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Residential park homes – Specification

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Contents

Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 26, an inside back cover and a back cover.

Foreword

Publishing information

This British Standard was published by BSI Standards Limited, under licence from The British Standards Institution, and came into effect on 30 November 2015. It was prepared by Technical Committee B/511, *Buildings mobile and temporary*. A list of organizations represented on this committee can be obtained on request to its secretary.

Supersession

The Technical Committee recognizes that users of BS 3632 might require time to comply with the requirements of BS 3632:2015. For this reason, there is a transition period of 12 months in which BS 3632:2005 will remain current.

This British Standard supersedes BS 3632:2005, which will be withdrawn on 30 November 2016.

Information about this document

When this British Standard was first published in 1963, the title *Specification for permanent residential caravans* was adopted to reflect the design and use of this type of caravan, the term by which it was then commonly known. Since then, the permanent residential caravan has undergone considerable development in terms of size, services, equipment and material.

When issued in 1981, this British Standard was titled *Specification for mobile homes*, "mobile home" being the term used in the United Kingdom following the Mobile Homes Act 1975 [1]. In 1981, the term "park home" was adopted by the caravan industry and was introduced into the 1981 revision of this standard. The term "residential park home" was adopted when this standard was revised in 1995.

The 2005 revision of this standard was developed to include criteria appropriate to more conventional forms of housing, and was aimed at ensuring the suitability of a residential park home as a permanent dwelling.

This revision of the standard continues that approach and reflects the advances in material technologies and building techniques that have taken place since the 2005 revision. This revision also includes a significant increase in the requirements to incorporate energy efficiency measures that were unavailable or unsuitable for inclusion in the 2005 edition. These measures help to reduce the environmental footprint of residential park homes in the built environment.

Presentational conventions

The provisions of this standard are presented in roman (i.e. upright) type. Its requirements are expressed in sentences in which the principal auxiliary verb is "shall".

Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.

Requirements in this standard are drafted in accordance with *Rules for the structure and drafting of UK standards*, subclause **J.1.1**, which states, "Requirements should be expressed using wording such as: 'When tested as described in Annex A, the product shall ...'". This means that only those products that are capable of passing the specified test will be deemed to conform to this standard.

Contractual and legal considerations

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard cannot confer immunity from legal obligations.

Particular attention is drawn to the following specific regulations:

- The Furniture and Furnishing (Fire) (Safety) Regulations 1988, as amended [2]
- The Gas Safety (Installation and use) Regulations 1998 [3]
- The Water Supply (Water Fittings) Regulations 1999, as amended [4]
- The Water Supply (Water Fittings) (Scotland) Byelaws 2014 [5]
- The Water Supply (Water Fittings) Regulations (Northern Ireland) 2009 [6]
- Caravan Sites and Control of Development Act 1960, as amended [7]
- Caravan Sites Act 1968, as amended [8]
- The General Product Safety Regulations 2005 [9]
- Manual Handling Operations Regulations 1992 [10]

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1 Scope

This British Standard specifies requirements for the manufacture of an ex-works residential park home for use as a permanent place of residence. It also specifies the tests and acceptance criteria to ensure compliance with the requirements of this British Standard.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

BS 476-3:2004, *Fire tests on building materials and structures – Part 3: Classification and method of test for external fire exposure to roofs*

BS 476-7:1997, *Fire tests on building materials and structures – Part 7: Method for classification of the surface spread of flame of products*

BS 715, *Specification for metal flue boxes for gas-fired appliances not exceeding 20 kW*

BS 1188, *Specification for ceramic wash basins and pedestals*

BS 5410-1, *Code of practice for oil firing – Part 1: Installations up to 45 kW output capacity for space heating and hot water supply purposes*

BS 5440-1, *Flueing and ventilation for gas appliances of rated input not exceeding 70 kW net (1st, 2nd and 3rd family gases) – Part 1: Specification for installation of gas appliances to chimneys and for maintenance of chimneys*

BS 5608, *Specification for preformed rigid polyurethane (PUR) and polyisocyanurate (PIR) foams for thermal insulation of pipework and equipment*

BS 6206, *Specification for impact performance requirements for flat safety glass and safety plastics for use in buildings*

BS 6262-4, *Glazing for buildings – Part 4: Code of practice for safety related to human impact*

BS 6762-2, *Services for leisure accommodation vehicles and transportable accommodation units – Part 2: Code of practice for the installation of solid fuel fired heating in park homes and transportable accommodation units*

BS 6891, *Installation of low pressure gas pipework of up to 35 mm (R1¼) in domestic premises (2nd family gas) – Specification*

BS 7671, *Requirements for electrical installations – IET Wiring Regulations*

BS 8417, *Preservation of wood – Code of practice*

BS EN 30-1-1, *Domestic cooking appliances burning gas – Part 1-1: Safety – General*

BS EN 33, *Pedestal WC pans with close-coupled flushing cistern – Connecting dimensions*

BS EN 806-1, *Specification for installations inside buildings conveying water for human consumption – Part 1: General*

BS EN 806-2, *Specification for installations inside buildings conveying water for human consumption – Part 2: Design*

BS EN 806-3, *Specifications for installations inside buildings conveying water for human consumption – Part 3: Pipe sizing – Simplified method*

BS EN 806-4, *Specifications for installations inside buildings conveying water for human consumption – Part 4: Installation*

BS EN 806-5, *Specifications for installations inside buildings conveying water for human consumption – Part 5: Operation and maintenance*

BS EN 997, *WC pans and WC suites with integral trap*

BS EN 1111, *Sanitary tapware – Thermostatic mixing valves (PN 10) – General technical specification*

BS EN 1287, *Sanitary tapware – Low pressure thermostatic mixing valves – General technical specifications*

BS EN 12056-2, *Gravity drainage systems inside buildings – Part 2: Sanitary pipework, layout and calculation*

BS EN 12521, *Furniture – Strength, durability and safety – Requirements for domestic tables*

BS EN 12600, *Glass in building – Pendulum test – Impact test method and classification for flat glass*

BS EN 13501-5:2005+A1:2009, *Fire classification of construction products and building elements – Part 5: Classification using data from external fire exposure to roofs tests*

BS EN 13823:2010+A1:2014, *Reaction to fire tests for building products – Building prodcuts excluding floorings exposed to the thermal attack by a single burning item*

BS EN 13859-1, *Flexible sheets for waterproofing – Definitions and characteristics of underlays – Part 1: Underlays for discontinuous roofing*

