
Superhomes Training Plan and Resources

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Abbreviations

COP	Coefficient of Performance is a metric of performance of a HP system
CEC	Comfort & Energy in Construction Webinar Series
CR	Croatia
D&C	Dissemination and Communication
DIY	Do It Yourself
EHPA	European Heat Pump Association
EISH	Electric Ireland Superhomes
EPG	Energy Performance Gap
ES	Spain
ESV	Energiesparverband Oberosterreich
FCTA	Fundacion Corporacion Tecnologica de Andalucia
HP	Heat Pump
IERC	International Energy Research Centre
NZEB	Near-Zero Energy Building
RDP	Regional Development Plan
RES	Residential
RINA-C	Rina Consulting SPA
SIE	Sustainable Innovations Europe
SME	Small Medium Enterprise
TUS	Technology University of the Shannon

Executive Summary

In order for Electric Ireland Superhomes (EISH) to continue their success more contractors, in-house engineers and retrofit advisors are required and in order to ensure the EISH standard is kept a training plan is required for in-house engineers, in-house retrofit advisors and retrofit contractors.

The EISH process is based off of the SEAI grant funding scheme for retrofit measures, as such the SEAI have minimum requirements for competency of installers of retrofit measures. The minimum requirements for SEAI should be the same for EISH. Thus, this document clearly outlines the entry requirements for contractors that wish to work for EISH in section 2.1 / 2.2.

Example:

Contracted Retrofit Measure	Minimum Requirement for Retrofit Measure Grant funding
Heat Pump Systems	<ol style="list-style-type: none">1. FETAC / QQI Level 6 Advanced Craft in Plumbing2. Certified Manufacturer training3. Fetac/QQI Level 6 Heat Pump Systems4. Registered Electrical Contractor5. F-Gas Regulation Compliant

A step-by-step plan was also created to further develop contractors skills and competencies in Section 2.3, which outlines the following:

1. Contractor Knowledge Hub / Self Learning
2. Webinar Series and Talks outside of working hours
3. ETB NZEB Centres of Excellence enrolment
4. In-House Engineer Training

As part of the Digital Academy for Sustainable Built Environment (DASBE) project, a standard for Residential Energy Retrofit Management was created. Using this standard and from conversation with EISH staff a training plan, entry requirements and resources have been created for in-house engineers and Energy advisors in section 2.4 to 2.7.

Homeowners have also a targeted plan for further developing their understanding of their new home and new heating system. This plan includes further case studies, homeowner guides, homeowner handover by engineers and installers, and readily available online resources.

1. Background and Context

The Superhomes skills & knowledge profile was the first step in the development of SH2030 training plan as the profiles (available in Deliverable D3.4) will be used by both the in-house engineering staff and contractors to identify any skills & knowledge gaps for them to be able to meet the Superhomes standards.

The methodology undertaken consisted of:

1. Engagement with key stakeholder groups
2. Review
3. Results and Development of Skills and knowledge profiles (for in house and contractors)
4. Feedback

The developed knowledge profiles will add value to the Superhomes organisation as they provide an overview of the professionalism required for delivery of a SuperHomes retrofit. The checklist of skills and knowledge can be used by contractors and in house staff alike to identify any shortcomings in knowledge. It is envisaged that both current and new in-house engineers & Contractors will evaluate their training status using this tool and provide EISH a good indication of the continuous professional development CPD packages they need to develop or plan for.

The contractor situation is more complex due to the nature of the sector and constraints on SMEs. This is why a Massive Open Online Course (MOOC) or learn as you go approach has been taken suggested in this report and is planned to be available as a Contractor Knowledge Hub for Electric Ireland Superhomes contractors only.

2. SH2030 Training Plan & Resources

The SH2030 plan will require participants both in-house staff and external contractors to firstly complete the subsequent training in order to apply for grant funding from SEAI grant system. When minimum requirements are met, the follow-on training will be provided in multiple ways, including in-house mentoring, in-house engineering procedures manuals, short webinars sessions, and masterclass talks from in-house engineers.

The Target for Superhomes2030 is to engage with 200 Contractors and 100 Homeowners in capacity building events. The Electric Ireland Superhomes team currently works with in excess of 75 contractors delivering 200 number of retrofits per annum.

