

Future Homes Standard

- **Spring 2023** Consultation on the technical specification
- **2024** – Implementation of the Consultation and publication of the Future Homes Standard
- **2025** – FHS regulations come into effect – likely to have same transition process as 2022



Ready for Zero

Evidence to inform the 2025
Future Homes Standard

Task Group Report

28 February 2023

[Ready for Zero: Evidence to inform the 2025 Future Homes Standard – Task Group Report](#)

Future Homes Standard

5 main Contender Specifications were set:

- Slightly below 2021 Part L
- 2021 Part L with FEES
- Similar to 2025 Part L Notional
- Passivhaus equivalent
- No heating system

All CS levels were assessed by working groups, with the exam questions:

- How would each CS be delivered
- What are the attributes and outcomes



Contender specifications

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Overview of specifications modelled - Houses								
	Ref 2021	Ref 2025	CS1	CS2	CS2a	CS3	CS4	CS5
Wall U-value	0.19	0.15	0.19	0.19	As per CS2	0.15	0.13	0.10 / 0.13
Roof U-value - plane	0.11	0.11	0.11	0.11	As per CS2	0.11	0.10	0.10
Floor U-value	0.15	0.11	0.15	0.15	As per CS2	0.11	0.10	0.08
Glazing	Double	Triple	Double	Double	As per CS2	Double	Triple	Triple
Thermal bridging	Psi values - Set A	y-value = 0.05	Psi values - Set A	Psi values - Set A	As per CS2	Psi values - Set B	Psi values - Set B	Psi values - Set B
Air permeability	4.5 - 5.0	5.0	5.0	4.5 - 5.0	As per CS2	3.0	1.0	0.5
Ventilation	dMEV	Natural ventilation with extract fans	dMEV	dMEV	As per CS2	MVHR	MVHR	MVHR integral with EAHP
Heating	Gas boiler	ASHP	ASHP	ASHP	IR direct elec	ASHP	ASHP	None
DHW / WWHR	Gas boiler	ASHP	ASHP	ASHP & WWHR	Immersion + smart cylinder	ASHP & WWHR	ASHP & WWHR	DHW cyl EAHP & MVHR & WWHR
PV philosophy	To achieve 2021 Part L Pass	None	None, unless req. for min. 75% redn	40% GF area, max 3.68kWp	Maximise roof area for PV		40% roof area max 3.68kWp	
Battery	No	No	No	No	6.5kWh hybrid	No	No	No
Overview of specifications modelled - Apartments								
	Ref 2021	Ref 2025	CS1	CS2	CS2a	CS3	CS4	CS5
Wall U-value	LR 0.19 HR 0.17	0.15	0.21	LR 0.19 HR 0.17	As per CS2	0.15	0.15	0.15
Roof U-value - plane	0.11	0.11	0.11	0.11	As per CS2	0.11	0.10	0.10
Floor U-value	0.15	0.11	0.15	0.15	As per CS2	0.11	0.10	0.08
Glazing	Double	Triple	Double	Double	As per CS2	Double	Triple	Triple
Thermal bridging	Psi values - Set A	y-value = 0.05	Psi values - Set A	Psi values - Set A	As per CS2	Psi values - Set B	Psi values - Set B	Psi values - Set B
Air permeability	4.5 Low-rise 3.0 High-rise	5.0	5.0	4.5 Low-rise 3.0 High-rise	As per CS2	3.0	1.0	0.5
Ventilation	dMEV	Natural ventilation with extract fans	dMEV	cMEV	As per CS2	MVHR	MVHR	MVHR integral with EAHP
Heating	Gas boiler	ASHP	Direct elec	Direct elec	IR direct elec	Direct elec	Direct elec	None
DHW	Gas boiler	ASHP	DHW ASHP	DHW ASHP & WWHR	Immersion + smart cylinder	DHW ASHP & WWHR	DHW ASHP & WWHR	DHW Cyl EAHP & MVHR & WWHR
PV philosophy	To achieve 2021 Part L Pass	None	None, (unless required for min. 75%)	Pro rata of 40% ground floor area	Maximise roof area for PV		low-rise: Pro rata of 40% roof area in plan high-rise: Pro rata of 20% roof area in plan	
Battery	No	No	No	No	6.5kWh hybrid	No	No	No

