Unit 211PH: Understand sanitation systems

# Delivery guide

Unit information

The purpose of this unit is for learners to explore sanitation systems within a domestic property and industrial and commercial building and the knowledge that underpin work on the different systems. Learners will have the opportunity to install and test sanitation systems.

Learners may be introduced to this unit by asking themselves questions such as:

* Why are there different types of sanitation systems?
* How do you install a wash hand basin and toilet to a primary ventilated stack system?
* How do you test a primary ventilated stack system?

Learning outcomes

1. Understand the applications, advantages and limitations of sanitary appliances and pipework systems
2. Understand the applications, advantages and limitations of appliances, components and accessories in relation to the working environment
3. Understand the methods and techniques for fitting, fixing and connecting the selected appliances, components and accessories
4. Understand the appropriate testing procedures for confirming the systems' integrity

Suggested resources

British Standards

* BS EN 12056-2:2000 *Gravity drainage systems inside buildings. Sanitary pipework, layout and calculation*

Websites

* [GOV.UK | Structure: Approved document A](https://www.gov.uk/government/publications/structure-approved-document-a)
* [GOV.UK | Drainage and waste disposal: Approved document H](https://www.gov.uk/government/publications/drainage-and-waste-disposal-approved-document-h)
* [GOV.UK | Access to and use of buildings: Approved document M](https://www.gov.uk/government/publications/access-to-and-use-of-buildings-approved-document-m)

Manufacturers’ websites

* [Drainage Sales | Installation guides | Soil stack installation guide](https://www.drainagepipe.co.uk/media/wysiwyg/installation-guides/drainage/Soil-Stack-Installation-Guide.pdf)
* [Drainage Sales | Installing waste pipes and traps](https://www.drainagepipe.co.uk/soil-and-waste/installing-waste-pipes-and-traps/)
* [Twyford | Professionals area | Downloads](https://www.twyfordbathrooms.com/professionals-area/downloads/)
* [Planning Portal | Home](https://www.planningportal.co.uk/)

Suppliers’ websites

* [Armitage Shanks | Home](https://www.armitageshanks-mena.com/homepage.html)
* [Ideal Standard | Home](https://www.idealspec.co.uk/)
* [Polypipe | Home](https://www.polypipe.com/)
* [McAlpine Plumbing Products | Home](https://mcalpineplumbing.com/)
* [Floplast | Home](https://www.floplast.co.uk/)
* [Saniflo | Home](https://www.saniflo.co.uk/)

Textbooks

* Maskrey, M. (2019) *The City & Guilds Textbook: Plumbing Book 1 for the Level 3 Apprenticeship (9189), Level 2 Technical Certificate (8202) & Level 2 Diploma (6035)*. London: Hodder Education. ISBN 978-1-51041-648-2
* Tanner, P. and Lane, S. (2019) *The City & Guilds Textbook: Plumbing Book 2 for the Level 3 Apprenticeship (9189), Level 3 Advanced Technical Certificate (8202) & Level 3 Diploma (6035)*. London: Hodder Education. ISBN 978-151041-646-8