2.1 Superhomes Contractors Minimum Requirements

The vast majority of contractors that work with Superhomes are construction related SME's, that consist of a team that can directly¹ or in-directly² delivery the retrofit project to the Superhomes design and standard. The EI Superhomes standard is based on the SEAI grant funding requirements. SEAI have provided an installer requirements & competency for each retrofit measure and provide information on various standards and guidelines contractors should follow. The major retrofit measures conducted by EI Superhomes and the minimum requirements and competencies for contractors are outlined below.

¹ Directly = the contractor is able to delivery on all the measures (fabric & airtightness and building services) needed to successfully delivery the retrofit project.

² In-directly = the contractor sub-contracts some measures.

Heat Pump Systems

For installation of heat pump systems, suitable qualified personnel are required. Contractors nominated to supervise work, inspect work, and to sign off the Declaration of Works must be competent in design, sizing, and installation of the whole heat pump system. To ensure this competency, contractors are required to possess:

1. Fetac/QQI Level 6 Advanced Craft in Plumbing, including a module on minor electrical works, or equivalent
2. Certificate of competence from the specific manufacturer of the heat pumps installed, based on an adequate training programme
3. Fetac/QQI Level 6 Heat Pump Systems (Course Code C30263) and supplemental Domestic Heat Pump Installation (Code 700606) or equivalent
4. A Registered Electrical Contractor (REC) is required to supervise and sign off the electrical installation of a heat pump system, and a copy of the RECI certificate must be left with the homeowner and available for inspection.

5. An F-Gas engineer is required to carry out and certify heat pump system installations involving refrigerant pipework and charging as per the F-Gas Regulation EU No. 517/2014 in force since 1st January 2015.

Heating Controls

Heating controls must be installed by suitably qualified individuals:

1. in accordance with manufacturer's guidelines as a minimum;
2. a Level 6 National Craft Certificate in Plumbing or an equivalent Plumbing qualification such as City and Guilds;
3. Plumbers must have completed an electrical module during their course to carry out the 'minor' electrical works involved in specific control measures.

If 'Controlled Works', as defined by the CRU document 'Definition of the Scope of Controlled Works' are required, then these works must be carried out by a Registered Electrical Contractor and a Completion Certificate must be issued.

Insulation

This section includes and combines the requirements for cavity wall, external wall, internal wall, roof, rafter, and floor insulation measures. Insulation contractors must have/be:

1. Approved by the NSAI Agrément scheme
2. NSAI Agrément Approval Scheme for Installers of External Thermal Insulating Composite Systems (ETICS).
3. NSAI Agrément Registered Blown Cavity Wall Installation Companies
4. Contractors must be competent to install same and must complete the work to the standard set out in S.R.54 Code of Practice for Energy Efficient Retrofit of dwellings
5. Roof insulation Contractors should have completed a FETAC level 5 or equivalent in attic insulation installation
6. in accordance with the manufacturer's specifications and NSAI's S.R. 54:2014 – Code of practice for the energy efficient retrofit of dwellings

Windows and Doors

This section includes all internal and external doors, as well as window replacement and glazing envelope replacement. Contractors of this section are required to install windows and doors:

1. In accordance with British Standard document Code of practice for the survey and installation of windows and external door sets (BS 8213-4:2016)
2. and the manufacturer's guidelines as a minimum requirement.
3. Contractors installing glazing within existing frames must be in accordance with British Standard document Workmanship on construction sites. Introduction and general principles (BS 8000-0).

Mechanical Ventilation

The mechanical ventilation must be installed by suitably qualified individuals in accordance with manufacturer's guidelines as a minimum.

Air Tightness / Draught Proofing

Draught proofing Contractors must complete the work as set out in the guidance document BS 7386:1997 Specification for draught strips for the draught control of existing doors and windows in housing.

Draught proofing should be installed in accordance with Best Practice Guides/ Technical Guides supplied by the material manufacturer and covered by an NSAI Agrément Certificate.

Solar Photovoltaic

The Installer has total responsibility for ensuring compliance. The Installer must be registered on SEAI's Solar PV Installer Register at the time the installation is carried out. The Installer must provide all information required by SEAI for the purposes of audit and inspection.

Solar Hot Water

The contractor is required to hold a Level 6 FETAC Certificate in Solar Domestic Hot Water Systems or an equivalent qualification, the system must be listed on the SEAI Solar Thermal Registered Product List, and the contractor must install the system in accordance with SR 50-2:2010 "Code of practice for building services – Part 2: Solar panels".

