
Superhomes Standards Recommendations Report

Prepared by: **Superhomes Ireland DAC**



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Disclaimer of Warranties

“This project has received funding from the European Union’s Horizon 2020 research and innovation programme under Grant Agreement No 890492”.

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Abbreviations

SuperHomes 2030: Up scaling integrated Home Deep renovation services for Ireland

Partners

EHPA: European Heat Pump Association

ESB: Electricity Support Board

LIT: Limerick Institute of Technology

TEA: Tipperary Energy Agency

SIDAC: Superhomes Ireland DAC

SW: Sustainable Works

Current Practice

SuperHomes 2030 is an initiative by Tipperary Energy Agency, where bespoke retrofits are offered to private dwellings. These retrofits always include heat pump technology and include a high level of fabric upgrades. Common fabric upgrade measures include, wall, roof and floor insulation, window & door upgrades, air leakage minimisation. Retrofit could also include other renewable technologies such as solar PV or in the future electric vehicle charging points.

SuperHomes are considered a one-stop-shop as they manage the whole retrofit process for the client. This includes assistance in accessing the SEAI grants, managing the contractors and sub-contractors, designing the retrofit, overseeing the retrofit works, and standing over the finished product.

The One-Stop-Shop business model can be broken down into key roles, with each role having its own set of standards to follow.

1. SuperHomes Advisor – This is the initial stage of the SuperHomes process. This is where standards must be implemented on how staff reach homeowners, how they interact with clients and how they produce effective and accurate assessments that ‘sell’ the retrofit. This can be considered ‘sales and initial advice’.
2. Design - This stage is where an energy report is produced, and the retrofit measures are designed. An initial or preliminary design is carried out prior to issuing the energy report and more detailed design is carried out once the project is confirmed as proceeding. There are design and reporting standards that will apply to this stage.
3. Project management – This stage runs concurrently throughout the whole retrofit process; this manages all the elements of the retrofit from start to finish and there are project management standards that must be adhered to.
4. Technical standards – these are the standards that all contractors and sub-contractors must adhere to when choosing materials, installing technologies, or carrying out building works on the property.
5. Finance and accounting – there are key standards to adhere to when considering the financing and account of a retrofit. These are expensive dwelling interventions and require grants and subsidies. It is vital that standards are implemented with respect to finance and accounting, or it risks projects running over budget or grant applications getting rejected.
6. Quality Standard -Running concurrently to all other stages is a ‘quality standard’. This is an inhouse standard applied to all stages to ensure the highest possible quality of work is carried out. The process is carried out using quality checks and comprehensive auditing that is measured against key KPIs.

Current Standards

For each retrofit measure there are international, national and inhouse standards to work within. Overall, Superhomes follow over 100 recognised standards. Below, is an extract from Appendix 1 (Superhomes Technical Standard Reference Docs (Current)).

Appendix 1 is a list of standards and reference documents currently used by Superhomes, indicating the Stages in our processes in which these various documents apply. In addition, parts of these reference standards apply across various energy upgrade measures.

However, this is just a sample and not an extensive list, as it is important to keep some level of industry secret to remain competitive within the market.

Fig 1: Extract from Appendix 1 “Superhomes Technical Standard Reference Docs (Current)”

See

Ref.	Reference (Click for link where available)	Rev:	Type:	Marketing			Sales					E		
				[1] Website	[2] Marketing / Advertising	[3] Open Houses	[1] Applications	[2] Customer Service - Initial Screening	[3] Technical Advisor - Further Screening	[4] Send Survey Process & arrange Survey	[5] EAR Discussion and Signing up HO		[1] Pre Survey	[2] Survey
1	Superhomes Website		InHouse	✓	✓	✓	✓							
2	Superhomes Application		InHouse	✓	✓		✓	✓						
3	Superhomes FAQ and note on fees		InHouse						✓	✓				
4	Heat Pump Survey Info Sheet		InHouse						✓	✓				
5	DRPP Domestic Technical Standards and Specifications (Latest Version)	V 1.2 2019	National									✓	✓	✓
6	S.R.54: 2014 & A1: 2019 (code of practice for energy efficient Retrofit of Dwellings)	2019	National									✓	✓	✓
7	Building Regs 2014 TGD J Heat producing Appliances		National										✓	✓
8	Building Regs 2010 TGD E Ventilation	2010	National											✓

NOTE: See Appendix 1 for more complete table of Standards & Reference Documents.

