

Appendix D: Specification for a home built with a heat pump

- D1** This appendix provides a good practice specification for a dwelling built with a heat pump.
- D2** By using this specification, the dwelling should pass the target primary energy rate and target emission rate. However, this should be checked through energy calculations.

Table D1 Summary of notional dwelling specification for new dwellings

Element or system	Reference value for target setting ⁽¹⁾
Opening areas (windows, roof windows, rooflights and doors)	Same as for actual dwelling not exceeding a total area of openings of 25% of total floor area ⁽²⁾
External walls including semi-exposed walls	$U = 0.18 \text{ W}/(\text{m}^2\cdot\text{K})$
Party walls	$U = 0$
Floors	$U = 0.13 \text{ W}/(\text{m}^2\cdot\text{K})$
Roofs	$U = 0.11 \text{ W}/(\text{m}^2\cdot\text{K})$
Opaque door (less than 30% glazed area)	$U = 1.0 \text{ W}/(\text{m}^2\cdot\text{K})$
Semi-glazed door (30–60% glazed area)	$U = 1.0 \text{ W}/(\text{m}^2\cdot\text{K})$
Windows and glazed doors with greater than 60% glazed area	$U = 1.2 \text{ W}/(\text{m}^2\cdot\text{K})$ Frame factor = 0.7
Roof windows	$U = 1.2 \text{ W}/(\text{m}^2\cdot\text{K})$, when in vertical position (for correction due to angle, see specification in SAP 10 Appendix R)
Rooflights	$U = 1.7 \text{ W}/(\text{m}^2\cdot\text{K})$, when in horizontal position (for correction due to angle, see specification in SAP 10 Appendix R)
Ventilation system	Natural ventilation with intermittent extract fans
Air permeability	$5 \text{ m}^3/(\text{h}\cdot\text{m}^2)$ at 50 Pa
Main heating fuel (space and water)	Mains electricity
Heating system	Air source heat pump and radiators Design flow temperature = 45°C
Heat pump⁽³⁾	Space heating efficiency = 250% Water heating efficiency = 250%
Heating system controls	Weather compensation Either: <ul style="list-style-type: none"> – single storey dwelling in which the living area is greater than 70% of total floor area: programmer and room thermostat – any other dwelling: time and temperature zone control, thermostatic radiator valves

Table D1 Continued

Hot water system	Stored hot water in cylinder, heated by air source heat pump with back-up immersion heating Separate time control for space and water heating
Wastewater heat recovery (WWHR)	None
Hot water cylinder	If cylinder, declared loss factor = $0.85 \times (0.2 + 0.051 V^{2/3})$ kWh/day where V is the volume of the cylinder in litres
Lighting	Fixed lighting capacity (lm) = 185 × total floor area Efficacy of all fixed lighting = 80 lm/W
Air conditioning	None
Photovoltaic (PV) system	None

NOTES:

1. Changes from the notional dwelling specification (Table 1.1) are in **bold**.
2. See SAP 10 for details.
3. Space heating and water heating efficiencies as calculated in SAP 10; this is different from the COP.