

# Heat Pump System Design Training Course



## Background:

This course is designed to fulfil a gap identified within existing formal training requirements for heat pump technologies. The course has no specific prerequisite knowledge, understanding nor training. The course is intended for anyone involved with the design of heat pump systems, the specification of technologies and components of heat pump systems. It is intended that the course should align with MCS standards for heat pump designers by providing specific training to enable engineers to design compliant, effective systems with confidence. By increasing the skills and expertise in the sector, it is expected that consumer confidence will grow, prompting growth in the sector and contributing to the UK's clean energy goals.

## Course Content:

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### Introduction

#### Learning Objectives:

*To be aware of the importance of informed heat pump design:*

- I. *Be aware of the requirement and timeframe for national renewable heating alternatives*
  - II. *Understand why the course was developed and what will be covered*
  - III. *Recognise some of the government-backed, financial support available*
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### Heat Pump Variations & Performance Optimisation

#### Learning Objectives:

*To understand how a heat pump collects and upgrades heat:*

- I. *List the stages of reverse-refrigeration cycle*
- II. *Recognise some commonly used refrigerants and their properties*

*To be able to identify different types of heat pumps and ground loops*

- I. *Understand the differences between various types of heat pumps*
  - II. *Understand the advantages and disadvantages to each type*
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### Design Process

#### Learning Objectives:

*To be able to assess a property's suitability for heat pump technology*

- I. *Recognise how land constraints, age of building and local geology will affect the design options*
- II. *To be aware of ways in which a building's thermal efficiency can be improved and how this will influence the heat pump design*

*To be able to conduct accurate calculations to size a heat pump*

- I. *Understand how U-values affect building temperature losses*
- II. *Calculate heat loss and annual heating demand for a property*

*To be able to correctly design the heat source system*

- I. *Select and locate ASHP exchangers*
  - II. *Optimise a ground connection for GSHP*
  - III. *Evaluate Open Loop or other heat source options*
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### Design Challenges

#### Learning Objectives:

*To understand challenges encountered in the design process and how to mitigate against them*

*To be able to apply knowledge learnt from the course to specify a heat pump system for a real case study*

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