QUALIFICATION HANDBOOK

City & Guilds Level 3 Awards in Water Regulations & Hot Water Systems (3345-20/30)

April 2022 Version 1.8

City & Guilds

Qualification at a glance

Subject area	**Building Services – Plumbing**
City & Guilds number	3345
Age group approved	16+
Assessment	Practical assignment Multiple choice online/paper based tests
Support materials	Centre handbook Assessment packs containing multiple choice tests for 3345-304 and 305 Assessment pack containing the practical task manual for 3345-303
Registration and certification	Consult the Walled Garden/Online Catalogue for last dates

Title and level	**City & Guilds number**	**GLH**	**TQT**	**Ofqual Accreditation number**	**Qualification Wales Approval / Designation No.**
Level 3 Award in Water Supply (Water Fittings) Regulations and Water Byelaws in the UK	3345-20	8	30	600/6165/0	C00/0500/0
Level 3 Award in the Installation, Commissioning and Safety Aspects of Hot Water Systems for Domestic Use in Accordance With UK Building Regulations	3345-30	10	10	600/6159/5	C00/1151/8

Version and date	**Change detail**	**Section**
1.1 Mar 2014	Updated assessment method for 3345-20	Assessment
1.2 January 2015	Added assessment module 305 to 3345-30 Added guidance regarding claiming assessment modules to table.	Assessment
1.3 June 2016	QW Designation No. added and TQT	Structure
1.6 October 2017	Unit 301/304 – Duration updated to **105 mins**. Unit 302/305 – additional material allowed included; **Building Regulations approved document G**	Assessment
1.7 August 2021	Information on links to 6189/9189 suites included.	Appendix 1 – Relationships to other qualifications
1.8 April 2022	GLH and TQT clarified and highlighted	Qualification at a glance Structure

Contents

1 Introduction

This document tells you what you need to do to deliver the qualifications:

Area	Description
Who are the qualifications for?	These qualifications are intended for those learners who wish to learn about the legal requirements for plumbing systems in the UK covered by Water Supply (Water Fittings) Regulations and Water Byelaws and/or the Installation, commissioning and safety aspects of hot water systems for domestic use in accordance with UK Building Regulations. These qualifications are suitable for those studying to become a plumber or heating and ventilating engineer. They are also suitable for those already employed within these industries and who wish to update their knowledge of the Water Regulations or Hot Water Systems in line with UK Building Regulations for CPD purposes.
What do the qualifications cover?	The key aspects of the Water Supply (Water Fittings) Regulations and Water Byelaws and how this affects water supply and fittings. Also the design and features involved in the installation, commissioning and safety aspects of hot water systems.
Are the qualifications part of a framework or initiative?	These qualifications are available on the QCF.
What opportunities for progression are there?	There are a wide variety of qualifications suitable for learners who have successfully completed either of these qualifications. For further information please visit the City and Guilds website at **www.cityandguilds.com**

Structure

To achieve the **Level 3 Award in Water Supply (Water Fittings) Regulations and Water Byelaws in the UK**, learners must achieve **3** credits from the mandatory unit

Unit accreditation number	City & Guilds unit number	Unit title	Credit value	GLH
Mandatory				
T/504/1602	Unit 301	Water Supply 'Water Fittings' Regulations and Water Byelaws in the UK	3	8

To achieve the **Level 3 Award in the Installation, Commissioning and Safety Aspects of Hot Water Systems for Domestic Use in Accordance With UK Building Regulations**, learners must achieve **1** credit from the mandatory unit

Unit accreditation number	City & Guilds unit number	Unit title	Credit value	GLH
Mandatory				
D/504/1545	Unit 302	The installation, commissioning and safety aspects of hot water systems for domestic use in accordance with UK building regulations	1	10

Total Qualification Time

Total Qualification Time (TQT) is the total amount of time, in hours, expected to be spent by a Learner to achieve a qualification. It includes both guided learning hours (which are listed separately) and hours spent in preparation, study and assessment.