Each standard is currently numbered, its reference title, its current revision, and its 'type'. It may contain a link the standard.

Also included in the extensive standards list is a key to show the stages in the process in which these standards are and reference documents are applied.

Shortcomings with Current Practice

Appendix 1 demonstrates the process stages (in broad terms) at which parts of various standards and reference documents may apply to the SuperHomes process. However, it does not sufficiently narrow down the focus to the most relevant parts of these standards for the process stage in question. Nor does it bring focus to the relevant parts in a 'Measure by Measure' way.

Using this many reference documents in this way is quite cumbersome and can take quite some time to learn to navigate. The current model of Engineer Training is based primarily around a 'Mentoring' approach (where a new or Junior Engineer will work under or closely with a more senior engineer for a period of time), during which they will learn about the various standards, relevant parts and how to apply them. This can leave too much scope for gaps in learning leading to errors or omissions by less experienced SuperHomes engineers.

The current practice also poses challenges for the development of more formal Engineer Training and for the development and implementation of Quality Assurance procedures (to check and monitor that the Standards and Reference documents are being appropriately utilised) in order to ensure the delivery of high quality energy upgrade projects.

Currently there is no formal review process in place for the Technical Standards and Reference Documents. These are typically only reviewed as new or revised SEAI, National or EU Standards come to our attention or where quality failures highlight a shortcoming or oversight.

Conclusions

Whilst the current practice of routinely referencing a wide range of Technical Standards and Reference Documents worked in a small team of engineer working closely together where clarification questions could be easily and quickly asked and answered, this will not work sufficiently well in the context of a rapidly growing team of Retrofit Engineers operating out of different offices and increasingly working remotely.

We conclude that, in this context the existing structure and use of the standards is;

- too broad in content and not sufficiently focused on specifics relating to the Superhomes Approach
- too inefficient to use
- too inefficient in the transfer of this knowledge to new and/or junior engineers
- difficult to incorporate into training programmes
- open to inconsistent application
- difficult to apply efficient quality checks
- lacking in an effective formal review process

Recommendations

We recommend that, whilst the existing Reference Standards and Reference Documentation need to remain as the primary reference sources (as dictated by Best Practice Standards, National & EU Legislation & Regulations, Support Scheme requirements etc.), new more specific and focused standards should be developed to improve efficiency and effectiveness in both use and dissemination. Development of such new 'in-house' standards should incorporate the following improvements & features;

Measure by Measure

Many of the existing reference standards span a number of different Energy Upgrade Measures. This means that numerous documents may need to be consulted for information on any given energy upgrade measure. As 'Technical Standards' the new standards documents should be broken down, as far as is practical, on a 'measure by measure' basis. E.g.;

- A Standard for Heatpumps,
- A standard for Cavity Wall Insulation
- etc.

Whilst some cross referencing will be necessary in some instances it should be possible, easy and quick to source the most relevant concise information on the most common energy improvement measures used by Electric Ireland Superhomes engineers.

Consolidation

The existing extensive list contains over 100 Standards & Reference Documents. Whilst it includes almost every standard SuperHomes staff need to refer to, it is very large and makes the process of finding relevant information inefficient. Within the context of an expanding retrofit market, Superhomes will see an increase in engineers and retrofit specialists. This is where the inefficiency of the current system will be most greatly felt as new staff take time to learn the system and end up referring to large documents to find, and become familiar with, short extracts from standards.

In order to simplify this, the recommendation is then to consolidate the most relevant parts of these standards, carefully selected to best match the SuperHomes approach and methodology. These SuperHomes 'In-house' standard can be set out in a Measure-by-measure format and will contain the key information most commonly used by SuperHomes, for use in an easy and accessible way.

To consolidate these standards several key steps should be taken.

- Firstly, the current extensive list should be reviewed by the engineering team to ensure that all key standards are currently included.
- Secondly, key day-to-day standards should be identified and condensed into easily accessible information. This could be either simple sentences of text or infographics.

The result of this should be a short booklet containing all the key information needed on a day-to-day basis by the engineering team at SuperHomes. It should be easily accessible for new staff arriving at SuperHomes and should contain all the necessary standards to design an energy retrofit project.

Clear, Concise and Efficient

In developing these standards it will be important to ensure that the minimum required information is easily accessible, clearly laid out or explained (using pictures & diagrams where necessary), and should contain quick tips, tools and reference tables to help eliminate repetitive tasks.