For more detail on each of the [specifications](#) see Appendix D

Future Homes Standard

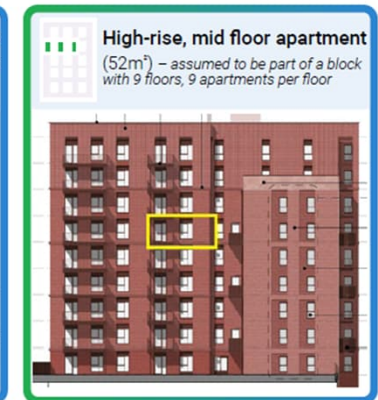
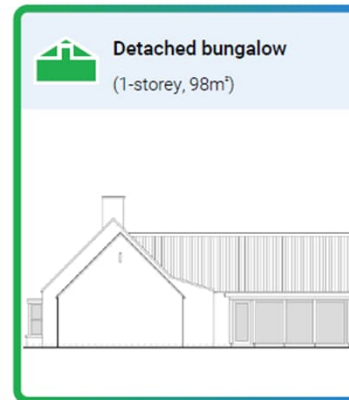
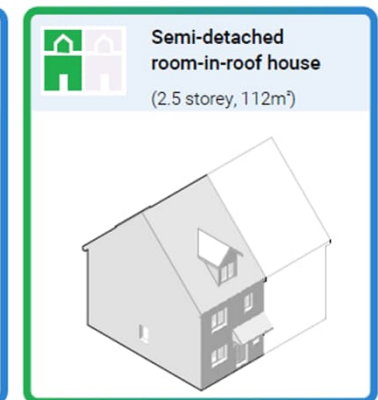
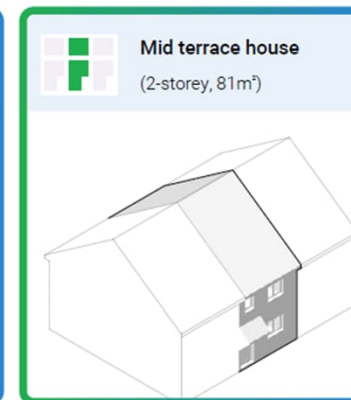
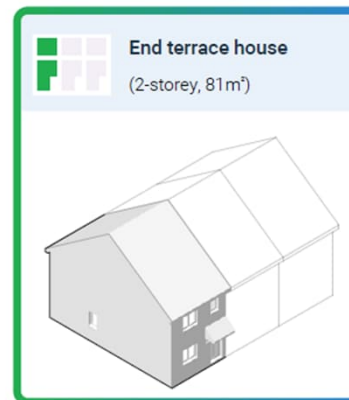
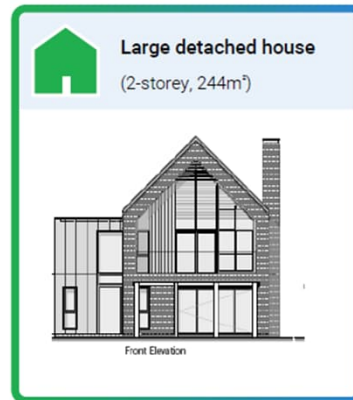
- 7 different building types were assessed:

- End, mid and 2½ storey covering **volume house-building**
- Large detached and bungalows covering **self-build / small builders**
- Low rise apartments
- High rise apartments

- Timber frame inputs covered all types with the exception of the high-rise apartments.

The different contender specifications were modelled using seven archetypes.