BS EN 14604, *Smoke alarm devices*

BS EN 14749, *Domestic and kitchen storage units and worktops – Safety requirements and test methods*

BS EN 50291-1, *Electrical apparatus for the detection of carbon monoxide in domestic premises – Part 1: Test methods and performance requirements*

BS EN 60335-2-6, *Household and similar electrical appliances – Safety – Part 2-6: Particular requirements for stationary cooking ranges, hobs, ovens and similar appliances*

BS EN 60335-2-24, *Household and similar electrical appliances – Safety – Part 2-24: Particular requirements for refrigerating appliances, ice-cream appliances and ice makers*

BS EN ISO 10140-2, *Acoustics – Laboratory measurement of sound insulation of building elements – Part 2: Measurement of airborne sound insulation*

BS EN ISO 11925-2:2010, *Reaction to fire tests – Ignitability of products subjected to direct impingement of flame – Part 2: Single-flame source test*

BS EN ISO 12944-2:1998, *Paints and varnishes – Corrosion protection of steel structures by protective paint systems – Part 2: Classification of environments*

3 Terms and definitions

For the purposes of this British Standard the following terms and definitions apply.

NOTE BS EN 13878 is also a useful guide to some terms and definitions.

3.1 equivalent area of ventilation
area of a sharp edged circular orifice through which the same volume flow rate of air would pass as the opening in the ventilator on which the equivalent area is marked, under an identical applied pressure difference

3.2 free area of ventilation
geometric open area of the aperture of a ventilator, typically 25% greater than its equivalent area

3.3 habitable area
area used for living purposes which is not solely a utility room (a room limited in function to a washing machine and/or a tumble dryer), bathroom, shower room, WC, walk-in storage or hallway

3.4 residential park home
caravan used as a permanent place of residence

NOTE Attention is drawn to:

- *the Caravan Sites and Control of Development Act 1960, as amended [7];*
- *the Caravan Sites Act 1968, as amended [8]; and*
- *The Caravan Sites Act 1968 and Social Landlords (Permissible Additional Purposes) (England) Order 2006 (Definition of Caravan) (Amendment) (England) Order 2006 [11].*

3.5 wet rooms
rooms used for domestic activities such as cooking, laundry and bathing which give rise to the production of airborne moisture, such as WCs, utility rooms, bathrooms and shower rooms

4 Design

4.1 Occupancy

The occupancy shall be designated as the number of both standard and additional berths provided and shall be used to determine the ventilation requirements.

4.2 Accommodation

The accommodation shall provide as a minimum, a: living area; dining area; kitchen area; bedroom; bathroom and/or shower room; and WC.

4.3 Dimensions

All floor areas shall be determined by internal measurements taken at floor level, between external and/or partition walls, excluding floor to ceiling fitted furniture and skirting boards.

The total floor area of the residential park home shall be not less than 23 m².

For a flat ceiling, the internal ceiling height shall be not less than 2.135 m, excluding floor coverings.

For a pitched ceiling, the average internal ceiling height shall be not less than 2.135 m, excluding floor coverings.

The overall height of the living accommodation, measured internally from the floor at the lowest level to the ceiling at the highest level, shall not exceed 3.05 m, excluding floor coverings.

4.4 External doors and windows

If the total floor area of the residential park home is less than 40 m^2, then a minimum of one external door shall be provided.

If the total floor area of the residential park home is greater than or equal to 40 m^2, then no fewer than two external doors shall be provided.

All habitable areas (see **3.3**) shall be provided with windows or glazed external doors (or both) of which the total glazed area shall be not less than 10% of the room floor area (see **4.3**). The glazed area shall include any glazing bars and lead strip decoration.

All habitable areas (see **3.3**) shall be provided with windows or external doors (or both) of which the total open-able area shall be not less than 5% of the room floor area (see **4.3**).

Hinged windows shall open not less than 30°. Sliding windows shall open to not less than 5% of the room floor area (see **4.3**).

In rooms designated as sleeping areas, if purge ventilation is provided by a door, the extent of opening shall be limitable by suitable means to ensure that the security of the residential park home is maintained.

Windows shall be fitted with means to prevent inadvertent opening.

4.5 Means of escape

4.5.1 General

All habitable areas (see **3.3**) shall be provided with a means of escape, either through an emergency door or emergency window giving direct access to the open air, which shall not require the use of a key or tool. Any opening which is provided as a means of escape shall conform to **4.5.2** or **4.5.3**. In a kitchen, if any part of an external door or window is within 1 m of any fixed hob, cooker or grill, an alternative means of escape shall be provided. The clear opening of an entrance door or a means of escape shall not be obstructed by any fixed part of furniture or equipment.

4.5.2 Emergency doors

Emergency doors shall be vertically hinged or slide horizontally and shall have a clear opening of not less than 1.9 m in height and 0.7 m in width. Where hinged, doors shall open not less than 85°.

4.5.3 Emergency windows

Emergency windows shall have a clear opening of not less than 0.45 m × 0.45 m, and not less than 0.33 m^2 in area. No casement stay or casement fastener shall project into the clear opening.

Emergency windows shall be capable of being easily and quickly opened from the inside. The lower edge of the clear opening shall be not more than 0.9 m above floor level, except in kitchens and utility rooms, where the clear opening shall be not more than 1 m above floor level.

Emergency windows shall be not horizontally hinged on their lower edge. Where top hung they shall be capable of staying open to not less than 70° without needing to be held by the person escaping. Handles of top hung emergency windows shall be located more than three quarters of the height of the window below the upper edge.

4.6 External walls

External walls shall conform to **4.9.3**, **4.9.4** and **5.2**.

4.7 Internal walls and internal doors

Internal walls shall conform to **5.3**.

Internal doors shall be vertically hinged or slide horizontally to fit the aperture as closely as is practicable. Where hinged, doors shall open not less than 85°.

In order to ensure adequate transfer of air between rooms, there shall be openings at low level totalling an area not less than 7 600 mm^2.

NOTE Consideration should be given to means of reducing sound transmission between rooms.

4.8 Glazing

The glass in external doors and windows shall conform to BS 6262-4 and BS EN 12600. Glass in domestic and kitchen storage units and worktops shall conform to BS EN 14749. Glass in tables shall conform to BS EN 12521.

4.9 Construction design criteria

4.9.1 Structure

The external construction shall be designed to prevent penetration of weather and damp under normal conditions.

The structure shall be capable of transmitting the dead and imposed loads to which it might be subjected to the ground. It shall also be capable of supporting the dead and imposed loads during normal use.