Title and level	GLH	TQT
Level 3 Award in Water Supply (Water Fittings) Regulations and Water Byelaws in the UK	8	30
Level 3 Award in the Installation, Commissioning and Safety Aspects of Hot Water Systems for Domestic Use in Accordance With UK Building Regulations	10	10

2 Centre requirements

Approval

If your Centre is approved to offer any of the following complexes:

- 6189-31
- 6189-32
- 6189-33
- 6189-41
- 6189-42
- 6189-43

you will be automatically approved for the 3345-20 Level 3 Award in Water Supply (Water Fittings) Regulations and Water Byelaws in the UK and 3345-30 Level 3 Award in the Installation, Commissioning and Safety Aspects of Hot Water Systems for Domestic Use in Accordance With UK Building Regulations

To offer these qualifications, new centres will need to gain both centre and qualification approval. Please refer to the *Centre Manual - Supporting Customer Excellence* for further information.

Centre staff should familiarise themselves with the structure, content and assessment requirements of the qualification[s] before designing a course programme.

Resource requirements

Centre staffing

Staff delivering these qualifications must be able to demonstrate that they meet the following occupational expertise requirements. They should:

- be occupationally competent or technically knowledgeable in the area[s] for which they are delivering training and/or have experience of providing training. This knowledge must be to the same level as the training being delivered
- have recent relevant experience in the specific area they will be assessing
- have credible experience of providing training.

Centre staff may undertake more than one role, e.g. tutor and assessor or internal quality assurer, but cannot internally verify their own assessments.

Assessors and Internal Quality Assurer

Assessor/Internal Quality Assurer TAQA qualifications are valued as qualifications for centre staff, but they are not currently a requirement for the qualifications.

Continuing professional development (CPD)

Centres must support their staff to ensure that they have current knowledge of the occupational area, that delivery, mentoring, training, assessment and verification is in line with best practice, and that it takes account of any national or legislative developments.

Candidate entry requirements

City & Guilds does not set entry requirements for these qualifications. However, centres must ensure that candidates have the potential and opportunity to gain the qualifications successfully.

Age restrictions

City & Guilds cannot accept any registrations for candidates under 16 as these qualifications are not approved for under 16s.

3 Delivering the qualification

Initial assessment and induction

An initial assessment of each candidate should be made before the start of their programme to identify:

- if the candidate has any specific training needs,
- support and guidance they may need when working towards their qualifications.
- any units they have already completed, or credit they have accumulated which is relevant to the qualifications.
- the appropriate type and level of qualification.

We recommend that centres provide an induction programme so the candidate fully understands the requirements of the qualifications, their responsibilities as a candidate, and the responsibilities of the centre. This information can be recorded on a learning contract.

Support materials

The following resources are available for these qualifications:

Description	How to access
Qualification Handbook	**www.cityandguilds.com**
Assessment Pack	**www.cityandguilds.com**

4 Assessment

For 3345-20 Candidates must:

- successfully complete the online test (301) or the paper based test (304)

For 3345-30 Candidates must:

- successfully completed the online test (302) or the paper based test (305)
- successfully complete the practical assignment (303)

Unit	Title	Module to claim via Walled Garden	Assessment method	Where to obtain assessment materials
Unit 301	Water Supply 'Water Fittings' Regulations and Water Byelaws in the UK	301 (e-volve) or 304 (paper based version)	City & Guilds e-volve/ paper based multiple choice test. The test covers all of the knowledge in the unit.	Examination provided on e-volve or in the assessment pack which is available to download from the City & Guilds website.
Unit 302	The installation, commissioning and safety aspects of hot water systems for domestic use in accordance with UK building regulations	302 (e-volve) or 305 (paper based version)	City & Guilds e-volve/ paper based multiple choice test. The test covers the all of the knowledge in the unit.	Examination provided on e-volve or in the assessment pack which is available to download from the City & Guilds website.
		303	Assignment The assignment covers the skills in the unit.	**www.cityandguilds.com**

Time constraints

The following must be applied to the assessment of this qualification:

- Candidates must finish their assessment within their period of registration
- The assignment should take no longer than 8 hours. If they do, centres should consider why this is, and make sure that they are not trying to gather too much evidence.

Test specifications

The way the knowledge is covered by each test is laid out in the tables below:

Candidates are allowed to take **The Water Regulations Guide (Second Edition)** as reference into the exam.