2.2 Contractor Minimum Requirements Overview

Contracted Retrofit Measure	Minimum Requirement for Retrofit Measure Grant funding
Heat Pump Systems	<ol style="list-style-type: none"> 6. FETAC / QQI Level 6 Advanced Craft in Plumbing 7. Certified Manufacturer training 8. Fetac/QQI Level 6 Heat Pump Systems 9. Registered Electrical Contractor 10. F-Gas Regulation Compliant
Heating Controls	<ol style="list-style-type: none"> 1. in accordance with manufacturer’s guidelines as a minimum; 2. a Level 6 National Craft Certificate in Plumbing or an equivalent Plumbing qualification such as City and Guilds; 3. Plumbers must have completed an electrical module during their course to carry out the ‘minor’ electrical works involved in specific control measures.
Insulation	<ol style="list-style-type: none"> 1. Approved by the NSAI Agrément scheme 2. NSAI Agrément Approval Scheme for Installers of External Thermal Insulating Composite Systems (ETICS). 3. NSAI Agrément Registered Blown Cavity Wall Installation Companies 4. Contractors must be competent to install same and must

	<p>complete the work to the standard set out in S.R.54 Code of Practice for Energy Efficient Retrofit of dwellings</p> <p>5. Roof insulation Contractors should have completed a FETAC level 5 or equivalent in attic insulation installation</p> <p>6. in accordance with the manufacturer’s specifications and NSAI’s S.R. 54:2014 – Code of practice for the energy efficient retrofit of dwellings</p>
Windows & Doors	<p>1. In accordance with British Standard document Code of practice for the survey and installation of windows and external door sets (BS 8213-4:2016)</p> <p>2. In accordance with manufacturer’s guidelines as a minimum requirement.</p>
Mechanical Ventilation	<p>1. The mechanical ventilation must be installed by suitably qualified individuals in accordance with manufacturer’s guidelines as a minimum.</p>
Air Tightness/ Draft Proofing	<p>1. Work as set out in the guidance document BS 7386:1997</p> <p>2. Draught proofing should be installed in accordance with Best Practice Guides/ Technical Guides supplied by the material</p>

	manufacturer and covered by an NSAI Agrément Certificate.
Solar PV	<ol style="list-style-type: none"> 1. The Installer must be registered on SEAI’s Solar PV Installer 2. The Installer must provide all information required by SEAI for the purposes of audit and inspection.
Solar Hot Water	<ol style="list-style-type: none"> 1. Level 6 FETAC Certificate in Solar Domestic Hot Water Systems or an equivalent qualification.

2.3 Contractors further learning & Contractor Hub

The plan for further learning for contractors is using continuous learning and self-learning mechanisms in order to improve contractor skills and competencies.

Contractors present the most difficult challenge for upskilling and capacity building. From conversations with contractors, it seems apparent that training isn’t seen as important as work. This work/training dichotomy is a major factor in the training plan and will require alternative options to provide training than the traditional long-period training course.

With this in mind it is envisaged that a contractor hub on the Electric Ireland Superhomes website will have resources available for contractors and in house engineers alike. This library of training materials will allow contractors to learn in their own time instead of during working hours. A list of resources and standards (available in Appendix B) is envisaged to be available on the contractor knowledge Hub and with the help of in-house engineers proper guidance will be available for contractors, improving their skills and competencies.

The next step for a EISH contractor is to attend short webinar series by TUS and EISH having in-house engineers and industry experts speaking about specific retrofit measures or specific products outside of working hours or during lunch times. This removes the need to take the contractors out of work while also providing useful information in a short period of time.

The next step for a EISH contractor is to enrol in an Education Training Board (ETB) NZEB centre of Excellence for NZEB and Retrofit Training. ETBs including Laois Offaly ETB (LOETB),

Waterford Wexford ETB (WWETB) or Limerick Clare ETB (LCETB). These centres provide courses such as:

- NZEB fundamentals
- QQI level 5 retrofit insulation skills
- NZEB ventilation systems
- External wall insulation applicator
- Building Physics
- Building Services
- Renewables, Solar PV, Smart metering, and electric vehicles
- Communication and User Information

The final step for a contractor looking to further improve their skills is to undergo the training plan for in-house engineers.