Primary (Normative) References

Whilst we strive to make these new standards quicker and more user friendly it is important that we do not lose sight of the primary standards on which they are based. For this reason, the new standards should contain direct reference to the most relevant parts of the primary reference standards. With this information, an engineer will be able to quickly and easily get further detail and understanding if necessary. This section will act as a more direct 'sign post' to further information.

Main Clauses of the Standards

The main clauses of each 'measure by measure' standard should address each of the following;

- Design Standards and considerations
- Installation standards and considerations
- And where applicable Commissioning standards & considerations.

Identify Training Needs

As one of the key functions of the new technical standards should be to act as the 'Engineering Design Manual' for Electric Ireland Superhomes Engineers it should also form a vital part of any training programmes to be developed for Electric Ireland Superhomes:-

- Retrofit Engineers
- Approved Contractors
- and in some cases, Clients / Homeowners

This will help ensure consistency in approach and output by the Engineering Team and our approved Contractors.

Note: The Skills & Knowledge sections of the standards can be used to inform training & qualification needs analysis.

Documentation Checklists

The technical Standards should list (and describe where necessary), the various documentations and certifications that are required and need to be gathered and kept on record for various purposes such as;

- BER Substantiation
- Grant Claim Support
- Quality Control
- Safety File
- Operation & Maintenance Manuals

We suggest that this checklist is in the form of a standard appendix to the relevant standard.

Inspection Checklists

The Technical Standards should contain a checklist of ‘measure by measure’ installation Inspection points (and described / explained where necessary), to offer clear guidance to Engineers & Contractors what is expected to meet quality standards to ensure;-

- Quality Standards
- SEAI / KSN Inspection Standards
- Performance Standards
- Client / Homeowner Satisfaction

In addition to being broken down on a ‘measure by measure’ basis, these should also clearly identify (for the benefit of contractors) what trades are typically responsible for meeting these inspection points. For example; With a Heatpump Installation there may be inspection points that are relevant to both Plumbers & Electricians.

We suggest that this checklist is in the form of a standard appendix to the relevant standard.

Format

The Standards should follow a recognised format such as might be used in a formal document and quality control system to include key headings such as;

- Scope
- Normative References
- Terms & Definitions
- Standards Clauses (Specific to the measure in question)
- Reference to Installation Standards
- Reference to Commissioning Standards (Where applicable)
- Other Supporting Documentation (such as checklists, forms, certifications, manuals, Eco-design data etc.) noting the purpose and need for these supporting documents.
- Installation Inspection (Referencing inspection checklists for Quality Control)
- Skills & Knowledge

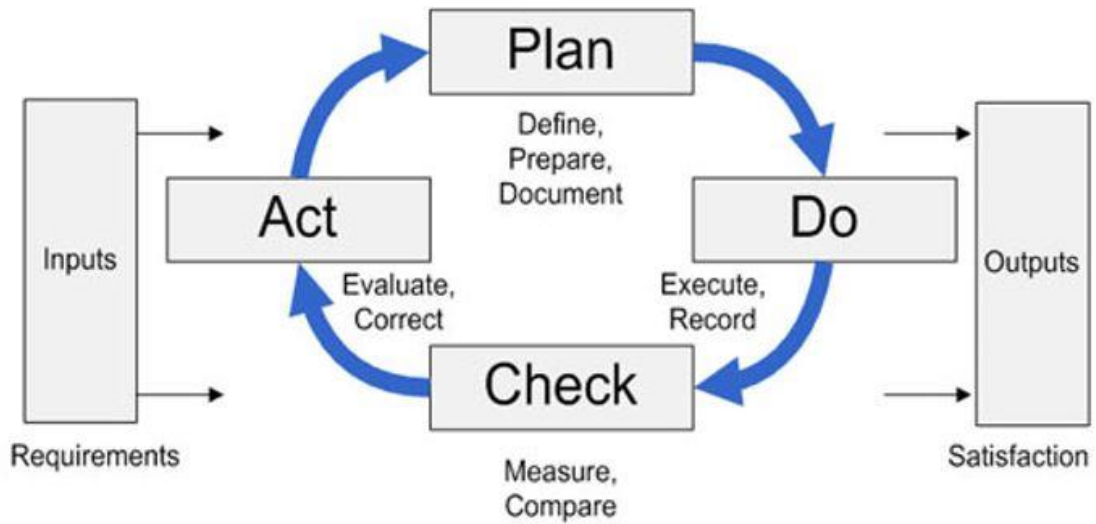
Continual Review

It is important, in order to ensure that the new Technical Standards remain current that a process of continual review is implemented. As a new and developing industry, the Energy Retrofitting is growing, developing and changing all of the time. Such changes may become necessary for any one of a number of reasons such as;-