The axle, wheel and tyre configuration shall be designed to support the ex-works mass of the residential park home and the dead and imposed loads during transportation and manoeuvring.

Wheeled residential park homes greater than 10.9 m in overall length, excluding drawbars, or with a mass which imposes a load greater than 5 400 kg on the wheels shall be fitted with no fewer than two axles per section, positioned to ensure that the residential park home is manoeuvrable. Where multiple axles are fitted, the maximum spacing between the axle centres shall be not greater than twice the outside diameter of the tyre.

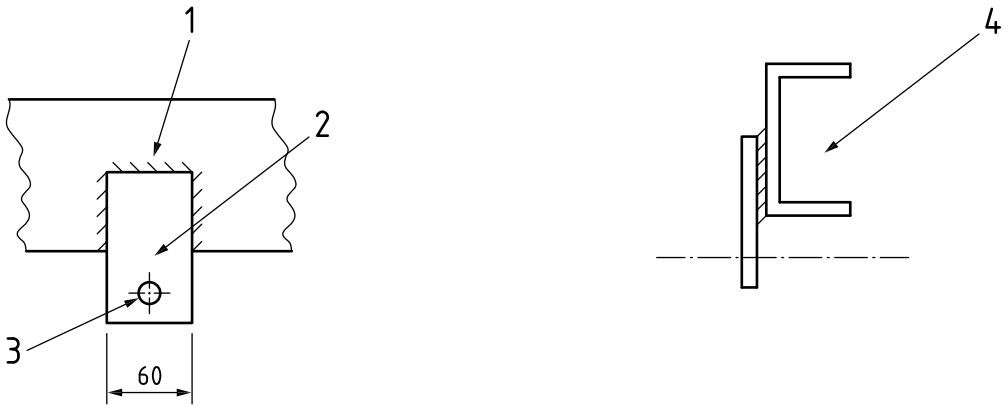
If the nose weight is greater than 25 kg, a warning notice making reference to the *Manual Handling Operations Regulations* [10] shall be displayed adjacent to the coupling head in a position that is readily visible.

4.9.2 Stability (resistance to overturning)

The residential park home shall be provided with holding down points, each capable of resisting a load of 10 kN. Holding down points shall be located at each corner of the residential park home and within (1 ± 0.2) m of the ends of the chassis.

NOTE An example of a suitable chassis holding down point is shown in Figure 1.

Figure 1 **An example of a chassis holding down point**



a) Elevation b) Section

Key

1 6 mm fillet weld applied evenly around plate
2 6 mm thick mild steel plate
3 15 mm diameter hole to receive 13 mm diameter shackle bolt with safe working load of not less than 10 kN
4 Chassis member

4.9.3 Thermal insulation

When calculated in accordance with Annex A, the external walls, floor and roof, excluding any door and window openings, shall have average thermal transmittances (*U* value) of not greater than:

- 0.35 W/m²K for the walls;
- 0.35 W/m²K for the floor; and
- 0.2 W/m²K for the roof.

Glass in external doors and windows shall conform to BS 6262-4 and BS 6206, and the complete doors and windows (including frames) shall have a *U* value not greater than 1.6 W/m²K.

The risk of water vapour condensation within the insulating material shall be minimized by the selection of materials and membranes.

NOTE Further guidance on dealing with interstitial condensation is given in BS 5250.

Under-floor insulation shall be protected from being dislodged or damaged during transit.

4.9.4 Sound insulation

In order to minimize the transmission of airborne noise, the external walls (excluding doors and windows) shall have a sound reduction index (*R*) of 35 dB over a frequency range of 125 Hz to 4 000 Hz.

Testing shall be carried out in accordance with BS EN ISO 10140-2.

4.10 Ventilation

4.10.1 General

Ventilation shall provide a:

a) supply of fresh air for occupants;

b) supply of combustion air for all non-room sealed appliances; and

c) means of purge venting products of combustion, moisture and noxious odours.

*NOTE Further requirements for the installation of appliances that require ventilation are given in Clause **7**.*

4.10.2 Free and equivalent area of ventilation

For the purposes of calculating the minimum requirement for background ventilation (**4.10.4.2**) the free area of ventilation (see **3.2**) shall be used. For all other types of ventilation, unless stated otherwise, the minimum opening size stated shall be the equivalent area of ventilation (see **3.1**).

NOTE Typically, this is marked on the ventilator by the ventilator manufacturer.

4.10.3 Habitable areas containing appliances that are non-room sealed

Where a non-room sealed appliance is installed in a habitable area, additional ventilation shall be provided conforming to the appliance manufacturer's installation instructions.

4.10.4 Ventilation systems

4.10.4.1 General

A ventilation system conforming to **4.10.4.2**, **4.10.4.3**, **4.10.4.4** or **4.10.4.5** shall be provided in the residential park home.

4.10.4.2 Background ventilation with intermittent extractor fans

4.10.4.2.1 General

In addition to the background ventilation provisions, intermittent mechanical extraction shall be provided in accordance with Table 1.

Table 1 **Minimum extract ventilation rates**

Room	**Intermittent extract rate** (see **4.10.4.2**) (L/s)	**Continuous extract rate** (see **4.10.4.3**) (L/s)
Kitchen	30 if the extract hood is ≤0.75 m above the working surface of the hob 60 if the extract hood is >0.75 m above the working surface of the hob	13
Utility room	30	8
Bath/shower room	15	8
WC	6	6

4.10.4.2.2 Habitable areas not containing flued appliances, other than room sealed

NOTE There are two methods for specifying background ventilation of habitable areas.

Habitable areas (see **3.3**) shall be provided with fixed background ventilation openings of not less than 1 000 mm^2 at low level and not less than 2 000 m^2 at high level. If the total number of occupants is greater than four, then a minimum free area of 650 mm^2 multiplied by the number of occupants, similarly apportioned between high and low level, shall be provided.

Alternatively, for bedrooms, a minimum of 4 000 mm^2 area of fixed background ventilation shall be incorporated in a window frame at high level.

4.10.4.2.3 Bathrooms, shower rooms and WCs

Bathrooms, shower rooms and WCs shall have a minimum total free area of fixed background ventilation of 2 000 mm^2 apportioned equally between high and low level vents.

4.10.4.2.4 Alternative background ventilation provisions

As an alternative to **4.10.4.2.2** and **4.10.4.2.3**, background ventilation shall be provided by trickle ventilators, installed not less than 1.75 m above finished floor level, with the following areas for rooms containing no flued appliances, other than room sealed, utilizing Method 1 or Method 2, as appropriate.