| **Learning outcomes** | **Criteria** | **Delivery guidance** |
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| 1. Understand the applications, advantages and limitations of sanitary appliances and pipework systems | * 1. The advantages and disadvantages of sanitary appliances and pipework systems | * Learners to be able to describe the advantages and disadvantages of the following central heating systems and layouts: * primary ventilated stack system * secondary ventilated stack system * ventilated branch discharge system * stub stack system. * Learners to recap the key points of each system and produce a summary of the advantages and disadvantages of each. |
| * 1. The typical pipe sizes and maximum distances permitted in sanitary appliances pipework systems within dwellings | * Learners to know the typical pipe sizes and maximum distances permitted in the following sanitary appliances systems: * primary ventilated stack system * secondary ventilated stack system * ventilated branch discharge system * stub stack system. * Learners to be able to describe the pipe sizes and maximum distances permitted in sanitary appliances pipework and to know: * soil stack sizes based on WC outlet size * waste stack sizes serving waste appliances only * maximum branch discharge pipework lengths and gradients * sizes of branch discharge pipework for soil and waste appliances. * Learners to be shown examples of installations and to know the design features and requirements. * Learners to be able to give reasons why particular sizes of pipe have been used. |
| 1. Understand the applications, advantages and limitations of appliances, components and accessories in relation to the working environment | * 1. The types of sanitary appliances pipework systems | * Learners to be able to identify types and layout features of sanitary appliances pipework systems, including: * primary ventilated stack system * secondary ventilated stack system * ventilated branch discharge system * stub stack system. * Learners to be given a selection of images and diagrams for them to label and to be able to state the type of pipework system shown. * Include the positioning, fixing, connection of sanitary appliances. |
| Install | | |
| 1. The methods and techniques for fitting, fixing and connecting the selected appliances, components and accessories in accordance with:  * the plumbing and heating system's design * the working environment * manufacturers' instructions | * 1. The requirements of sanitary facilities and equipment in dwellings for the disabled including wet rooms | * Learners to know the requirements of Building Regulations Approved Document M. * Learners to know the installation requirements of sanitary facilities and equipment in dwellings for the disabled, including wet rooms. * Learners to be able to describe the spacing requirements for sanitary facilities and equipment including the positioning of grab rails and drop-down rails. * Learners to be able to produce a summary of the requirements for sanitary facilities for the disabled. |
| * 1. The jointing methods used in sanitary appliances pipework systems | * Learners to be able to identify jointing methods used in sanitary appliances pipework systems, including: * ring seal joints * solvent weld joints * compression joints * fusion welded. * Learners to be able to identify types of fittings used in sanitary appliances pipework systems, including: * bend 92.5° * bend 135° * bend (male-female) * access bend * offset bend * branch tee * boss * boss socket. * Learners to know how to joint soil and waste pipe using the methods listed above. * Learners to be shown how to interpret typical installation drawings showing outlets identified and to know how to produce a fitting schedule. * Learners to be given further examples of installation drawings and to produce their own fitting schedules. |
| * 1. The positioning and fixing of pipework within the building fabric | * Learners to be able to describe the positioning and fixing of pipework within the building fabric in line with current industry requirements and applicable regulations for pipework: * under suspended timber floors * under solid floors * embedded in walls. * Learners to know the requirements for notching and drilling holes in timber joists, including the maximum depth and permitted zones. * Learners to know the maximum depth of pipe chases in walls. * Learners to know the maximum pipework clipping distances for vertical and horizontal central heating system pipework as laid down in manufacturers’ guidance. * Learners to be shown actual examples of installations and to identify key features such as where pipework is installed and how this has been done. |
| * 1. How to install sanitary appliances, pipework systems and components | * Learners to know how to install the following sanitary appliances in compliance with the manufacturers’ instructions, industry requirements and current regulations and standards, including: * bath * WHB * WC * sinks * shower trays * bidets * WC macerators * waste disposal units. * Learners to know the installation requirements of pipework systems components, including bends, access pipes, branch tees, boss, boss sockets, vent terminals, waste manifold, drain connectors, pan connectors, traps, air admittance valves, couplers, rodding access. * Learners to know the following types of trap: P, S, bottle, sink, self-sealing/re-sealing, running traps, mechanical traps, anti-siphon, waterless traps. * Learners to research manufacturers’ installation instructions for different sanitary appliances and to produce a list of the components needed for the pipework. |
| 1. Understand the appropriate testing procedures for confirming the systems' integrity | * 1. The visual inspection of a sanitation system to confirm that it is ready to be soundness tested | * Learners to understand the steps taken during a visual inspection to confirm the sanitation system is ready to be soundness tested. * Check appliances. * Check that all joints have been made correctly. * Check that all pipework is secure. * Check the installation conforms to the regulations. * Learners to know that any problems, such as insufficient clipping of pipes, should be rectified before testing begins. * Learners to be shown how to complete a visual inspection and then to complete the process themselves. * Learners to be able to state potential problems that would need to be rectified before testing the soundness of the system. |
| * 1. A soundness test to industry requirements on sanitary appliances and pipework systems, pipework and components | * Learners to be able to describe a soundness test to industry requirements on central heating systems pipework and components, including: * visual inspection * notifying occupants * air test * initial fill * wet test * checking for leaks * completing documentation and notify as required. * Learners to be made of aware of the equipment used (manometer, hand pump, seal, cap), including test pressure and test durations. * Learners to know the air test specification: 38mm water gauge, 3‑minute test, no pressure loss. * Learners to know how to use air test equipment. * Learners to be shown how to use equipment safely when carrying out a soundness test. * Learners to demonstrate that they can use the test equipment safely. |