- Technical Advances
- Regulatory Changes
- Grant Support Scheme Rules
- Changes in inspection regimes
- Learned Experience (from past successes or failures)

As these Standard will need to be continually reviewed and updated it is vital that these standards have a carefully maintained document control system in place to track these ongoing changes and to ensure that all users are kept abreast of ongoing changes and can always reference the latest version.

We recommend that a Standards Review Process is implemented to ensure continual improvement and updating of the standards and to ensure that they remain effective and can be efficiently used and applied in a consistent manner. A simple review process with regular (possibly annual) review dates should be implemented. Below is a basic map of how such a review could operate.



This process is to be replicated again for several different key retrofit measures so that the aim of creating a short, easily accessible document containing the key standards and acting as a guide for Superhomes staff is realised.

Appendix 1

Superhomes Technical Standard Reference Docs (Current)

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Ref.	Reference (Click for link where available)	Rev:	Type:	Marketing			Sales					Engineering Process										Other			
				[1] Website	[2] Marketing / Advertising	[3] Open Houses	[1] Applications	[2] Customer Service - Initial Screening	[3] Technical Advisor - Further Screening	[4] Send Survey Process & arrange Survey	[5] EAR Discussion and Signing up HO	[1] Pre Survey	[2] Survey	[3] Design	[4] Tender Stage	[5] Energy Report	[6] Contract Stage	[7] Project Planning & Start	[8] Project Management	[9] Project Completion	[10] Payment Claim & other	Quality Assurance & Management	Finanace		
1	Superhomes Website		InHouse	✓	✓	✓	✓																		
2	Superhomes Application		InHouse	✓	✓		✓	✓																	
3	Superhomes FAQ and note on fees		InHouse							✓	✓														
4	Heat Pump Survey Info Sheet		InHouse							✓	✓														
5	DRPP Domestic Technical Standards and Specifications (Latest Version)	V 1.2 2019	National										✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
6	S.R.54: 2014 & A1: 2019 (code of practice for energy efficient Retrofit of Dwellings)	2019	National										✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
7	Building Regs 2014 TGD J Heat producing Appliances		National											✓	✓					✓	✓			✓	
8	Building Regs 2019 TGD F Ventilation	2019	National												✓	✓				✓	✓			✓	
9	I.S. EN 1856-2:2009 Chimneys. Requirements for metal chimneys. Metal flue liners and connecting flue pipes		EU																						

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10	MCS - Guide to the Installation of Photovoltaic Systems		EU											✓	✓	✓		✓	✓			
11	ESB Networks - Conditions Governing the Connection and Operation of Micro-generation		National												✓			✓				
12	BS EN 215 'Thermostatic Radiator Valves. Requirements & Test Methods'.		-											✓				✓				
13	Building Regs 2019 TGD L Conservation of Fuel & Energy (Dwellings)		National									✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
14	Irish Agreement Board approved/certified product installed to IAB approved methods and standards.		National										✓	✓	✓	✓	✓	✓	✓	✓	✓	
15	Building Regulations TGD G - Hygiene		National										✓	✓	✓		✓	✓	✓		✓	
16	BS EN 60598-1 Luminaires . General requirements and tests		EU																			
17	TGD L 2011_Limiting Thermal Bridging and Air Infiltration - Acceptable Construction Details		National										✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

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18	Energy Efficiency Best Practice in Housing		EU									✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
19	MCS Domestic RHI Metering Guidance v1.1		EU										✓	✓	✓	✓	✓	✓	✓	✓						
20	Building Regs 2014 TGD K Stairways, Ladders, Ramps & Guards		National																						✓	
21	SR50-1 - Code of practice for building services – Part 1: Domestic plumbing & heating		National										✓	✓	✓	✓	✓	✓	✓	✓					✓	
DRAFT	SR50-4 - Building Services – Part 4: Heat Pump Systems in Dwellings [DRAFT ONLY]		National										✓	✓	✓	✓	✓	✓	✓	✓					✓	
NEW	Heating and Domestic Hot Water Systems for Dwellings – Achieving compliance with Part L & Energy Performance of Buildings Regulations 2019		National										✓													
22	SEAI DOMESTIC SOLAR PHOTOVOLTAIC- CODE OF PRACTICE FOR INSTALLERS (latest version)		National										✓	✓	✓	✓	✓	✓	✓	✓					✓	
23	DPR Data Monitoring Guidelines		National										✓	✓	✓	✓	✓	✓	✓	✓						
24	Local Authority Planning Search Planning Search		National									✓														