NOTE Trickle vents can be fixed or adjustable.

Method 1

Wet rooms (including kitchens)	4 000 mm^2
Other habitable areas (see **3.3**)	8 000 mm^2

Method 2

An average provision shall be provided for the residential park home equivalent to 6 000 mm^2 per habitable area (see **3.3**) and wet rooms (see **3.5**), including kitchens, with a minimum provision in each room of 4 000 mm^2.

4.10.4.3 Continuous mechanical ventilation

The continuous mechanical ventilation rate shall be the greater of total ventilation rate given in Table 2, and the continuous mechanical extraction rate calculated using the ventilation rate for various rooms given in Table 1.

Table 2 **Total ventilation rate for the residential park home**

	Number of bedrooms				
	1	2	3	4	5
Total ventilation rate (L/s)	13	17	21	25	29

Purge ventilation may be used in separate WCs. Where purge ventilation is used in the WC, then the ventilation rate for the WC shall be omitted from the calculation of continuous mechanical extraction rate.

Air extraction points (terminals) shall be installed in all wet rooms (including kitchens). In kitchens, a suitable cooker extractor hood, located directly over the cooking appliance may be used as the extraction point. With the exception of cooker extractor hoods in kitchens, all extraction points shall be located not more than 0.4 m below the ceiling.

Supply of ventilation may be provided by either:

a) ventilators with a free area of not less than 2 500 mm^2, provided in all rooms, except those from which air is being extracted;

b) a mechanical supply ventilation system which is controlled so that it provides a flow rate equal to the continuous mechanical ventilation rate. Where purge extraction is provided, the supply ventilation shall be capable of providing a balanced supply at all times. Incoming air shall be distributed to all habitable areas.

The control system shall be set up to provide at least the continuous mechanical ventilation rate at all times.

Manual boost controls shall be located in the room/area being served.

Automatic boost controls using humidity shall not be used in WCs.

Automatic boost controls provided in a kitchen shall ensure that sufficient ventilation is provided when cooking with gas or LPG to avoid the build-up of the products of combustion.

NOTE Automatic boost controls can be controlled by sensors measuring humidity, occupancy, usage or pollutant levels.

Manual override controls shall be readily accessible.

4.10.4.4 Mechanical ventilation with heat recovery (MVHR)

Where MVHR is provided as a form of ventilation, it shall conform to **4.10.4.3**, with the exception of **4.10.4.3**a), which does not apply.

4.10.4.5 Passive stack ventilation

*COMMENTARY ON **4.10.4.5***

*Air flow is facilitated by providing background ventilation openings in the shell of the residential park home, supplemented by passive stack ventilators in the wet rooms (see **3.5**). Passive stack ventilation is unsuitable for residential park homes that are sited within the range of five times the difference in height between the residential park home and an adjacent building which is more than 50% taller than the residential park home.*

The required minimum area of background ventilator openings given in Table 3 shall be provided, unless the air tightness of the residential park home is less than 5 $m^3/h \cdot m^2$, in which case the minimum area of background ventilators in Table 4 shall be provided.

NOTE 1 The area of the passive stack ventilators can be subtracted from the minimum area of background ventilators (assume each passive stack ventilator has an equivalent area of 3 000 mm^2).

The total equivalent area of background ventilators shall be at least equal to the total cross-sectional area of all passive stack ventilator ducts.

Table 3 **Total equivalent area of ventilation openings for background ventilation (mm^2)**

Total floor area (m^2)	**Number of bedrooms** 1	2	3	4+
≤60	35 000	40 000	50 000	55 000
61–70	40 000	40 000	50 000	55 000
71–80	45 000	45 000	50 000	55 000
81–90	50 000	50 000	50 000	55 000
91–100	55 000	55 000	55 000	55 000
101–110	60 000	60 000	60 000	60 000
111–120	65 000	65 000	65 000	65 000
121–130	70 000	70 000	70 000	70 000
131–136	75 000	75 000	75 000	75 000

*NOTE 2 The opening sizes given in Table 3 and Table 4, together with the passive stack ventilator sizes given in **4.10.4.4** are designed to ensure that indoor air quality remains within acceptable levels during the peak heating season. It is anticipated that purge ventilation will be required to supplement the air change rate provided by these openings during the spring, summer and autumn.*

Passive stack ventilators shall be provided in the kitchen, utility room, bathroom, shower room and WCs. They shall comprise extract terminals connected to a roof terminal by ducting.

Table 4 **Total equivalent area of ventilation openings for background ventilation (mm^2) where air permeability is less than 5 $m^3/h \cdot m^2$**

Total floor area (m^2)	Number of bedrooms			
	1	2	3	4+
≤60	45 000	50 000	60 000	70 000
61–70	55 000	55 000	60 000	70 000
71–80	60 000	60 000	60 000	70 000
81–90	65 000	70 000	70 000	70 000
91–100	75 000	75 000	75 000	75 000
101–110	82 000	82 000	82 000	82 000
111–120	89 000	89 000	89 000	89 000
121–130	96 000	96 000	96 000	96 000
131–136	103 000	103 000	103 000	103 000

The internal cross-sectional area of ducting shall be not less than 12 000 mm^2 and the free surface area of extract terminals shall be not less than the cross-sectional area of the ducting.

The path of the ducting shall not deviate beyond 30° of the vertical plane and any changes in direction shall be at a radius not less than the internal diameter of the ducting. There shall be no more than two changes of direction in the ducting between extract terminals and roof terminals.

The design of roof terminals shall be determined by the passive stack ventilation manufacturer. They shall be installed either on the roof ridge or within 0.5 m of the ridge line and shall be sited not less than 1 m apart in order to minimize the risk of cross-contamination.

Passive stack roof terminals not fitted on the highest roof ridge shall be extended to not less than the height of the highest roof ridge.

Passive extract points in wet rooms shall be located not more than 0.4 m below the ceiling.

In rooms fitted with an open-flued appliance, the passive stack ventilator can be omitted only if the appliance provides an equivalent level of ventilation when it is not firing. In this case, the flue shall have a free area equivalent to an internal cross-sectional area of 12 000 mm^2 and the combustion air and dilution air inlets shall be permanently open. Control dampers shall not restrict the flow of air.

4.10.5 Recessed areas of external walls

Ventilation openings and flue terminals of fuel burning appliances shall be not located within recessed areas of external walls.