2.4 In-House Engineer Minimum requirements

For those wishing to join the in-house engineering team at EISH they must have one of the following:

- An honours degree (level 8) in a cognate discipline (e.g., Engineering, Architecture, Building Services, Construction Management etc.) or approved equivalent qualification
- Or A level 7 qualification in a cognate discipline (e.g., Engineering, Architecture, Building Services, Construction Management etc.,) or approved equivalent qualification, with 1-year relevant work experience
- Or Special Case Registrations: Prospective participants who do not meet the entry requirements above, but who may qualify for admission by meeting certain other equivalent criteria, including workplace experience, should apply to the EI Superhomes to undergo the procedure for consideration

2.5 In-House Engineers Further Learning

Superhomes engineers have highly technical and project management skills at their core, gained from a combination of higher-level education and work experience. Due to the dynamic nature of retrofits projects engineers must be able to work in a multidisciplinary team,

as the projects will involve many stakeholders from homeowners, BER assessors, principle and sub-contractors, fellow engineers, SEAI and the wider Superhomes organisation.

A Superhomes engineer should have the skills and knowledge to deliver all the tasks involved in the workflow process of a typical retrofit project as shown in Figure 1 below:

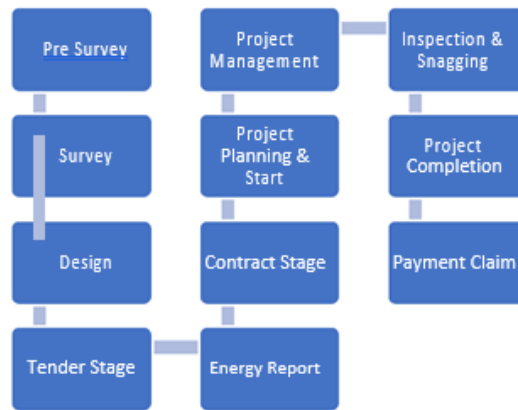


Figure 1 Superhomes Engineering Flow Process for a typical retrofit project

Figure 1 demonstrates the wide scope of skills and knowledge needed, thus highlighting the importance of this task and the subsequent training plan for in-house engineers.

The Digital Academy Sustainable Built Environment (DASBE) project & TUS have produced a flexible learning Higher Diploma in Residential Energy Retrofit Management. From the learnings of the higher diploma and conversations with EISH engineers, the following is the proposed plan for training of in-house engineers and is envisaged to be presented via masterclass talks by senior or specialised engineers.

Module / Learning Unit
Module 1 - Residential Energy Retrofit Fabric
Unit 1.1 - Building Physics and Fabric
Unit 1.2 - Air Tightness
Unit 1.3 - Building Defects Detection & Analysis
Module 2 - Residential Energy Retrofit Systems
Unit 2.1 - Heating & DHW for Residential Retrofit

Unit 2.2 - Ventilation Solutions for Energy Retrofit
Unit 2.3 - RES Electricity & Smart Buildings
Module 3 - Residential Energy Retrofit Management
Unit 3.1 - Project Management for Residential Energy Retrofit
Unit 3.2 - Energy Retrofit Project
Module 4 - Retrofit Advisory / Sales
Unit 4.1 - Retrofit Business Planning & Finance
Unit 4.2 - Circular Economy & Procurement

2.6 Retrofit Advisor Entry Requirements

For an those wishing to join the in-house retrofit advisory team at EISH they must have one of the following:

- An honours degree (level 8) in a cognate discipline or approved equivalent qualification.
- Or A level 7 qualification in a cognate discipline or approved equivalent qualification, with 1-year relevant work experience.
- Special Case Registrations: Prospective participants who do not meet the entry requirements above, but who may qualify for admission by meeting certain other equivalent criteria, including workplace experience, should apply to the EI Superhomes to undergo the procedure for consideration.

2.7 Retrofit Advisors Further Training

Energy advisors are an integral part of the EI SuperHomes customer journey and the 'Client team'. The client team consists of the Retrofit Advisor, retrofit engineer, finance and accounts. The advisor schedules an initial consultation with the client, after which the client and the retrofit advisor will have a clearer idea about what measures, costs, grants, and timelines are involved in the project. In order to ensure the best possible retrofit advisors, it is envisaged that a review of grant funding availability be completed, following the review a short webinar/ talk will take place to ensure all advisors are up to date.

Further to the grant funding review, it is envisaged that retrofit advisors will undertake Module 4 of the in-house engineers training.

