification, industry standards, Gas Safety (Installation & Use) Regulations, British Standards and Building Regulations
22. The types of pipe materials suitable for carrying gas - steel, malleable iron, copper, pliable corrugated stainless steel tubing, polyethylene & lead, etc.
23. The types of pipe fittings suitable for carrying gas – capillary, compression, push-fit, union joints & screwed joints
24. The industry practices and work standards for jointing materials and fittings suitable for carrying gas, including connecting to lead composition pipes
25. The positioning and fixing requirements for gas pipework, valves, systems and components to comply with the manufacturers' specification, industry standards, current Gas Safety (Installation & Use) Regulations, British Standards and Building Regulations
26. The procedures and work methods for connecting to input services including; gas, earthing systems and ventilation
27. The procedures and work methods of connecting pipework, valves and components to both new and existing gas systems and appliances
28. How to confirm that the gas supply and ventilation are adequate for de-commissioning, strength testing, tightness testing and direct purging of the gas system, appliance(s) and components
29. How to measure, calculate and record gas system installation volumes for strength testing, tightness testing and direct purging activities – IGE/UP/1A
30. The test equipment and legislative requirements for applying

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strength testing, tightness testing to gas systems, appliances and components –

31. How to remove or bypass existing gas appliances and components prior to carrying out strength testing, tightness testing and purging activities

32. Strength testing procedures to confirm the integrity of newly installed gas system and, where applicable, new and existing appliances

33. Tightness testing procedures to confirm the integrity of newly installed and existing gas systems and, where applicable, new and existing appliances to ensure the installation doesn't exceed the maximum permissible pressure drop

34. How to recognise medium pressure regulator sets where the maximum operating pressure (MOP) at the outlet of the emergency control valve (ECV) is above 75mbar but not exceeding 2bar and, whether a meter inlet valve (MIV) is fitted

35. Tightness testing procedures to confirm the integrity of gas systems where the maximum operating pressure (MOP) at the outlet of the emergency control valve (ECV) is above 75mbar but not exceeding 2bar and, where a meter inlet valve (MIV) is fitted or, no meter inlet valve is fitted

36. The process and procedures for tracing and repairing escapes if the installation fails the strength test and tightness test

37. The process and procedures, equipment and legislative requirements for applying direct purging of gas systems, appliances and components –

38. The routines and sequences for direct purging of gas systems, appliances and components and the correct process and procedures to follow in case of failure

39. The routines and sequences for commissioning gas systems, valves and components to industry standards

40. Measures to prevent un-commissioned gas systems being brought into operation utilising safety and warning notices

41. How to complete all strength testing, tightness testing and direct purging documentation and records to be left with the property

42. The system handover procedures and demonstrating the operation of gas systems and components to end users

43. The steps to take when problems arise in the work activities

44. Job management structures and methods of reporting and recording job progress or problems delaying progress

45. How to safely collect and dispose of system contents that may be

hazardous to health or the  
46. How to isolate unsafe gas appliances, gas systems and  
components and application of the gas industry unsafe situations  
procedure



## Glossary

“Cookers” refers to Freestanding, Built In, Slide Under, Hotplates, Grilles, Range Cookers, and Dual Fuel Cookers

“Leisure Appliances” refers to Greenhouse Heaters, BBQ’s, Patio Heaters, Gas Flambeaux, and Outdoor Gas Lighting

“Small, low pressure industrial and commercial natural gas installations” refers to Natural Gas Systems and Components downstream of an emergency control valve (ECV). The installation shall have; a volume not exceeding 1.0m<sup>3</sup> including any meter and any allowance for fittings, a maximum operating pressure (MOP) not exceeding 40mbar at the outlet of the primary meter regulator, a supply (MOP) not exceeding 75mbar, a nominal bore not exceeding 150mm.

“Work Site” refers to the area where the work will take place and all areas affected by the works

‘Services and Systems’ refers to water, central heating, gas, electricity supply, condensate disposal, chimneys and ventilation systems

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