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25	SEAI National BER Register		National									✓	✓	✓												
26	Google Maps Ireland or Google Earth		Other									✓	✓													
27	DEAP Survey Form		National										✓													
28	TEA Window Schedule		InHouse										✓	✓												
29	TEA Radiator Schedule		InHouse										✓	✓												
30	Preliminary Health & Safety Checklist	V1.1	InHouse										✓													
31	Use of AutoCAD to re-draw site sketches		Other										✓	✓	✓											
32	Use of Sketchup to Redraw site sketches / 3D model.		Other										✓	✓	✓											
33	BRE U-value Calculator		EU											✓	✓							✓				
34	DEAP Manual	V4.2.2	National																							
35	Carol DEAP calculation / record sheet		Other											✓												
36	DEAP Software Version 4.2.0		National											✓								✓				
37	Measures Table [Master] (EAR Detailed Measures)	REV 2.2	InHouse											✓				✓								
38	Measures Table [Master] (EAR Optional Measures)	REV 2.2	InHouse											✓				✓								

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39	Measures Table [Master] (HLI_Results_Table)	REV 2.2	InHouse																					
40	Measures Table [Master] (Scope of Works)	REV 2.2	InHouse																					
41	QR Sched_SH (Quote Request / Pricing Schedule)	REV 3.2	InHouse																					
42	TEA Heat Loss Calculation (HLC-SHXXX (2020 MASTER draft))	REV 1.4	InHouse																					
43	Energy Report	V2.0	InHouse																					
44	Energy Report_TA (Heat Pump Technical Assessment)	V1.1	InHouse																					
45	WR (Cost Analysis)	REV 2.0	InHouse																					
46	Pmtschr_2020_V5.08 (Payment Schedule)	V5.08	InHouse																					
47	[1] Cover Letter		InHouse																					

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48	[2] Contract		InHouse												✓					✓	
49	[3] Homeowner Agreement		InHouse												✓						
50	[4] Letter of Acknowledgement		National												✓						
51	[5] Bill Data Waiver		InHouse												✓						
52	[6] Personal Data Consent		InHouse												✓						
53	[7] H&S Info Letter		InHouse												✓					✓	
54	[8] Client Duties Decision Tree		Other												✓						
55	[9] PSDP/PSCS Appointment Form		InHouse												✓					✓	
56	[10] HSA Guidelines		National												✓						
57	[11] Prelim H&S Plan		InHouse												✓					✓	
58	[12] Risk Register		InHouse												✓					✓	
59	[13] AF1 Form		National												✓						
60	[14] SEAI Consent Form(s)		National												✓						
61	[15] Bank Details Form		InHouse												✓						
62	[16] Contractor Deposit Agreement		InHouse												✓					✓	
63	Variation Request Form	V1.0	InHouse												✓		✓			✓	

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64	Energy Credits Calculator	V1.1	InHouse																							
65	Contractor Invoice Template		InHouse																							
66	2021 Progress Report		InHouse																							
67	Documentation Checklist		InHouse																							
68	Superhomes Inspection Checklist	V3	InHouse																							
69	SH Snag List	V1.0	InHouse																							
70	DR PV, Vent & OH Design Calc		InHouse																							

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71	Contractor Pre-qualification Questionnaire	REV 1.2	InHouse																			✓	✓	
72	Contractor On-Boarding Checklist	REV 1.0	InHouse																				✓	
72	PSDP_PSCS Competency Questionnaire	V1.1	InHouse																				✓	
74	RCT Summary 2021		InHouse																					✓
75	RSL Statement of Account 2021		InHouse																					✓
NOTE:	In all instances <u>all</u> relevant Current Standards, SEAI Standards & Guidance Notes, all Irish Building Regulations & Health and Safety Standards Apply, (except where otherwise explicitly stated)																							