

UK Certification

Qualifications & Certification for the
Building Services Industry

**UK Certification Award
Low Temperature Heating & Hot Water
Systems**

**Qualification
Specification
Warmur Academy
(Issue 1)**



Introduction

This qualification has been developed to provide learners with the knowledge and understanding required to design low temperature heating and hot water systems for boiler and heat pump applications within domestic dwellings in accordance with Building Regulations and MCS standards.

Occupational needs

Current Building Regulations and MCS standards require low temperature system design when installing full new heating systems with new boilers and for all heat pump systems.

This qualification supports the development of the hydronic design knowledge required to support compliant and energy efficient domestic heating system applications.

Qualification Specification Award in Low Temperature Heating and Hot Water Systems

1. Overview

Qualification Title	Award in Low Temperature Heating and Hot Water Systems				
Qualification No (QN)	N/A				
Qualification Code	UKC-LTHHWS (Warmur Academy)				
Assessment Method/s	Embedded gated knowledge checks and controlled final assessment				
Entry Requirements	Please see section 3 & 4				
Guided Learning Hours	16	TQT	20	Credits	N/A
Mandatory Units	1				

2. Qualification Purpose

Current Building Regulations and MCS standards require low temperature system design when installing full new heating systems with new boilers and for all heat pump systems.

This qualification supports the development of the hydronic design knowledge required to support compliant and energy efficient domestic heating system applications.

3. Entry Requirements & Pre-requisites

Learners wishing to undertake the UK Certification/Warmur Academy Award in Low Temperature Heating and Hot Water Systems shall:

- Learners must be aged 16 years and over
- Learners should be able to demonstrate that they have the minimum levels of literacy and numeracy required for the completion of the learning outcomes and the assessment.

This qualification has been developed to promote equal opportunities, by eliminating any avoidable barriers which have the potential to restrict access or progression.

4. Learner Profile

This qualification is intended for:

- Practising plumbing and heating engineers installing boilers or heat pumps;
- Apprentices undertaking relevant plumbing and heating training;
- Learners preparing for progression into heat pump training pathways;
- Industry professionals seeking to develop low temperature heating system design knowledge.

5. Work Experience

Prior to the commencement of the training programme, Learners are recommended to:

- Have a basic understanding of wet heating systems; or
- Be undertaking relevant plumbing, heating or building services training; or
- Be existing industry professionals seeking to develop low temperature heating system design knowledge.

6. Requalification requirements

This qualification is valid for a period of 5 years. The Learner needs to retake the qualification before the certificate expiry date to remain qualified.

7. Support and Accreditation

This is an unregulated qualification supported by industry and meets the requirements of MCS.

8. Qualification Limitations

This qualification confirms knowledge and understanding relating to low temperature heating and hot water system design.

The qualification does not independently confirm occupational competence to install, commission, service or maintain heating, boiler or heat pump systems where separate competency, licensing, registration or certification requirements apply.

Completion of this qualification does not replace:

- Statutory requirements.
- Manufacturer-specific training requirements.
- Scheme membership requirements.
- Installation competency assessments.
- Refrigerant handling qualifications.

9. Relationship to Other Qualifications

This qualification may be undertaken as:

- a standalone low temperature heating systems qualification for the design and optimisation of boiler and heat pump systems; or
- progression learning toward wider low carbon heating and heat pump qualifications.

10. Programme Syllabus

The qualification consists of one mandatory unit containing overarching six learning outcomes which are supported by detailed learning outcomes.

Programme Syllabus Continued

At the end of this qualification the learner will be able to:

1. Understand the requirements of relevant regulations, standards and guidance relating to low temperature heating systems.
2. Understand how to calculate the heat loss from a dwelling for low temperature heating system design
3. Understand how to size and apply heat emitters for low temperature heating systems.
4. Understand how to size and apply hydraulic components within low temperature heating systems.
5. Understand how to design domestic hot water systems for low temperature heating applications.
6. Understand how to design and apply low temperature heating system configurations and controls.

Learning Outcome 1 - Understand the requirements of relevant regulations, standards and guidance relating to low temperature heating systems. The learner will demonstrate knowledge of:

Reference	Learning Outcome
1.1	Standards & regulations applicable to heating & hot water system design
1.2	Responsibility & duty of the operative to correctly specify, design, install & commission an energy efficient low carbon hot water & heating system
1.3	Other opportunities for energy efficiency upgrades within a property & their impact on the heating system
1.4	Understand and explain the requirements for designing low temperature heating systems in line with Part L of the Building Regulations
1.5	Understand and explain system efficiency and factors that affect it
1.6	Define the term "Low Temperature Hot Water Heating"
1.7	Know the key design factors of the Domestic Building Services Compliance Guide which apply to Low Temperature Hot Water Heating technologies: a) Condensing boilers – return temperature $\leq 55^{\circ}\text{C}$, b) Heat pump technologies

Learning Outcome 2 - Understand how to calculate the heat loss from a dwelling for low temperature heating system design. The learner will demonstrate knowledge of:

Reference	Learning Outcome
2.1	Different building elements and structures
2.2	U-values and their application within heat loss calculations
2.3	Ventilation heat loss
2.4	Transmission heat loss
2.5	Calculating a room-by-room heat loss for a dwelling
2.6	Understand the importance of heat loss for system design and how to apply heat loss to the design

Learning Outcome 3 - Understand how to size and apply heat emitters for low temperature heating systems. The learner will demonstrate knowledge of:

Reference	Learning Outcome
3.1	Advise the consumer on the benefits and limitations of a low water temperature heating system
3.2	Correctly calculate heat emitter sizes considering heat loss, MWT, design room temperature, and user behaviour
3.3	Effects on heat emitter size/output at varying flow and return temperatures
3.4	Effects of different controls on the overall size of the heat emitters
3.5	Importance of system balancing and its benefits
3.6	Understand why heat pump annual operating hours vary
3.7	Understand how to calculate and control flow

Learning Outcome 4 - Understand how to size and apply hydraulic components within low temperature heating systems. The learner will demonstrate knowledge of:

Reference	Learning Outcome
4.1	Relationship between pressure, flow & velocity
4.2	Relationship between heat, ΔT & flow rates
4.3	Effects of different pipe diameters at different load conditions
4.4	Effect on system pressure loss in relation to valves, components and fittings
4.5	Interpretation of a pump curve
4.6	Duty point and how to correctly size a pump to meet the needs of the index circuit
4.7	Expansion vessel sizing
4.8	Calculating pipework size and selecting the correct pump
4.9	Effect of high velocities on system design
4.10	Importance of flow rate, ΔT , pump size and pump speed on the index circuit
4.11	Interpret pump curves to determine the duty point
4.12	Effects on pressure loss with different system ΔT values
4.13	Assess heat pump hydraulic flow rate when selecting circulation pumps
4.14	Understand and explain correct pump positioning
4.15	Understand how to size a volumiser and why it is important for heat pump systems

Learning Outcome 5 - Understand how to design domestic hot water systems for low temperature heating applications. The learner will demonstrate knowledge of:

Reference	Learning Outcome
5.1	Design a hot water system based upon property and consumer needs
5.2	Identify various hot water storage vessels and systems used with low temperature heating systems
5.3	Effects on response times with varying heat generator sizes
5.4	Location of hot water storage systems and pipework
5.5	Calculate DHW system and pipework sizing
5.6	Understand insulation requirements for storage vessels and pipework
5.7	Calculate heat input requirements of a hot water storage vessel based on 55°C storage temperature and volume
5.8	Understand DHW peak delivery and the impact of coil sizes on cylinder recovery times

Learning Outcome 6 - Understand how to design and apply low temperature heating system configurations and controls. The learner will demonstrate knowledge of:

Reference	Learning Outcome
6.1	System designs
6.2	System layouts
6.3	System types
6.4	Understand accommodation of water expansion in sealed LTHW systems
6.5	Correct positioning of expansion vessels
6.6	Understand hydraulic separation and use of low loss headers and buffer vessels where multiple zones are employed
6.7	Understand importance of zoning in accordance with legislation
6.8	Understand controls preventing simultaneous space heating and DHW production in heat pump systems
6.9	Identify heating controls and their role in efficient heating systems
6.10	Understand importance of system balancing
6.11	Know fundamental commissioning procedures
6.12	Different design configurations between radiators and underfloor heating
6.13	Understand and explain weather compensation control strategies
6.14	Understand the importance of PDHW setup for boilers and heat pumps
6.15	Understand steps to achieve a hydronically balanced system

11. Assessment Methods and Arrangements

Assessment of this qualification is through:

- Embedded, gated knowledge checks throughout the programme; and
- Summative assessment.

Learners must successfully complete all mandatory learning content and assessment requirements before certification can be issued.

This qualification is designed for digital delivery and incorporates sequential progression, embedded assessment activities and authenticated learner engagement throughout the programme.

Learning time

The qualification has been designed around structured digital learning activities incorporating applied examples, knowledge checks and controlled assessment activities.

Guided Learning Hours (GLH) reflect active learner engagement with the qualification content, learning activities and assessments rather than classroom attendance time.

Total Qualification Time (TQT) includes guided learning, embedded assessment activities and learner re-engagement associated with assessment progression.

Knowledge checks

Embedded knowledge checks are used throughout the qualification to:

- Verify learner understanding;
- Support learner progression;
- Identify knowledge gaps prior to progression;
- Support continued learner engagement throughout the programme;
- Build retained understanding toward the final assessment.

Learners must achieve a minimum pass mark of 80% within embedded knowledge checks before progressing to subsequent stages of learning.

Where learners do not achieve the required pass mark, they are provided with feedback identifying areas requiring further learning and required to revisit the relevant learning content and activities before re-attempting progression.

All modules, learning activities and embedded knowledge checks must be completed before subsequent stages of the qualification become available.

Summative Assessment

The summative assessment shall consist of a controlled multiple-choice assessment designed to assess applied knowledge and understanding across the qualification learning outcomes.

Learners must achieve a minimum pass mark of 80% within the final assessment.

A minimum 14-day cooling-off period will apply between unsuccessful assessment attempts.

Learner verification and assessment integrity

Learners register through individual authenticated accounts linked to verified professional or employer information.

Authenticated access controls and re-authentication measures are maintained throughout the qualification delivery and assessment process.

Prior to undertaking the final assessment, learners complete a declaration confirming the authenticity of their learning activity and assessment responses.

Learner progression, completion status, time on task, activity participation and assessment performance is digitally recorded throughout the programme to provide a retained audit trail available for quality assurance and external moderation purposes.



UK Certification
Unit 5 Station Close
Westover Trading Estate, Langport
Somerset, TA10 9RB
Tel: 01458252757
Web: www.ukcertification.org