Test 1: Unit 301/304
Duration: **105** minutes

Unit	Outcome	Number of questions	%
301/304	1 Understand the requirements of the Water Supply (Water Fittings) Regulations and Water Byelaws	2	4
	2 Understand terminology used to confirm requirements of the water regulations	1	2
	3 Know the suitability of materials and substances in contact with water	2	4
	4 Understand the requirements for water fittings	7	14
	5 Know the design and installation requirements for a water supply system	9	18
	6 Know the requirements for the prevention of cross connection to unwholesome water	2	4
	7 Know the backflow prevention fluid categories	1	2
	8 Know the requirements for backflow prevention	1	2
	9 Understand the guidance clauses relating to backflow prevention	11	22
	10 Know the installation requirements for cold water services	1	2
	11 Know the installation requirements for hot water services	4	8
	12 Know the installation requirements for WC's, flushing devices and urinals approved for use	4	8
	13 Know the types of bath, sink, showers taps location and installation requirements	2	4

Unit	Outcome	Number of questions	%
	14 Know the consumption limitations for washing machines, dishwashers and other appliances	1	2
	15 Know the requirements for water supplied for outside use.	2	4
	Total	**50**	**100**

Test 2: Unit 302/305
Duration: 50 minutes

Candidates are allowed to take **The Water Regulations Guide (Second Edition)** and **Approved Document G – Sanitation, Hot Water Safety and Water Efficiency (2015 edition with 2016 amendments)** as reference into the exam.

Unit	Outcome	Number of questions	%
302/305	1 Understand the types and configurations of vented/unvented hot water systems including the design installation requirements	5	20
	2 Know the types and operation of specialist components used in hot water systems	4	16
	3 Understand the design requirements for hot water systems	5	20
	4 Know the installation and safety features of hot water systems and components	4	20
	5 Know the requirements for the installation of cold water components associated with hot water systems	2	8
	7 Know the commissioning requirements of hot water systems and components in accordance with design specifications	4	16
	Total	**24**	**100**

Recognition of prior learning (RPL)

Recognition of prior learning means using a person's previous experience or qualifications which have already been achieved to contribute to a new qualification. RPL is not allowed for this qualification.

5 Units

Availability of units

Below is a list of the learning outcomes for all the units.

Structure of units

These units each have the following:

- City & Guilds reference number
- unit accreditation number (UAN)
- title
- level
- credit value
- guided learning hours
- unit aim
- endorsement by a sector or other appropriate body
- information on assessment
- learning outcomes which are comprised of a number of assessment criteria.

Unit 301 Water Supply (Water Fittings) Regulations and Water Byelaws in the UK

UAN:	**T/504/1602**
Level:	3
Credit value:	3
GLH:	8
Endorsement by a sector or regulatory body:	This unit is endorsed by Summit Skills, the Sector Skills Council for the building services engineering (BSE) sector.
Aim:	The aim of this unit is to provide candidates with the underpinning knowledge of the legal requirements for plumbing systems in the UK covered by Water Supply (Water Fittings) Regulations and Water Byelaws. The purpose of this unit is to enable learners to develop the underpinning knowledge and skills required • To enable existing workers in the occupation to update their professional competence • To extend their range of work On achievement of this unit candidates may apply for approval status to one of the recognised Approved Contractor Schemes operating in the UK.
Assessment:	This unit can be assessed using e-volve (301) or a centre marked multiple choice paper (304)

Learning outcome
The learner will: 1. Understand the requirements of the Water Supply (Water Fittings) Regulations and Water Byelaws
Assessment criteria
The learner can: 1.1 explain the requirements of the Water Regulations/Byelaws (Part 1) • within the domestic environment • within the commercial, industrial environment 1.2 explain the requirements of the Water Regulations/Byelaws (Part 2) in relation to: • the restriction on installation of water fittings • the requirements for water fittings • the notification requirements relating to any person who proposes to install a water fitting • approved contractors

1.3 explain the requirements of the Water Regulations/Byelaws (Part 3) in relation to: • penalties for contravening the Water Regulations • relaxation of the Water Regulations • dispute with a water undertaker

Learning outcome
The learner will: 2. Understand terminology used to confirm requirements of the water regulations
Assessment criteria
The learner can: 2.1 explain the meanings of the **key factors** within the interpretations of the Water Regulations. 2.2 identify the different types of water treatment apparatus available to dwellings

