Unit 310PH: Understand rainwater systems

# Delivery guide

Unit information

The purpose of this unit is for learners to explore rainwater systems within a domestic property and industrial and commercial building and the knowledge that underpin work on the different systems.

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

* Why are there different types of rainwater systems?
* What are the limitations of various rainwater systems and components?

Learning outcomes

1. Understand the applications, advantages and limitations of rainwater systems
2. Understand the applications, advantages and limitations of appliances, components and accessories in relation to the working environment

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

* [Floplast | Homepage](https://www.floplast.co.uk/)
* [Gutter Crest | Homepage](https://www.guttercrest.co.uk/)
* [Marley Plumbing and Drainage | Homepage](https://www.marleyplumbinganddrainage.com/)
* [Planning Portal | Homepage](https://www.planningportal.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 H: Drainage and Waste Disposal*. Newcastle upon Tyne: NBS.

ISBN 978-1-8594-6599-8

| **Learning outcomes** | **Criteria** | **Delivery guidance** |
| --- | --- | --- |
| 1. Understand the applications, advantages and limitations of rainwater systems | * 1. The types and layout features of rainwater systems | * Learners to understand the working principles of gravity rainwater systems such as: * guttering that collects water from pitched and flat roofs * down pipes, which drain guttering and convey the water to the drain. * Learners to work on their understanding of gravity rainwater systems and understand typical pipe layouts. * Learners to be able to identify types and layout features of rainwater systems. * Pipe: * pipe (RWP) * round section * square section. * Gutter: * half round * square * ogee (ornamental gutter) * high capacity. |
| * 1. The advantages and disadvantages of rainwater systems | * Learners to be able to state the advantages and disadvantages of each type of rainwater system and their typical applications. * Learners to be able to state the advantages and disadvantages of rainwater systems, pipe (RWP) and gutter materials in relation to: * corrosion resistance * flow rates * cost * installation requirements * lifespan * co-efficient of linear thermal expansion * weight * suitability * length and colour availability * strength and flexibility. |
| * 1. The typical sizes and materials used in rainwater systems | * Learners to be able to identify typical materials used in rainwater systems, pipe (RWP) and gutter including: * unplasticized PVC (PVC-U) * extruded aluminium * cast iron * copper * fusion welded * specialist materials such as lead lined/copper. * Learners to be able to identify typical sizes used in rainwater systems, pipe (RWP) and gutter including: * pipe (RWP) (round section, square section) * gutter (half round, square, ogee, high capacity). |
| 1. Understand the applications, advantages and limitations of appliances, components and accessories in relation to the working environment | * 1. The working principles of rainwater systems, positioning fixing, connection and operation of components | * Learners to be aware of the working principles, procedures and processes for: * joining plastic guttering * joining metallic guttering * the jointing method employed in the connecting of PVC-U gutters and fall pipes * the jointing method employed in the connecting of aluminium gutters and fall pipes * the jointing method employed in the connecting of cast iron gutters and rainwater pipes. * Learners to know the positioning, fixing, connection and operation of components listed above. * Learners to develop their understanding of the key points of rainwater recycling and typical system layouts. * Learners to be able to describe working principles of rainwater systems, type, positioning fixing, connection and operation of components. * Pipe (RWP): * offsets * angles * branches * hopper heads * shoes * specialist connectors to the drainage system * brackets. * Gutter: * running outlets * gutter angles * gutter unions * stop ends * specialist unions between different gutter materials * symphonic outlets * fascia brackets * rafter brackets * rise and fall brackets. * Learners to be able to state the positioning and fixing requirements of gutter system components including: * recommended fixing distances and types of screws used * recommended fall * running outlet position * changes of direction in the gutter run. * Learners to be able to explain the jointing methods for rainwater and gutter systems including: * PVC-U * extruded aluminium * cast iron and specialist materials such as a lead-lined box guttering. |
| * 1. The expansion and contraction in rainwater systems and negative effects | * Learners to be able to explain expansion and contraction in rainwater systems and describe the negative effects. * Learners to be able to explain how expansion and contraction may be catered for in PVC-U gravity rainwater systems including: * the use of thermal expansion limit marks on connectors and joints that allow guttering to expand and contract without leaking * the use of expansion joints * avoiding installation during extremely warm or cold weather. |
| * 1. The working principles of rainwater recycling systems | * Learners to be able to describe the basic operating principles of rainwater recycling systems. * Learners to be able to identify the permitted uses of captured rainwater in properties: flushing toilets, washing cars etc. * Learners to be able to describe the purpose of components used within rainwater harvesting systems including: * anti-surcharge valve * calmed inlet * inlet filter * level sensor/float switch * module (including pump and air gap) * pump control unit * system control unit * water level gauge. |