2.8 Homeowners

Homeowners will require training on their new heating systems, as retrofit measures such as insulation, airtightness, etc are out of their control. Homeowner heating system training is very important as it ensures that the designed heating system is working at its maximum efficiency. TUS has been working with local authorities and the consensus is that a homeowner leaflet is perfect for providing an overview of a system and can get across key messages to homeowners with little to no experience with heat pumps or heating systems. For the more advanced and technology savvy homeowner the common request is for a homeowner manual, similar to that of a car manual, on the measures completed at the house, and will also keep a record of works done.

Other resources for homeowners will be available on the Electric Ireland Superhomes Website and will include:

1. Recordings and slides of webinars targeting homeowners, including the TUS hosted HP4ALL homeowner webinar series and the Community of Practice homeowner event.
2. Podcasts (due to commence in 2023)
3. Case Studies

Appendix A – Training Resource Sources

Content was created from a list of sources.

BIMzeED

BIMzeED was one source of information and materials that inspired the Superhomes2030 training materials. These materials are well defined, well designed and fully incorporate BIM and NZEB together, which is excellent for in house engineers. There are well-defined materials in the area of building physics, NZEB fundamentals, airtightness and ventilation, and fabric that are applicable to both contractors and in-house engineers alike. There is an online course for BIMzeED that will be signposted to.

The BIMzeED project focuses on the training needs for the current and future construction industry with the main purpose to encourage:

- 1) better employability
- 2) low-carbon growth
- 3) green and NZEB skills
- 4) increase in youth employment.

The partners of this project include Technological University of the Shannon: Midlands, Midwest (TUS), Tipperary Energy Agency (TEA), the university of Zagreb, EMI, ITEC, Obuda University, CIM- UPC, Architects Council of Europe and Northwest Regional Energy Agency – Croatia. The projects website can be found here: <https://bimzeed.eu/>

HP4ALL

HP4ALL is a heat pump project funded under Horizon 2020 with the main aim of enabling capacity and skills development within the Heat Pump sector and to ensure that the energy efficiency gains afforded by heat pumps are realised. As part of pilot activities, the HP4ALL consortium must produce country specific Heat pump training for Homeowners, installers, and specifiers/Designers. TUS are leading the pilot activities in Ireland and have Heat pump materials that can be used by the Superhomes2030 project. The heat pump is a core aspect of the Superhome thus making these materials applicable to Superhomes2030 project.

The partners include ESV, TUS, FCTA, IERC, SIE, EHPA and RINA-C.

Comfort & Energy in Construction Webinar Series

A series dedicated to providing short training sessions to workers in the construction sector. The original series consisted of 14 webinars that were run from August to September every Wednesday and Thursday at lunchtime and are focused on the domestic sector. Another series is planned for December 2022 and will focus on the non-domestic sector. The webinar series brings together leading experts in the built environment to provide a quick overview of the current trends, common problems, and future trends in various sectors. The webinars will also be recorded and can be uploaded to the Superhomes contractor hub as well as being available on the TUS RDI YouTube channel (<https://www.youtube.com/playlist?list=PLrJa4Azt4NnDOaWw8CYxoqjyZ0Avmzvzq>)

The first CEC webinar series is listed below with speakers and a brief description of the webinar.

Table 1 Comfort & Energy in Construction Webinar Series 10th August to 22nd September

Webinar No.	Webinar Name	Module Description	Speaker
1	NZEB (Nearly Zero Energy Building)	<ul style="list-style-type: none"> - What is NZEB? - Current Regulations - Smart Homes - Future Prospects 	Benny McDonagh, TUS
2	Heat Pumps Overview	<ul style="list-style-type: none"> - Current Trends in Air to Water - Monobloc vs Split systems - Exhaust Air Heat Pumps 	April McHale, Daikin

		<ul style="list-style-type: none"> - Efficiency - Flow temperature and dT 	
3	Heat Pump & Refrigerant	<ul style="list-style-type: none"> - Current Refrigerants - Global Warming Potential - Efficiency (Fridge side) - Refrigerant Handling - Future trends of Refrigerants 	John Murphy, ECAC
4	SEAI Heat Pump Grant inspection Points	<ul style="list-style-type: none"> - Fabric inspection points - Heat pump inspection points - Controls requirements - Piping requirements - Wiring requirements - Qualification Requirements 	Michael Slevin, KSN Energy
5	Heat Loss Calculations & DEAP Software	<ul style="list-style-type: none"> - Fabric Heat Loss - Ventilation Heat Loss - Room by Room Calculations - DEAP Walk Through 	Barry Guinan, Grant