Archetypes were chosen to best test the contender specifications with a broad spread of designs and sizes and not simply represent the most common being built today.



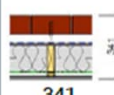
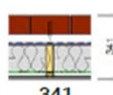
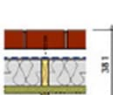
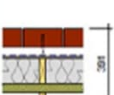
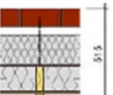
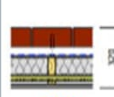
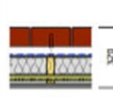
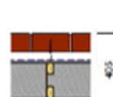
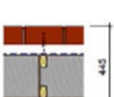
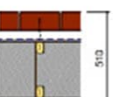
Future Homes Standard

- External wall build-ups were included for both **Masonry** and **Timber Frame** solutions to achieve U-Values from **0.19W/m²K** to **0.10W/m²K**
- Understood that there are 100's of solutions for build-ups to achieve, with 2 examples for each U-Value including:
 - Open panel and closed panel
 - Internal PIR insulation or VCL and service zone
 - Cavity insulation
- All solutions included are fully fire tested
- Timber Frame walls are **narrower** than masonry options down to 0.13W/m²K, and similar for 0.10W/m²K
- Psi values are key, and have much more impact on over all fabric performance than before

Masonry Wall examples:

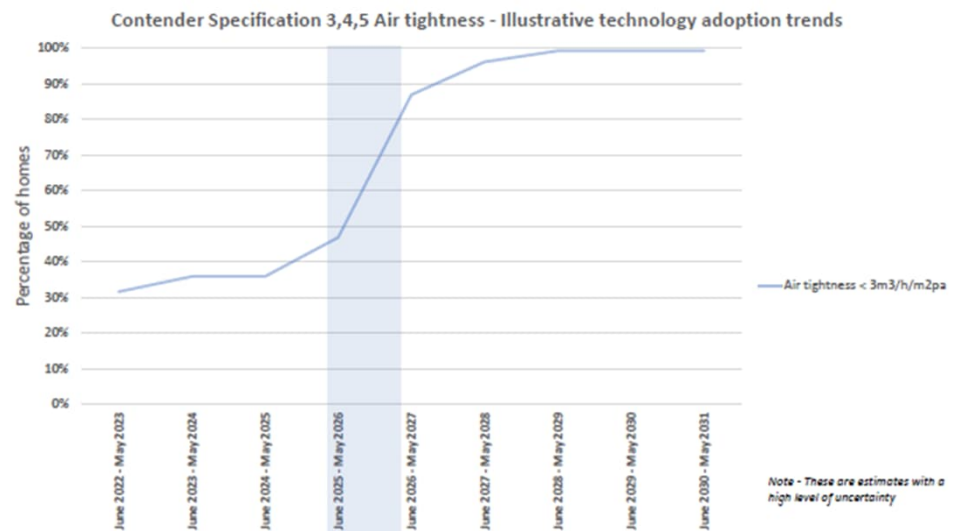
Contender Specification	CS1		CS2		CS3		CS4 & CS5*		CS5 *	
Air permeability	5.0		4.0 – 5.0		3.0		1.0		0.5	
U-value	0.19		0.19		0.15		0.13		0.10	
Full fill (mm) (mineral wool, λ)	150 (0.034)		150 (0.034)		200 (0.034)		230 (0.034)		285 (0.032)	
Part fill (mm) (PIR, λ)		85 (0.022)		85 (0.022)		115 (0.022)		135 (0.022)		185 (0.022)
Cavity width (mm)	150	135	150	135	200	165	230	185	285	235
Wall zone (full fill, mm)										
	380		380		430		460		515	

Timber Frame Wall examples:

Contender Specification	CS1		CS2		CS3		CS4 & CS5*		CS5*	
Air permeability	5.0		4.0 – 5.0		3.0		1.0		0.5	
U-value	0.19		0.19		0.15		0.13		0.10	
Option 1 (wall zone, mm)										
	341		341		381		391		515	
Option 2 (wall zone, mm)										
	320		320		405		445		510	