Range
Key Factors Backflow, cistern, combined feed and expansion cistern, combined temperature and pressure relief, contamination, distributing pipe, expansion cistern/vessel, expansion valve, flushing cistern, overflow pipe, pressure relief valve, primary circuit, secondary circuit, secondary system, servicing valve, stopvalve, storage cistern, temperature relief valve, terminal fitting, vent pipe

Learning outcome
The learner will: 3. Know the suitability of materials and substances in contact with water
Assessment criteria
The learner can: 3.1 describe situations where **materials** or substances either alone or in combination are likely to cause contamination of water 3.2 identify suitable **fittings** for use above and below ground 3.3 identify suitable jointing materials and compounds

Range
Materials different classes of steel pipes, copper tubes and their connections above and below ground, unplasticised PVC, polyethylene pipes, stainless steel pipes **Fittings** Stopvalves, drain off vales, servicing valves

Learning outcome
The learner will: 4. Understand the requirements for water fittings
Assessment criteria
The learner can: 4.1 state the fitness for purpose of water fittings in relation to • British Standards or equivalent • immunity and protection from galvanic action 4.2 state the **requirements** for installed water fittings 4.3 describe the requirement for pressure testing • metallic pipework systems • plastic pipework systems 4.4 explain how surges within a pipework system can **affect system performance** 4.5 state the connection requirements for the **installation of a pump** on a supply pipe 4.6 state the connection requirements for the **installation of a pumped shower** 4.7 state the installation **requirements for pipes and operational fittings** 4.8 state the installation **requirements for pipes entering a building** 4.9 state the installation requirements for **underground pipework** 4.10 explain the terms 'concealed fitting' and 'dezincification resistant material'

Range
Requirements Water tightness, prevention of ingress from contaminants, prevention from damage by freezing and other causes, prevention from deterioration by permeation, the supporting pipework, the fixings for water fittings **Affect system performance** Water hammer, relief valve discharge, pneumatic accumulators **Installation of a pump** Permissible pump output capacity permitted siting of a pump **Installation of a pumped shower** Permissible pump output capacity, recommended siting of a pump **Requirements for pipes and operational fittings** Located in the cavity of a cavity wall, embedded in any wall or solid floor, located below a suspended floor, below a solid floor at ground level, location and accessibility to operational fittings **Requirements for pipes entering a building** Depth of pipework, insulation requirements**,** protection of pipework **Underground pipework** Pipes laid underground, pipes laid over an underground obstruction, pipes under an underground obstruction, pipes supplying water to a building below street level, pipes beneath a stream

Learning outcome
The learner will: 5. Know the design and installation requirements for a water supply system
Assessment criteria
The learner can: 5.1 state **factors** to be taken into consideration in the design of a water supply system 5.2 describe **types of distribution system** available within a dwelling 5.3 explain the methods of preventing the contamination of water fittings and the water contained within them when passing through contaminated environment. 5.4 state the distribution temperature of cold water 5.5 state the installation requirements for Stopvalves to **premises** 5.6 state the installation requirements for the provision, operation and location of **servicing valves** 5.7 state the **installation requirements** for the provision of draining taps 5.8 state the requirements with respect to dead legs and redundant fittings 5.9 state the requirements for pressure testing different **systems** 5.10 explain the reason for the flushing of a system installation 5.11 state when system disinfection is required

Range
Factors Total daily consumption, maximum and average flows required, availability of mains supply, mains pressure variance, water storage capacity where needed, transient or surge pressures, environmental issues surrounding area and supply **Types of distribution system** Direct fed system, indirect fed system, combination of direct and indirect fed systems **Premises** Individual property, location within premises supplied with water, block of flats supplied from a common supply pipe, block of flats with separate supply pipes to each flat **Servicing valves** Inlet to Float Operated Valve (FOV), outlet of storage cisterns, inlet to appliances, accessibility of servicing valves, methods of operation **Installation requirements** Location, accessibility, types of draining taps **Systems** Systems that do not include any plastic, systems that include plastic pipes

Learning outcome
The learner will: 6. Know the requirements for the prevention of cross connection to unwholesome water
Assessment criteria
The learner can: 6.1 state the meaning of unwholesome water in relation to: • rainwater • recycled water • any fluid not supplied by a water undertaker 6.2 state the requirements for identifying an unwholesome water system so that it is readily distinguishable from a wholesome system in relation to: • colour coding for pipes and fittings • labelling for pipes and terminal fittings 6.3 identify the correct arrangement for connecting a wholesome water supply to a re-use system