6	Circular Economy and Waste	<ul style="list-style-type: none"> - Construction Waste - Circular Economy - Examples of Irish Products - Future trends of circular economy 	Benny McDonagh, TUS
7	Emission System (Radiators, Underfloor heating)	<ul style="list-style-type: none"> - Traditional Heating systems overview (Boiler with Rads) - Heat Pump + emitter requirements - Retrofit & Radiators - Future trends of Emitters 	Calin Tasnadi, HEVAC
8	Pipe sizing (dT) with Heat Pumps	<ul style="list-style-type: none"> - dT requirements of emitter & Heat Pump - Flow rates, pressure, heat output - Pipe Insulation - Underfloor heating piping 	Keith Scully, Grant Engineering
9	Retrofit Management	<ul style="list-style-type: none"> - Initial Assessment - Measure selection 	Shaun Finn, EI Superhomes

		<ul style="list-style-type: none"> - Cost / benefit analysis 	
10	Insulation	<ul style="list-style-type: none"> - Current trends in market - Common problems identified - Future trends in market 	Joe Fitzgerald, Eco Building Systems
11	Airtightness	<ul style="list-style-type: none"> - Current trends in market - Common problems identified - Future trends in market 	Joe Fitzgerald, Eco Building Systems
12	Ventilation	<ul style="list-style-type: none"> - Current trends in market - Common problems identified - Future trends in market 	Dara McGowan, Partel
13	Refrigeration & Air Conditioning	<ul style="list-style-type: none"> - Cooling Market in Ireland - Commercial Chiller market overview - Air conditioning market overview - Future of Cooling in Ireland - Training Providers 	John Murphy, ECAC

14	Customer handover	<ul style="list-style-type: none"> - Initial Contact - Customer Journey - Servicing and callouts 	Cori Calvert, EI Superhomes
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Appendix B – Additional Resources

Heat Pump Systems Contractor Resources

EPA “Summary Guidance for Compliance with the ODS and F-Gas Regulations” and “Complying with Regulations Controlling Fluorinated Greenhouse Gases and Ozone Depleting Substances – A Guidance Note for Operators of Equipment Containing F-gases and ODS”
I.S. EN 15450 Heating Systems in Buildings – Design of Heat Pump Heating Systems
I.S. EN 12831 Heating Systems in Buildings – Method for calculation of the design heat load
B.S. EN 12828+A1 Heating systems in buildings. Design for water-based heating systems
HPIA Heat Pump installation guidelines
S.R. 50 – 1 Code of Practice for Building Services Part 1: Domestic Plumbing and Heating
Microgeneration Certification Scheme MCS 021 Heat emitter guide for domestic heat pumps and “Heat Emitter supplement to the Domestic Heating Design Guide” by the Institute of Domestic Heating and Environmental Engineers (IDHEE)
‘Heating and Domestic Hot Water Systems for Dwellings – Achieving Compliance with Part L’, Section 8 from DHPLG
SEAI DEAP Heat Pump Methodology

I.S. EN 378-1 and I.S. EN 378-3: Refrigerating systems and heat pumps – Safety and environmental requirements -Part1: Basic requirements, definitions, classification, and selection criteria and - Part3: Installation site and personal protection

Manufacturer’s installation instructions for the specific Heat Pump model(s) and other parts of the system installed

CIBSE TM 51 Ground Source Heat Pumps

CIBSE – Domestic Heating Design Guide

Microgeneration Certification Scheme (MCS) MIS 3005 “Requirements for MCS Contractors undertaking the supply, design, installation, set to work, commissioning and handover of microgeneration heat pump systems”

I.S EN 17628 – Geotechnical Investigation and Testing – Geothermal Testing- Determination of thermal conductivity of soil and rock using borehole heat exchangers

Environmental good practice guide for ground source heating and cooling (GEHO0311BTPAE-E) by the UK Environment Agency

GSI Geothermal Collector suitability Maps

GSI Ground Source Heat and Shallow Geothermal Energy Homeowner Manual

IS. EN. 12897 ‘Water supply. Specification for indirectly heated unvented (closed) storage water heaters’

