Unit 311PH: 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 understand how 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

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) (City & Guilds Textbooks)).* London: Hodder Education.

ISBN 978-1-5104-1648-2

* Tanner, P. and Stephen, L. (2019) *The City & Guilds Textbook: Plumbing Book 2 for the Level 3 Apprenticeship (9189), Level 3 Advanced Technical Certificate (8202) & Level 3 Diploma (6035) (City & Guilds Textbooks).* London: Hodder Education.

ISBN 978-1-5104-1646-8

Websites

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

British Standards

* BS EN 12056-2:2000 *Gravity Drainage Systems Inside Buildings. Sanitary Pipework, Layout and Calculation.*

Legislation

* *Building Regulations 2010 Approved Document A: Structure*. Newcastle upon Tyne: NBS. ISBN 978-1-8594-6508-0
* *Building Regulations 2010 Approved Document H: Drainage and Waste Disposal*. Newcastle upon Tyne: NBS.   
  ISBN 978-1-8594-6599-8
* *Building Regulations 2010 Approved Document M: Access to and use of buildings.* Newcastle upon Tyne: NBS.

ISBN 978-1-8594-6747-3

| **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 have an understanding of the different types of sanitary appliances and pipework systems, including various stack systems. * Learners to be able to describe the advantages and disadvantages of the following sanitation systems and layout requirements including: * primary ventilated stack system * secondary ventilated stack system * ventilated branch discharge system * stub stack system. |
| * 1. The typical pipe sizes and maximum distances permitted in sanitary appliances pipework systems within dwellings | * Learners to understand system types and typical pipe layouts and pipe sizes used for different sanitary appliances, including: * 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 including: * 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. |
| 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 and the positioning, fixing and connection of sanitary appliances including: * primary ventilated stack system * secondary ventilated stack system * ventilated branch discharge system * stub stack system. * Learners to know the suitability of below ground drainage systems to receive waste-water including: * combined drainage systems * separate drainage systems * partially separate drainage systems * soakaway * cesspit * septic tanks. |
| 1. Understand 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 be able to list the stages of checking the system with water and the additional fitting that will have to be added prior to the soundness test. * Learners to know the industry standard methods of connecting system pipework to the outlets and components and how to interpret a typical installation drawing showing outlets identified, and how to produce a fitting schedule. * Learners to know the requirements of Building Regulations Approved Document M: Access to and use of buildings. * Learners to be able to explain 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. |
| * 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. * Types of fitting: * bend 92.5 degree * bend 135 degree * bend (male–female) * access bend * offset bend * branch tee * boss * boss socket. * Learners to be able to demonstrate how to joint soil and waste pipe using the methods listed above. |
| * 1. The positioning and fixing of pipework within the building fabric | * Learners to be able to identify different types of building fabric and the precautions to be taken when installing pipework and components within them and industry clipping distances. * 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 including: * suspended timber floors * 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. |
| * 1. How to install sanitary appliances, pipework systems and components | * Learners to know how to install the following sanitary appliances in compliance with the manufacturer instructions, industry requirements and current regulations and standards: * bath * wash hand basin (WHB) * water closet (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 be familiar with the following types of trap: P, S, bottle, sink, self-sealing/re-sealing, running traps, mechanical traps, anti-siphon, waterless traps. |
| 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 know the process of and reasons for a visual inspection and the types of problem that the inspection might uncover (unsecure pipe, open ends, loose fittings). * Learners to know the equipment used for pressure testing, how to complete an air test and the pressures used. * Learners to be able to explain the steps taken during a visual inspection to confirm the sanitation system is ready to be soundness tested including: * appliance checks * check that all joints have been made correctly * check that all pipework is secure * check the installation conforms to the Regulations. * Learners to be aware that any problems, such as insufficient clipping of pipes or incorrect installation gradients should be rectified before testing begins. |
| * 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 * notify * air test * initial fill * wet test * check for leaks * complete documentation and notify as required. * Learners to be made aware of the equipment used (manometer, hand pump, seal, cap) including test pressure and test durations. * Air test specification: 38mm water gauge, 3-minute test, no pressure loss. * Learners to be shown how to use air test equipment. |