Learning outcome
The learner will: 7. Know the backflow prevention fluid categories
Assessment criteria
The learner can: 7.1 define the five fluid categories

Learning outcome
The learner will: 8. Know the requirements for backflow prevention
Assessment criteria
The learner can: 8.1 state the requirements for the arrangements or devices to prevent the cross connection to unwholesome water 8.2 identify devices or arrangements used for backflow, back pressure and back siphonage prevention and their suitability

Learning outcome
The learner will: 9. Understand the guidance clauses relating to backflow prevention
Assessment criteria
The learner can: 9.1 describe the requirements whereby water can flow back into a supply or distributing pipe 9.2 explain the terms 'upstream' and 'downstream' 9.3 identify the method of protection against the backflow of water into a supply or distributing pipe without the need for a mechanical backflow prevention device 9.4 describe **installation requirements** for a mechanical backflow protection device 9.5 state the requirements for appliances supplied through or incorporating a pump. 9.6 state the requirements for the **installation of a bidet** or appliance using a hand held spray 9.7 explain the requirements for a water supply to a manually operated WC or urinal using a pressure flushing valve when supplied from a supply pipe or distributing pipe. 9.8 explain the requirements for tap outlets in relation to • single outlet taps • combination tap assembly outlets • fixed shower heads over basins, baths and bidets 9.9 explain the requirements for a sink in a non domestic environment 9.10 identify the requirements for submerged inlets to baths and washbasins in • a dwelling • a non-dwelling 9.11 identify the requirements for the installation of a drinking water fountain 9.12 identify the requirements for the installation of washing machines, washer-dryers and dishwashers in relation to • a dwelling • a non-dwelling 9.13 state the requirements for the installation of hose pipes for • a house garden • commercial installations 9.14 explain when whole site and zone protection are required 9.15 state the requirements for **fire protection systems** 9.16 state the requirements when applied to **miscellaneous commercial and industrial applications**.

Range
Installation requirements Accessibility of the mechanical backflow protection device, location within the premises, not to be buried in the ground, vented and verifiable, or devices with relief outlets not to be installed in chambers below ground or where liable to flooding, the installation of line strainers, the lowest point of discharge from the ground and termination with a Type AA air gap **Installation of a bidet** Ascending spray type, over rim type, spray handset fittings used with bidets and WC's **Fire protection systems** Direct fed sprinkler systems with no additives, direct fed sprinkler systems with additives, elevated storage cisterns with or without additives by gravity, elevated storage cisterns with pumped outlet with or without additives, dual feed cisterns with water from the water undertaker and from another source **Miscellaneous commercial and industrial applications** Pumped supply to laboratory fittings, separation of wholesome water from supplementary sources, separation of wholesome water from water that has been used, water supply taken directly from a supply pipe to a ship, water supply taken by gravity from storage on a quayside, water supply pumped from storage on a quayside, water taken from a hose union tap on a quayside

Learning outcome
The learner will: 10. Know the installation requirements for cold water services
Assessment criteria
The learner can: 10.1 describe the installation requirements and methods of connection for water fittings: • float operated valves • inlets to cisterns • outlets from cisterns • warning and overflow pipes • cold water storage cisterns

Learning outcome
The learner will: 11. Know the installation requirements for hot water services
Assessment criteria
The learner can: 11.1 describe the installation requirements and methods of connection for **water fittings** 11.2 state the requirements for discharge pipes from safety devices 11.3 state the requirements for discharge pipes from expansion valves 11.4 state the requirements for vent pipes from a primary circuit 11.5 state the requirements for vent pipes from a secondary hot water storage system

Range
Water fittings Directly heated unvented hot water systems, indirectly heated unvented hot water systems, independent water heaters, methods of accommodating expanded water in a hot water system, maximum temperature within a hot water system, hot water distribution temperatures, temperature of hot water at terminal fittings and surfaces of hot water pipes.