BS 1566-1:2000 ‘Plastics piping systems for soil and waste discharge (low and high temperature) within the building structure. Chlorinated poly (vinyl chloride) (PVC-C). Specification for pipes, fittings, and the system’

BS 3198 ‘Specification for copper hot water storage combination units for domestic purposes

Heating Controls Contractor Resources

Heating and Domestic Hot Water Systems for Dwellings – Achieving Compliance with Part L
Installations and BS 5449 – Specification of Forced Air Circulation Hot Water Central Heating Systems for Domestic Purposes(or equivalent Irish Standard)
GPG 302 Controls for Domestic Central Heating and Hot Water – Guidance for Specifiers and Installers (Energy Savings Trust and BRE)
CE29 Domestic Heating by Oil: Boiler Systems – Guidance for Installers and Specifiers
CE30 Domestic Heating by Gas: Boiler Systems – Guidance for Installers and Specifiers
EN 60730-1 Automatic electrical controls for household and similar use. General requirements

EN 60730-2-7 Automatic electrical controls for household and similar use Part 2-7: Particular Requirements for Timers and Time Switches

EN 215 Thermostatic Radiator Valves. Requirements and Test Methods

Insulation Contractor Resources

NSAI Agrément certificate and clause 7.3.4 of S.R. 54:2014.

“Major Renovation” section of Part L of the Building Regulations
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Guidance in Internal Wall Insulation in existing housing – a guide for specifiers and contractors (CE17/GPG138) published by the Energy Saving Trust
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NSAI’s S.R. 54:2014 – Code of practice for the energy efficient retrofit of dwellings.
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Windows & Doors Contractor Resources

EN 14351-1:2006 (Windows and doors – Product standard, performance characteristics).
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EN 14351-1:2006 (Windows and doors – Product standard, performance characteristics).
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EN 1279-1 (Glass in building. Insulating glass units. Generalities, dimensional tolerances, and rules for the system description)

PAS 24: 2016 (Enhanced security performance requirements for door sets and windows in the UK. Door sets and windows intended to offer a level of security suitable for dwellings and other buildings exposed to comparable risk).

EN 1279-2 (Glass in building. Insulating glass units. Long term test method and requirements for moisture penetration)

Construction Products Regulation (Council Regulation no. 305/2011)

IS EN ISO 12567 Thermal performance of windows and doors — Determination of thermal transmittance by the hot-box method — Part 1: Complete windows and door

IS EN ISO 10077 Thermal performance of windows, doors, and shutters — Calculation of thermal transmittance — Part 1: General

Mechanical Ventilation

COMMISSION DELEGATED REGULATION (EU) No 1254/2014 of 11 July 2014 supplementing Directive 2010/30/EU of the European Parliament and of the Council with regard to energy labelling of residential ventilation units

I.S. EN 13141-1:2004 Ventilation for buildings. Performance testing of components/products for residential ventilation. Externally and internally mounted air transfer devices.

B.S. EN 13141-4:2011 Ventilation for buildings. Performance testing of components/products for residential ventilation. Fans used in residential ventilation systems.

I.S. EN 13141-5:2004 Ventilation for buildings. Performance testing of components/products for residential ventilation. Cowls and roof outlet terminal devices.

I.S. EN 13141-7:2011 Ventilation for buildings. Performance testing of components/products for residential ventilation. Performance testing of a mechanical supply and exhaust ventilation units (Including heat recovery) for mechanical ventilation systems intended for single-family dwellings.

I.S. EN 13141-11:2015 Ventilation for Buildings – Performance Testing of Components/products for Residential Ventilation Part 11: Supply Ventilation Units

I.S. EN 13141-6:2014 Ventilation for Buildings – Performance Testing of Components/products for Residential Ventilation Part 6: Exhaust Ventilation System Packages Used in a Single Dwelling

I.S. EN 13141-8:2014 Ventilation for Buildings – Performance Testing of Components/products for Residential Ventilation Part 8: Performance Testing of Un-ducted Mechanical Supply and Exhaust Ventilation Units (including Heat Recovery) for Mechanical Ventilation Systems Intended for a Single Room

BS EN 13141-9:2008 Ventilation for buildings – Performance testing of components/products for residential ventilation. Externally mounted humidity-controlled air transfer device

Solar Hot Water

Solar Heating Design and Installation Guide – CIBSE Guide.

Solar PV

Solar PV Code of Practice.