

Install gas water heating and wet central heating

Overview

This national occupational standard is for gas engineers who are required to install, exchange and remove domestic water heating and wet central heating appliances and includes the following range of appliances: Instantaneous Water Heaters, and Wet Central Heating Boilers. This standard covers the work activities of planning, installing, exchanging, disconnecting, de-commissioning and commissioning those appliances.

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Performance criteria

- You must be able to:*
- Carry out heat loss calculations
 1. Calculate room volumes
 2. Calculate the surface area of any window
 3. Identify the type of window installed, including single and double glazed
 4. Determine the number and type of external walls
 5. Select the correct U value
 6. Establish the type of material and heating system if any below the space to be heated
 7. Establish the type of material above the space to be heated
 8. Calculate the heat output required for the room based on information gathered
 - Plan and prepare work activities for water heating and wet central heating appliances
 9. Identify, record and agree the customer's job requirements
 10. Ensure system and component compatibility
 11. Survey the work site and consult site diagrams as necessary for any key structural features and existing defects that could affect the installation and record them, advising property occupier of any defects found
 12. Check that the proposed siting of the appliance meets the manufacturers' and industry standards' requirements for location, siting and clearance and that all necessary input services meet the appliance manufacturers' and industry standards' requirements for the installation
 13. 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
 14. Protect the work site and the building fabric against possible damage during the de-commissioning and installation process
 15. Check and confirm all materials, tools and equipment necessary for the de-commissioning, installation and commissioning process are available as required and are fit for purpose
 16. Confirm that the services and systems meet the appliance manufacturers' and industry standards' requirements for the installation
 17. Check existing installation for any unsafe appliances and system components and apply the gas industry unsafe situations procedures as required

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De-commission water heating and wet central heating appliances to industry standards

18. Check that conditions within the gas and electricity systems will permit safe de-commissioning
19. Select and use the correct tools and equipment for de-commissioning activities
20. Use designated safe isolation methods, tests, and procedures to de-commission gas and electricity systems and components
21. Take precautionary actions to ensure that temporarily de-commissioned appliances, systems, or components do not present a safety hazard
22. Permanently disconnect and remove appliances, gas system components and electricity system components as required

Install, exchange, and remove water heating and wet central heating appliances to industry standards

23. Carry out preparatory work to meet the installation requirements
24. Carry out the installation processes minimising damage to customer property and building features
25. Select and use the correct tools and equipment for installation activities
26. Remove existing gas and electricity system components as required by the installation plan
27. Fabricate gas and electricity system components as required by the installation plan
28. Position the appliance and confirm it meets the location, siting and clearances required by the manufacturers' and industry standards' specification
29. Provide the required ventilation for new or replacement appliance installations and systems
30. Ensure existing systems are clean and free of debris
31. Fix and connect gas, electricity, central heating and condensate disposal components and all relevant pipes and components to the appliance
32. Use tightness testing and purging and electrical testing procedures to confirm the integrity of the installed systems, appliance
33. Take precautionary actions to prevent the unauthorised use of un-commissioned gas appliances, gas systems, electrical systems and components by isolation procedures and use of warning notices

Pre-commission and Commission water heating and wet central heating

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appliances to industry standards

34. Confirm the complete appliance installation complies with the manufacturers' specification, industry standards, Gas Safety (Installation & Use) Regulations, British Standards and Building Regulations
35. Check that conditions within the gas and electricity systems will permit safe commissioning
36. Select and use the correct tools and equipment for commissioning activities
37. Check and confirm the gas system operating pressures meet industry standards and the appliance operating pressure and the gas rate meet industry standards' and manufacturers' requirements
38. Check the combustion performance visually and by flue gas analysis as required
39. Test chimney performance and reconfirm it performs according to manufacturers' and industry standards' requirements
40. Reconfirm that the ventilation requirements meet industry standards for the installation
41. Check and confirm the operation of the gas appliance, the gas system, and components to ensure they function safely and operate in accordance with manufacturers' instructions
42. Check and confirm the electrical system and components function safely and operate in accordance with the manufacturers' instructions
43. Check and confirm the operation of the condensate disposal system as required
44. Instruct the property occupier on the correct operation of the appliance and gas system and provide them with their copy of the appliance literature

Use and communicate data and information to carry out de-commissioning, installation and commissioning work

45. Liaise with the property occupier and other people who will be affected by the work during the planning, de-commissioning, installation, and commissioning processes to minimise disturbance to the job
46. Use normative documents, industry standards, British Standards and information from manufacturers' instructions for the appliance to ensure the work is done to the specification
47. Advise of any delays to the work, unsafe situations and required remedial actions to those who require the information
48. Check that the customer is satisfied with the finished job