Future Homes Standard

- Air-tightness levels were a key part of the discussions
 - CS-1 + CS-2 @ 5.0
 - CS-3 @ 3.0
 - CS-2 @ 1.0
 - CS-1 @ 0.5
- Passivhaus supported claimed it was relatively simple to achieve with good detailing and training
- Mainstream house-builders expressed significant concern achieving lower levels, with less than **2%** of new homes built achieving below **3.0**, and **85%** achieving between **3.5 and 5.0** presently
- Building form and early design intent for air-tightness strategy are key



Future Homes Standard

- 26 recommendations made to DLUHC for the effective implementation of the Future Homes Standard
- Already behind schedule, with the consultation due in “Spring 2023” but now delayed to “early summer”, and SAP won’t be ready until later in the year!
- The number of responses is key, so make sure every member issues a response to the consultation process
- Suggest STA set up a working group to pull together response, for members to use as a basis for individual submissions.

Establish an Industry Government FHS Implementation Board with sub groups including at least: Consumer, Small Builder, Heat pump, Ventilation, Airtightness, Energy Flexibility to support robust roll out.

Announce key decisions as early as possible and include sufficient detail, to give industry time to prepare.

Provide a stable and consistent version of SAP11 in good time to enable industry to prepare and develop solutions.

Provide sufficient Transitional Arrangements based on robust understanding of the operational timescales for redesigning homes at scale and which enable a progressive implementation of the FHS.

Establish and enforce new build homes competency schemes covering airtightness, ventilation and heat pumps due to the risks highlighted in these areas.

Learn from UK and international leaders in net zero homes such as Sweden and Norway and on experience rolling out specific technologies like cMEV and MVHR.

Develop performance measurement techniques to better understand ‘as built’ performance as designed performance improves.

Scottish Passivhaus Equivalent

- Private Members Bill published in May 2022 by Alex Rowley MSP for consultation.
- Key drivers are to:
 - Reduce Fuel Poverty
 - Climate change
- Final Bill proposed in November 2022
- Approved by Scottish Government in December 2022
- Amended Regulations will be laded before Parliament in Mid-December 2024
- 629 responses to the consultation were received
 - 78 organisations
 - 551 individuals
 - Only 3 responses from House Builders / Timber Frame

Proposed Domestic Building Environmental Standards (Scotland) Bill



A proposal for a Bill to introduce new minimum environmental design standards for all new-build housing to meet the Passivhaus standard or a Scottish equivalent in order to improve energy efficiency and thermal performance.

Consultation by

Alex Rowley MSP for Mid Scotland and Fife Region

4 May 2022

Scottish Passivhaus Equivalent

- Legislation will be delivered through up-dates to Section 6 of the Technical Standards
- Scottish Building Standards Division are leading the work on consultation with industry
- Met Alex Rowley MSP in late February:
 - Confirmed it won't be Passivhaus
 - Agreed industry input is vital to ensure solution is deliverable at scale
- Met with SBSD in March, and will be included in steering group – next meeting this afternoon



Scottish Passivhaus Equivalent

- A summary of examples have been shared with Alex Rowle and SBSD for projects completed in Scotland to demonstrate near zero-carbon performance:
 - AIMc4 trial plots with Stewart Milne Group 2012
 - Fife Demonstrator Project in 2012
 - Glasgow Athletes Village 2014
 - AIMCH trial plots with Barratt in 2018
 - Salford University Energy House
 - Edinburgh Housing Demonstrator project
- What else is available – send info to Andrew Orriss + John Smith with outline project details and any as-built testing evidence / monitoring.
- **The number of responses is key, so make sure every member issues a response to the consultation process**
- Suggest STA set up a working group to pull together response, for members to use as a basis for individual submissions.