4.10.6 Solid fuel fired appliances

The fixed ventilation provision for solid fuel fired appliances shall conform BS 6762-2, or the appliance manufacturer's instructions.

4.10.7 Prevention of obstructions to ventilation openings

The location of all ventilation openings shall be such that they cannot be easily obstructed by the occupants.

4.10.8 Fixed ventilator screens

Fixed ventilation openings (but not background ventilators) shall be designed to prevent the entry of vermin and shall be protected by a grille or screen that shall be accessible for cleaning. The grille or screen shall allow the passage of a ball 5 mm in diameter but prevent the passage of one which is 10 mm in diameter.

4.10.9 Wardrobe ventilation

Built in wardrobes shall be ventilated into the room in which they are situated and not to the outside air. The minimum free area of ventilation for all wardrobes shall be 200 mm², apportioned equally between high and low level.

4.11 Open and room sealed appliances

Open and room sealed appliances shall be sited in order to prevent reversal in the flue system.

NOTE 1 This is of particular importance if flued appliances are sited adjacent to any mechanical extract system.

The selection, installation and operation of any flue system, with all appliances and the extractor in operation, shall conform to BS 5440-1 for gas-fired appliances and BS 5410-1 for oil-fired appliances. The minimum separation distance between the outlets from fanned-flue gas appliances and any fixed ventilation openings, doors or windows shall be not less than 300 mm.

NOTE 2 Care should be taken not to locate an open-flued appliance adjacent to an extraction fan or return air system to a warm air unit as this can lead to spillage of combustion products into the living spaces.

4.12 Roof ventilation

4.12.1 General

Roofs shall be designed to resist the passage of water, wind-blown snow and dust into the residential park home. Roofs shall be designed to prevent the formation of condensation within the structure.

Roof ventilation shall not increase the minimum *U* value for the roof specified in **4.9.3**.

NOTE Care should be taken to seal around all penetrations for, pipes, ducts and wiring.

There shall be no interconnection between internal air spaces in wall cavities and roofs.

4.12.2 Unventilated roofs

Unventilated roofs, whether flat or pitched, warm or cold, shall incorporate a proprietary breathable underlay membrane inside the outer roof covering. The membrane shall meet the requirements of BS EN 13859-1.

4.12.3 Ventilated roofs

*COMMENTARY ON **4.12.3***

Pitched roofs are classified either as cold or warm. Cold roofs have thermal insulation placed above the horizontal ceiling. Warm roofs have pitched ceilings with inclined thermal insulation fitted at rafter level.

4.12.3.1 General

A vapour control layer shall be installed where the roof pitch is less than 15°, or where the shape of the roof precludes conformity with **4.12.3.2**, **4.12.3.3**, **4.12.3.4** or **4.12.3.5**.

Where warm and cold roof ventilation is employed within the same roof structure, the roof shall be partitioned to ensure the two methods of ventilation are not mixed.

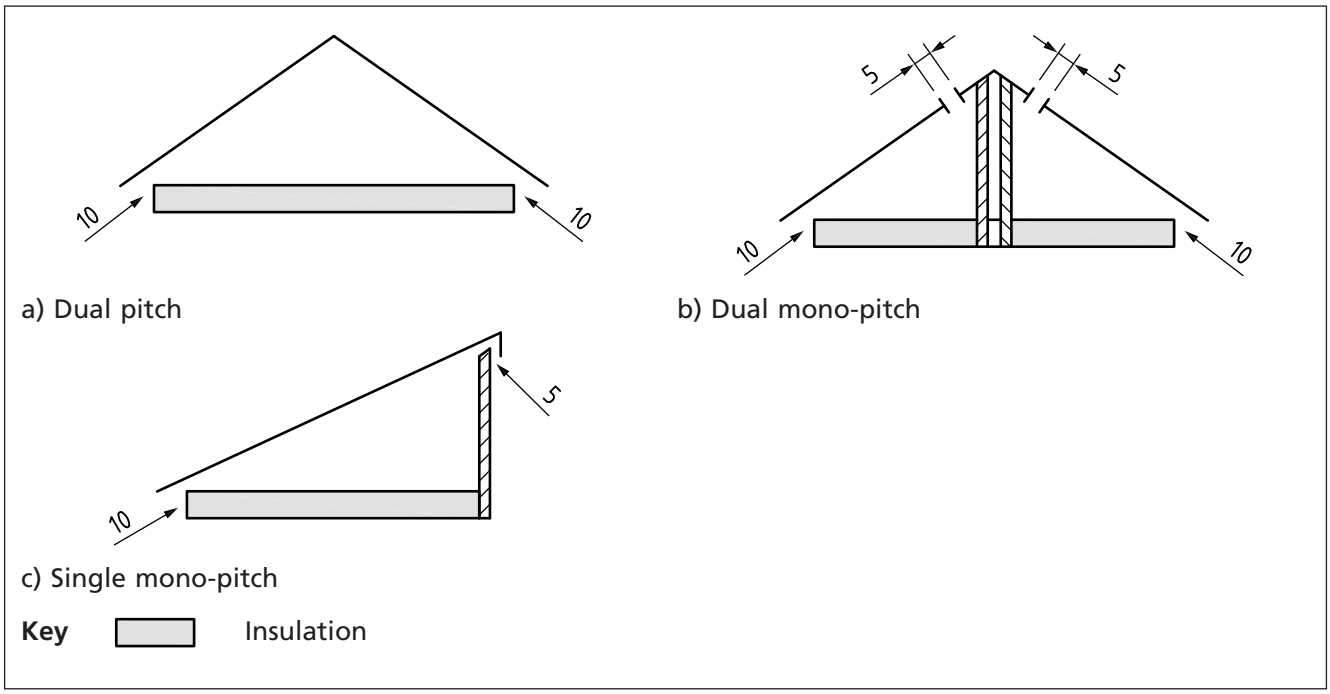
NOTE The use of a vapour control layer at ceiling level on the warm side of the insulation assists in limiting the transfer of moisture, but cannot be relied on as an alternative to ventilation unless a proprietary membrane is used and installed in accordance with the membrane manufacturer's instructions.

4.12.3.2 Cold pitched roofs with pitch ≥15°

Dual pitch roof spaces shall have ventilation openings at a level immediately above the insulation for cross-ventilation throughout the whole roof. These shall have an opening on opposite sides equivalent to not less than continuous ventilation slots 10 mm wide running the full length of the eaves [see Figure 2a)].