Learning outcome
The learner will: 12. Know the installation requirements for WC's, flushing devices and urinals approved for use
Assessment criteria
The learner can: 12.1 identify the **installation methods and requirements** for the operation of WC pans 12.2 explain **methods for flushing urinals** 12.3 describe **methods for filling a urinal cistern** 12.4 state the requirements for urinal cistern filling rates for: • a single urinal bowl • a urinal stall or slab serving two or more urinals 12.5 state the requirements for the renewal of a WC cistern installed before 1 July 1999

Range
Installation methods and requirements Single flush cisterns, dual flush cisterns, single flush siphonic outlet, dual flush siphonic outlet, drop and flap valve, dual flush cistern capacities, operating instructions for dual flush cisterns, pressure flushing valves, cistern water line mark, requirements for warning pipes, internal overflows **Methods to flush urinals** Manually operated cistern, automatically operated cistern, pressure

flushing valves

Methods to fill a urinal cistern

Manual infill, electronic sensor, pressure pad, time switch, frequency of flushing

Learning outcome
The learner will: 13. Know the types of bath, sink, showers taps location and installation requirements
Assessment criteria
The learner can: 13.1 state the requirements for drinking water points in premises 13.2 state the requirements for **drinking water supplies** 13.3 state the requirements for waste outlets from appliances

Range
Drinking water supplies Water supplied from a supply pipe, water supplied from a pumped supply pipe, water supplied from a storage cistern, water that has been softened used for drinking purposes

Learning outcome
The learner will: 14. Know the consumption limitations for washing machines, dishwashers and other appliances
Assessment criteria
The learner can: 14.1 state the upper limits of water consumption for domestic: • horizontal axis washing machines • washer – driers • dish washers

Learning outcome
The learner will: 15. Know the requirements for water supplied for outside use.
Assessment criteria
The learner can: 15.1 state the installation requirements for animal drinking troughs or bowls in relation to: • methods of controlling the inflow to a trough or bowl • the siting of servicing valves • backflow protection 15.2 state the installation requirements for ponds, fountains and pools in relation to: • impervious liners and water tightness • temporary connections to ponds, pools and fountains

Unit 302/305 The installation, commissioning and safety aspects of hot water systems for domestic use in accordance with UK building regulations

Learning outcome	
UAN:	**D/504/1545**
Level:	3
Credit value:	1
GLH:	10
Endorsement by a sector or regulatory body:	This unit is endorsed by Summit Skills, the Sector Skills Council for the building services engineering (BSE) sector.
Aim:	The purpose and aim of this unit is to enable learners to develop the underpinning knowledge and skills required: • Prior to progressing to assessment of occupational competence. • To enable existing workers in the occupation to update their professional competence • To extend their range of work • Where appropriate lead to the issue of a licence to practice
Assessment:	This unit can be assessed by completing practical task (303) as well as e-volve (302) or a centre marked multiple-choice paper (305)

The learner will:

1. Understand the types and configurations of vented/unvented hot water systems including the design installation requirements

Assessment criteria

The learner can:

1.1 explain types of domestic hot water supply systems:

- Centralised systems
  - Unvented hot water systems
  - Open vented hot water systems
- Localised systems
  - Unvented point of use heaters
  - Instantaneous heaters

1.2 describe types of unvented/vented hot water systems:
- Indirect storage systems (include water jacketed tube heaters)
- Direct storage systems
- Electrically heated
- Gas or oil fired
- Small point of use (under sink)
- Bulk Storage heaters (combination tank)
- Solar Thermal hot water systems
- Combination boilers

1.3 identify hot water system pipework layout features including systems with secondary circulation:
- Direct and indirect vented and unvented
- Direct and indirect cylinders
- Solar Thermal
- Thermal stores
- Combination boilers
- Secondary circulation
  - Location of pump and type
  - Automated timing devices
  - Methods of balancing systems

1.4 state the recommended design temperatures within hot water systems:
- Hot water storage vessels
- Hot water delivery
- Secondary return
- Point of use
  - Instantaneous heaters
  - Storage system
  - Fixed bath
  - Basin
  - Blending valve installations

1.5 identify the layout requirements, location and safety features for unvented/vented hot water systems:
- Expansion and temperature relief pipework
- Vent pipes

Learning outcome
The learner will: 2. Know the types and operation of specialist components used in hot water systems
Assessment criteria
2.1 state methods of preventing stored water from exceeding 100° C 2.2 state the minimum number of independent safety devices required to prevent overheating in unvented hot water systems 2.3 state the expansion rate of water when converted to steam 2.4 explain the working principle of functional devices in unvented hot water systems:

- Line strainer
- Pressure reducing valve
- Check valves
- Expansion device (vessel or integral to cylinder)
- Tundish
- Composite valve

Learning outcome
The learner will: 3. Understand the design requirements for hot water systems
Assessment criteria
3.1 identify factors affecting the selection of hot water systems for domestic use 3.2 explain how to minimise bacterial growth in hot water systems 3.3 state the criteria for selecting hot water system and component types: • Occupiers needs or usage (Max usage of water per person per day) • Building layout and features • Suitability of system • Water efficiency • Environmental impact • Energy efficiency 3.4 state which regulation applies to the installation of unvented hot water systems of more than 45KW and a capacity of 500 litres 3.5 state which documents should be used when designing domestic hot water systems

Learning outcome
The learner will: 4. Know the installation and safety features of hot water systems and components
Assessment criteria
The learner can: 4.1 state the effects of unbalanced supply pressures in hot water systems 4.2 state the take off point on a cold water supply to maintain a balanced hot and cold water supply 4.3 state the additional safety components where multiple heat sources exist 4.4 identify the positioning and fixing requirements of components used in unvented hot water systems: • Control thermostat • Overheat thermostat • Temperature relief valve • Line strainer • Pressure reducing valve • Check valves

- Expansion device
- Expansion relief valve
- Composite valves
- Tundish arrangements

4.5 state the installation, fixing and sizing requirements for safety relief pipework:

- Discharge D1
- Discharge D2
- Tundish
- Multiple discharge pipe arrangements from safety devices
- Termination

Learning outcome
The learner will: 5. Know the requirements for the installation of cold water components associated with hot water systems
Assessment criteria
The learner can: 5.1 describe the installation and siting requirements of cold water cisterns 5.2 describe the requirements for positioning a cold water pipe in relation to sources of heat

Learning outcome
The learner will: 6. Be able to diagnose faults in hot water systems and components
Assessment criteria
The learner can: 6.1 carry out diagnosis of hot water systems installation and component faults: • Thermostats • Expansion and pressure vessels • Temperature relief • Expansion relief • Discharge pipework 6.2 confirm the correct operation of system components and safety valves: • Thermostats • Expansion and pressure vessels • Temperature relief • Expansion relief • Discharge pipework 6.3 confirm the actions required to rectify the diagnosed faults

Learning outcome
The learner will: 7. Know the commissioning requirements of hot water systems and components in accordance with design specifications
Assessment criteria
The learner can: 7.1 state the checks to be carried out during a visual inspection 7.2 describe the commissioning procedure for an unvented hot water system 7.3 describe the procedure for carrying out a soundness test on a hot water system: • Metallic systems • Plastic pipework systems 7.4 describe the flushing procedure after completion of a soundness test

Learning outcome
The learner will: 8. Be able to carry out the commissioning of hot water systems
Assessment criteria
The learner can: 8.1 carry out the commissioning of a hot water system

Learning outcome
The learner will: 9. Be able to confirm that unvented hot water systems have been serviced in accordance with manufacturer's instructions
Assessment criteria
The learner can: 9.1 demonstrate service procedures on an unvented hot water storage system

Appendix 1 Relationships to other qualifications

Links to other qualifications

Mapping is provided as guidance and suggests areas of commonality between the qualifications. It does not imply that candidates completing units in one qualification have automatically covered all of the content of another.

Centres are responsible for checking the different requirements of all qualifications they are delivering and ensuring that candidates meet requirements of all units/qualifications.

This qualification has connections to the following within the Plumbing & Heating suite offered by City & Guilds.

- Plumbing and Domestic Heating (6189) Level 3
- Plumbing and Domestic Heating (9189) Level 3

Learners who have already achieved a full Level 3 certificate in either 6189 or 9189 can also certificate within the 3345. To gain certification centres need to register learners on **3345-21/31** and claim the certification modules **3345-820/830** which will then generate the relevant certificates.