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- 49. Complete records and documentation confirming the safe commissioning of gas appliances, systems and components
- 50. Complete gas appliance and system de-commissioning records
- 51. Submit details of installation and exchange appliance(s) to the Gas Work Notification Scheme

Resolve problems within own area of responsibility and competence which could affect the de-commissioning, installation and commissioning process

- 52. Rectify problems within own area of responsibility and competence and report deficiencies in gas and electric input services
- 53. Resolve problems in accordance with approved procedures where
 - a) pre-maintenance checks and tests reveal gas appliance, gas system or component defects
 - b) gas appliances, gas systems and components being commissioned do not meet design requirements
 - c) the gas system or component cannot be restored to full performance

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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

Calculating heat loss

4. The calculations required to size heating equipment, including outdoor design and indoor design temperatures
5. How to calculate the temperature difference
6. The way in which heat flows through building assemblies, including ventilation and the rankings from insignificant to significant
7. Accepted assumptions when calculating heat loss
8. Calculations required through below grade walls and floors to determine heat loss
9. The factors that must be taken into account when carrying out heat loss calculations
10. How to select the U value based on known information
11. How to interpret diagrams and drawings
12. How to size, select and specify suitable system, controls and pipework arrangements

De-commissioning, Installing and commissioning water heating and wet central heating appliances

13. The health, safety and environmental factors which need to be incorporated in risk assessment for the domestic installation process, including safe access and working at heights
14. The methods of working which protect the building décor, customer property and existing systems and components
15. The care, maintenance and storage requirements of tools and equipment, and checks for safe condition
16. The tools, equipment, materials and components required for the gas appliance and gas system de-commission, installation and commission including ordering, supplying, advising, checking and delivery procedures and steps to take if materials, components, tools and equipment are not available at the site
17. The potential hazards that could arise from all de-commissioning, installation and commissioning activities and the checks to be carried out before work takes place

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18. How and where to access and correctly interpret the required information, including normative documents, industry standards guidance documents, British Standards and manufacturers' instructions applicable to the appliance, to ensure the work is done to the specification and industry standards
19. How to measure and record installation and site details for prefabrication purposes
20. How to confirm that the services and system requirements are adequate for installation and extension of the new gas appliance, gas system and components
21. Safe isolation methods, tests, and procedures to de-commission gas and electricity systems or components
22. The procedures for safe temporary and permanent de-commissioning of appliances and systems including use of temporary continuity bonds
23. The measures to take to prevent de-commissioned appliances or systems being brought into operation utilising safety and warning notices
24. How and when to liaise with others whose procedures or routines may be affected by the suspension of the gas appliance and gas system operation
25. The industry practices and work standards for fabricating and installing water heating and wet central heating gas appliances, systems and components to comply with the manufacturers' specification, industry standards, Gas Safety (Installation & Use) Regulations, British Standards and Building Regulations
26. The positioning and fixing requirements for water heating and wet central heating gas appliances, systems and components to comply with the manufacturers' specification, industry standards, Gas Safety (Installation & Use) Regulations, British Standards and Building Regulations
27. The industry practices and manufacturers' requirements for the positioning and the installation of condensate drain for condensing boilers
28. The procedures and work methods for connecting to services, systems and components
29. The procedures and work methods for:
 - a) applying tightness testing and purging and electrical testing to appliances, gas systems and components to ensure safe functioning
 - b) commissioning water heating and wet central heating appliances, gas systems and components in accordance with manufacturers'

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specification and industry standards

c) checking the correct operation and performance of water heating and wet central heating gas appliances, gas systems and components and against the design and manufacturers' specification to ensure safe functioning

e) checking that the hot water performance of water heating gas appliances and combination boilers complies with the manufacturers' specification including ensuring sufficient pressure & flow rate and correct temperatures are achieved

f) checking and confirming the gas system and appliance operating pressures and gas rate

30. The tests and checks to confirm the integrity, suitability and performance of the chimney and ventilation system

31. How to complete all installation and commissioning documentation and records to be left with the property The required measures to take to prevent un-commissioned gas systems being brought into operation utilising safety and warning notices

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

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

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

How to safely collect and dispose of system contents that may be hazardous to health or the environment

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

“Water Heating Appliances” refers to Instantaneous Single Point and Multipoint Water Heaters. These will include Flueless, Room-Sealed, and Fan Draught Chimneys.

“Wet Central Heating Appliances” refers to Basic, Condensing and Combination Wet Central Heating Boilers. These will include Open, Room-Sealed, and Fan Draught Chimneys.

“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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