Additionally, single mono-pitch and dual mono-pitch roof spaces (where no cross-ventilation is provided) shall also have high level ventilation openings. These shall have an opening on opposite sides with an area equivalent to not less than continuous ventilation slots 5 mm wide running the full length of the ridge [see Figure 2b) and Figure 2c)].

Figure 2 **Cold pitched roofs with pitch ≥15°**

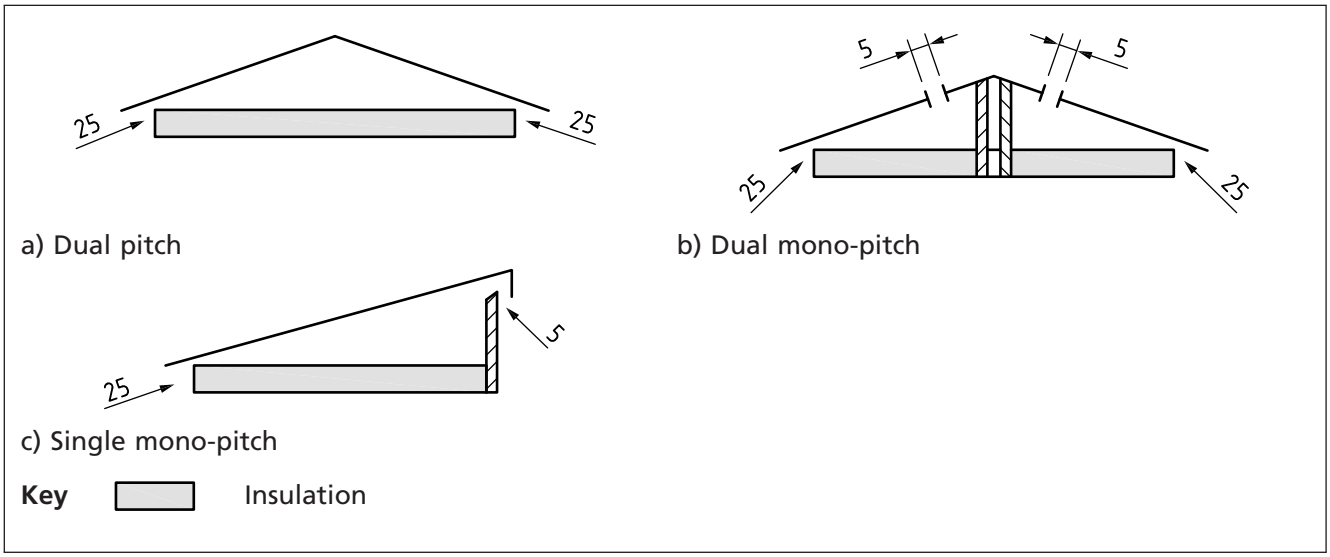


4.12.3.3 Cold pitched roofs with pitch <15° ≥10°

Dual pitch roof spaces shall have ventilation openings at a level above the insulation for cross-ventilation throughout the whole roof. These shall have an opening on opposite sides equivalent to not less than continuous ventilation slots 25 mm wide running the full length of the eaves [see Figure 3a)].

Additionally, single mono-pitch and dual mono-pitch roof spaces (where no cross-ventilation is provided) shall also have high level ventilation openings. These shall have an opening on opposite sides equivalent to not less than continuous ventilation slots 5 mm wide running the full length of the ridge [see Figure 3b) and Figure 3c)].

Figure 3 **Cold pitched roofs with pitch <15° ≥10°**

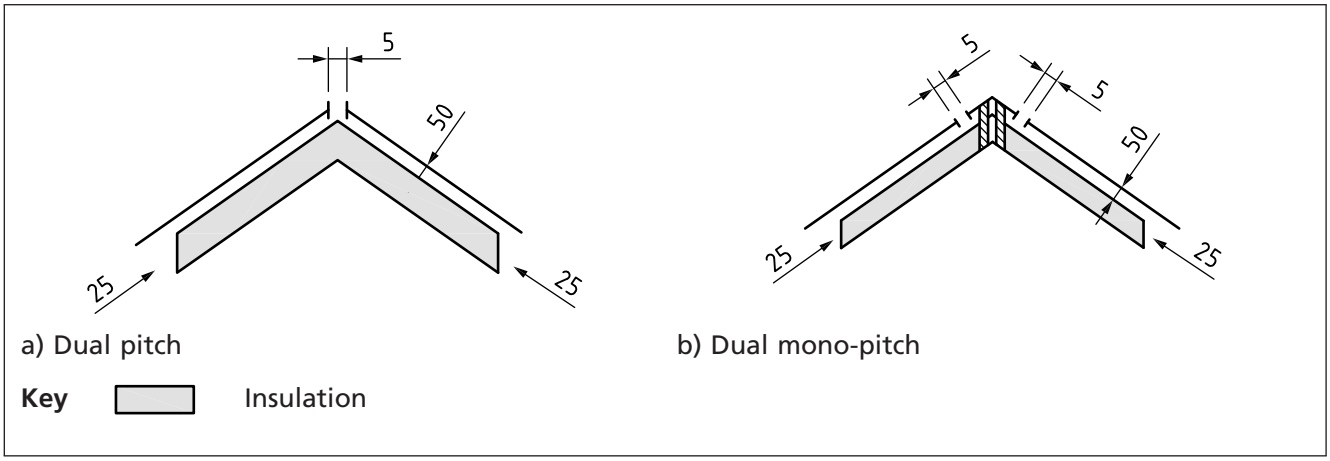


4.12.3.4 Warm pitched roofs with pitch ≥10°

Dual pitch roofs shall have ventilation openings on opposite sides for cross-ventilation throughout the whole roof. These shall be equivalent to not less than continuous slots 25 mm wide running the full length of the eaves as well as a single high level ventilation opening equivalent to not less than a continuous slot 5 mm wide running the full length of the ridge. The free air space between the underside of the roof covering and the top of the insulation shall be not less than 50 mm deep [see Figure 4a)].

Additionally, dual mono-pitch roofs shall have dual high level ventilation openings equivalent to not less than a continuous slot 5 mm wide running either side of the full length of the ridge [see Figure 4b)].