Literacy, language, numeracy and ICT skills development

These qualifications can develop skills that can be used in the following qualifications:

- Functional Skills (England) – see **www.cityandguilds.com/functionalskills**
- Essential Skills (Northern Ireland) – see **www.cityandguilds.com/essentialskillsni**
- Essential Skills Wales – see **www.cityandguilds.com/esw**

Appendix 2 Sources of general information

The following documents contain essential information for centres delivering City & Guilds qualifications. They should be referred to in conjunction with this handbook. To download the documents and to find other useful documents, go to the **Centres and Training Providers homepage** on **www.cityandguilds.com**.

Centre Manual - Supporting Customer Excellence contains detailed information about the processes which must be followed and requirements which must be met for a centre to achieve 'approved centre' status, or to offer a particular qualification, as well as updates and good practice exemplars for City & Guilds assessment and policy issues. Specifically, the document includes sections on:

- The centre and qualification approval process
- Assessment, internal quality assurance and examination roles at the centre
- Registration and certification of candidates
- Non-compliance
- Complaints and appeals
- Equal opportunities
- Data protection
- Management systems
- Maintaining records
- Assessment
- Internal quality assurance
- External quality assurance.

Our Quality Assurance Requirements encompasses all of the relevant requirements of key regulatory documents such as:

- Regulatory Arrangements for the Qualifications and Credit Framework (2008)
- SQA Awarding Body Criteria (2007)
- NVQ Code of Practice (2006)

and sets out the criteria that centres should adhere to pre and post centre and qualification approval.

Access to Assessment & Qualifications provides full details of the arrangements that may be made to facilitate access to assessments and qualifications for candidates who are eligible for adjustments in assessment.

The **centre homepage** section of the City & Guilds website also contains useful information such on such things as:

- **Walled Garden:** how to register and certificate candidates on line
- **Events**: dates and information on the latest Centre events
- **Online assessment**: how to register for e-assessments.

City & Guilds

Believe you can

www.cityandguilds.com

Useful contacts

UK learners **General qualification information**	**T: +44 (0)844 543 0033** **E: learnersupport@cityandguilds.com**
International learners General qualification information	T: +44 (0)844 543 0033 F: +44 (0)20 7294 2413 E: **intcg@cityandguilds.com**
Centres Exam entries, Certificates, Registrations/enrolment, Invoices, Missing or late exam materials, Nominal roll reports, Results	T: +44 (0)844 543 0000 F: +44 (0)20 7294 2413 E: **centresupport@cityandguilds.com**
Single subject qualifications Exam entries, Results, Certification, Missing or late exam materials, Incorrect exam papers, Forms request (BB, results entry), Exam date and time change	T: +44 (0)844 543 0000 F: +44 (0)20 7294 2413 F: +44 (0)20 7294 2404 (BB forms) E: **singlesubjects@cityandguilds.com**
International awards Results, Entries, Enrolments, Invoices, Missing or late exam materials, Nominal roll reports	T: +44 (0)844 543 0000 F: +44 (0)20 7294 2413 E: **intops@cityandguilds.com**
Walled Garden Re-issue of password or username, Technical problems, Entries, Results, e-assessment, Navigation, User/menu option, Problems	T: +44 (0)844 543 0000 F: +44 (0)20 7294 2413 E: **walledgarden@cityandguilds.com**
Employer Employer solutions, Mapping, Accreditation, Development Skills, Consultancy	T: +44 (0)121 503 8993 E: **business@cityandguilds.com**
Publications Logbooks, Centre documents, Forms, Free literature	T: +44 (0)844 543 0000 F: +44 (0)20 7294 2413

If you have a complaint, or any suggestions for improvement about any of the services that we provide, email: feedbackandcomplaints@cityandguilds.com

About City & Guilds

As the UK's leading vocational education organisation, City & Guilds is leading the talent revolution by inspiring people to unlock their potential and develop their skills. We offer over 500 qualifications across 28 industries through 8500 centres worldwide and award around two million certificates every year. City & Guilds is recognised and respected by employers across the world as a sign of quality and exceptional training.

City & Guilds Group

The City & Guilds Group operates from three major hubs: London (servicing Europe, the Caribbean and Americas), Johannesburg (servicing Africa), and Singapore (servicing Asia, Australia and New Zealand). The Group also includes the Institute of Leadership & Management (management and leadership qualifications), City & Guilds Land Based Services (land-based qualifications), the Centre for Skills Development (CSD works to improve the policy and practice of vocational education and training worldwide) and Learning Assistant (an online e-portfolio).

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