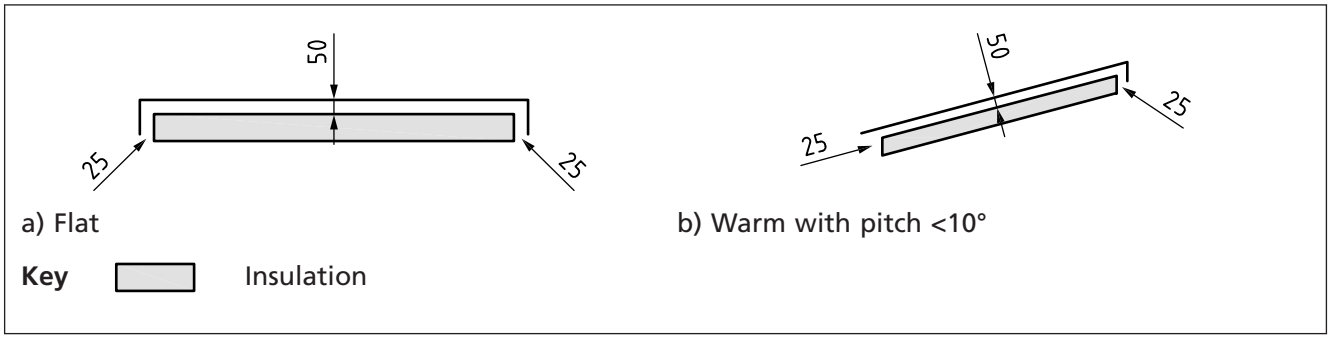
Figure 4 **Warm pitched roofs with pitch ≥10°**



4.12.3.5 Flat roofs and warm roofs with pitch <10°

The free air space between the underside of the roof covering and the top of the insulation shall be not less than 50 mm deep. The whole roof shall be ventilated at the perimeter on opposite sides in such a way that the whole roof is cross-ventilated. These shall be equivalent to not less than continuous slots 25 mm wide running the full length of the eaves [see Figure 5a) and Figure 5b)].

Figure 5 **Flat roofs and warm roofs with pitch <10°**



4.12.3.6 Warm and flat roof water vapour control layers

A water vapour permeable membrane shall be installed within the roof space in accordance with the membrane manufacturer's instructions.

NOTE 1 It is important that the integrity of the vapour control layer be maintained to minimize the risk of interstitial condensation.

NOTE 2 For flat roof constructions, attention is drawn to BS 5250.

4.12.4 Additional roof section

Any additional roof section shall be ventilated direct to the external air.

5 Materials

*COMMENTARY ON CLAUSE **5***

Attention is drawn to The Furniture and Furnishing (Fire) (Safety) Regulations 1988, as amended [2] which apply to all upholstered furniture and mattresses.

5.1 Roof

Materials used for the cladding of the external roof shall have surfaces of a fire resistance not less than classification "AC" as defined in BS 476-3:2004 or classification B_{roof} (t4) as defined in BS EN 13501-5:2004+A1:2009.

NOTE Roofing materials which are defined in the Commission Decision 2000/553/EC [12] regarding the fire performance characteristics of roof covering products are considered to fulfil the requirements for external fire performance without the need for further testing and can be used without restriction.

5.2 External cladding of walls

Materials used for the external cladding of walls shall have surfaces that are not less than Class 3 in accordance with BS 476-7:1997 or Euro Class D in accordance with BS EN 13501-1:2007+A1:2009.

5.3 Internal cladding of walls and ceilings

Materials used for the internal cladding of walls and ceilings shall have surfaces that are not less than Class 3 in accordance with BS 476-7:1997 or Euro Class D in accordance with BS EN 13823:2010+A1:2014 and BS EN ISO 11925-2:2010.

*NOTE Requirements for internal claddings adjacent to any heat producing appliances are given in Clause **7**.*

5.4 Prevention of decay and corrosion

5.4.1 Timber

When likely to come into contact with the ground, be exposed to the open air or be in a situation where wetting or condensation can occur, timber and timber based products shall either be inherently resistant to biological degradation (e.g. to rot or insect attack) or be treated with a wood preservative in accordance with BS 8417. The level of natural resistance to biological attack or the type of preservative treatment shall be based on the degree of exposure to wetting under the precise service conditions of the timber component.

NOTE For more information, see BS EN 1995-1-1 for structural timbers and BS 8417 for other timbers.

5.4.2 Metal

When likely to come into contact with the ground, be exposed to the open air, or be in a hostile environment, mild steel components shall be protectively coated against corrosion for a medium duration (i.e. five years to fifteen years) in an atmospheric environment with corrosivity category of C3 (medium) as defined in BS EN ISO 12944-2:1998.

The contact faces of dissimilar metals shall be electrically isolated from each other, or sealed against the ingress of moisture to avoid bimetallic corrosion.

NOTE For more information on this type of corrosion, see PD 6484.

5.5 Floor

The floor shall conform to **4.9.1** and **4.9.3**. The materials used for floor boarding shall be approved by the boarding manufacturer for use as a floor deck. Where floor boarding is installed in a wet room, it shall also be approved by the boarding manufacturer for use in an environment with high levels of airborne moisture. The floor boarding shall be installed in accordance with the boarding manufacturer's installation instructions.

NOTE 1 Care should be taken to ensure that spacing of joists, as well as spacing and type of board fixings conform to the manufacturer's installation instructions.

NOTE 2 Examples of flooring grade boarding materials are P5 moisture resistant flooring grade chipboard, water and boil proof flooring grade plywood, oriented strand board 3 and cement particle board, which should be identified by the boarding manufacturer as suitable for flooring use.

6 Internal equipment

6.1 General

Internal equipment shall be installed in accordance with the equipment manufacturer's installation instructions.

6.2 Heating equipment

The residential park home shall be equipped with a heating system capable of raising and maintaining the internal temperature (when the external temperature is –1 °C) as follows:

- living room, dining room: 22 °C;
- bathroom, shower room: 22 °C;
- kitchen: 18 °C;
- bedroom: 18 °C; and
- hallway: 19 °C.

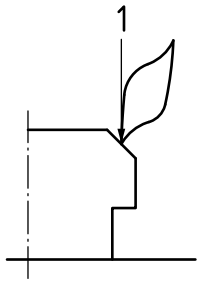
*NOTE For further information regarding calculating the rated power output of a space heating system, see **A.2**.*

6.3 Cooking equipment

Where cooking equipment is provided, it shall conform to either BS EN 30-1-1 or BS EN 60335-2-6. Where cooking equipment is not provided, a floor space of not less than 0.6 m × 0.6 m shall be provided for a free-standing cooking appliance. Provision shall also be made for the gas and/or electrical connections for a free-standing cooking appliance.

Rigid elements manufactured from flammable materials which are adjacent to heat generating equipment, or adjacent to the spaces left for such equipment shall be not less than 0.2 m from the point of emission of an open flame (see Figure 6) unless these elements are protected by non-flammable material. Protection made of non-flammable material can be fixed or hinged, but shall not be removable without the use of a key or tool.

Figure 6 **Point of emission of an open flame**



Key
1 Point of emission of an open flame

Movable rigid elements shall be checked in their most adverse position.

Non-guided elements such as curtains or non-guided blinds located less than 0.9 m from a point of emission of an open flame shall be incapable of being moved to within 0.3 m of the point of emission of an open flame, except when these elements are protected by non-flammable material.

The vertical dimensions of such non-flammable protection shall be the greater of:

a) 0.3 m above the point of emission of an open flame; or

b) equal to or higher than a line drawn between the point of emission of an open flame and the closest point at which the element is suspended.

In the case of open flame hotplates:

1) the surface below the burner shall be non-flammable; and

2) where the appliance is provided with a cover which is likely to come into contact with the pan supports, the cover shall have an inner lining of non-flammable material.

If hinged or otherwise movable, elements shall conform to **6.3** when they are open or pulled back, disregarding any storage devices.

6.4 Refrigeration equipment

Where a refrigerator is provided, it shall conform to BS EN 60335-2-24. Where a refrigerator is not provided, a floor space of not less than 0.6 m × 0.6 m shall be provided. Provision shall also be made for the necessary electrical connections for a free-standing refrigerator.

6.5 Safety alarms

6.5.1 Smoke alarms

A smoke alarm conforming to BS EN 14604 shall be installed in accordance with the alarm manufacturer's instructions.

6.5.2 Carbon monoxide (CO) alarms

A minimum of two CO alarms conforming to BS EN 50291-1 shall be installed in accordance with the alarm manufacturer's instructions.

7 Installation of services

7.1 Electrical services

The electrical installation shall conform to BS 7671. Electrical socket outlets shall be provided in all habitable areas and electric lighting shall be provided in all rooms.

7.2 Natural gas and LPG installations

The gas installation shall conform to BS 6891 and BS 5440-1, and the flues and terminals shall conform to BS 715.

NOTE Attention is drawn to The Gas Safety (Installation and use) Regulations 1998 [3].

7.3 Solid fuel installations

Where a solid fuel heating system is provided, it shall conform to BS 6762-2.

7.4 Oil-fired heating systems

Where an oil-fired heating system is provided, it shall conform to BS 5410-1.

7.5 Water and waste disposal

*COMMENTARY ON **7.5***

For further information on the design and installation of water systems, attention is drawn to:

- *The Water Supply (Water Fittings) Regulations 1999, as amended [4];*
- *The Water Supply (Water Fittings) (Scotland) Byelaws 2014 [5]; and*
- *The Water Supply (Water Fittings) Regulations (Northern Ireland) 2009 [6].*

7.5.1 Sanitary provisions

The residential park home shall be provided with a minimum of:

a) a flushing WC, which conforms to BS EN 33 and BS EN 997, and is capable of being connected to an external drainage system, which might require venting;

b) a bath or shower (or both), a fixed sink in the kitchen and a wash basin (where ceramic, conforming to BS 1188) in a bathroom, shower room or WC;

c) a water heating system;

d) a means of connecting a mains supply to the kitchen sink and the water heating system;

e) a hot and cold water supply; and

f) a stop cock for the incoming water supply, close to the point of entry of the pipe supplying water to the residential park home.

Fittings shall be trapped and drained in accordance with BS EN 12056-2.

Water pipes shall be positioned so that, where possible, all joints are accessible. Where they might be exposed to sub-zero conditions, water pipes shall be insulated. Where pre-formed rigid foam insulation is used, it shall conform to BS 5608.

The completed domestic water and sanitary system shall conform to BS EN 806 (all parts).

7.5.2 Drainage

The roof shall be designed to discharge rainwater into rainwater outlets by way of guttering or roof troughs. Rainwater outlets shall be positioned clear of doors, windows and ventilators.

The rainwater drainage system shall be installed in accordance with the manufacturer's instructions.

Foul drainage connections shall be positioned as to avoid structural members of the chassis and to minimize risk of damage during transportation and siting.

7.5.3 Prevention of scalding

The hot water supply to baths and showers shall be limited to 48 °C by a TMV 2 rated thermostatic mixing valve conforming to BS EN 1111 and BS EN 1287, to prevent scalding. Alternatively, a TMV 3 rated thermostatic mixing valve can be used to serve a whole room or the whole home.

7.6 Alternative or renewable energy systems and technologies

Alternative or renewable energy systems shall be installed in accordance with the system manufacturers' instructions.

7.7 Lighting

Fixed internal light fittings shall be provided with low energy lamps with a luminous efficacy greater than 45 lamp lumens per circuit watt.

NOTE Fixed internal light fittings in cupboards and other infrequently used areas are exempt from this requirement.

7.8 Protection of systems during transportation and siting

When a residential park home is dispatched from the factory, the open ends of all services shall be blanked and protected to prevent damage during transportation and siting.

8 Identification

The residential park home shall have an identification number permanently marked on the chassis, on the same side as the main entrance door, in a position that is readily visible.

As a minimum, the identification number shall identify the manufacturer, year of manufacture, and the individual home.

9 Notices

9.1 Fire warning notice

A fire warning notice not less than 0.2 m × 0.13 m shall be permanently fixed inside the residential park home in a position that is readily visible, and shall give simple fire prevention advice and set out the action to be taken in the event of fire (see Figure 7).

Figure 7 **Example of a fire warning notice**

Advice to Occupiers

Ventilation:

Do not obstruct any ventilation openings; your safety depends on them.

Fire action:

1. Raise the alarm and get everyone out;
2. Turn off the gas and/or oil valve (if fitted);
3. Call the fire brigade;
4. Disconnect the mains electricity supply;
5. Only tackle the fire if safe to do so.

Fire precautions:

Vulnerable persons should not be left unsupervised at any time.

Make sure you know the location and operation of the escape windows and doors, and keep all escape routes clear.

Keep combustible materials clear of heating and cooking appliances at all times.

The fire warning notice ventilation information shall be in white lettering on a red background. The fire action and fire precautions instructions shall be in white lettering on a blue background.

9.2 Gas commissioning notice

A gas commissioning notice not less than 0.21 m × 0.148 m shall be permanently fixed inside the residential park home in a position that is readily visible (see Figure 8).

NOTE The gas commissioning notice is completed by the gas commissioning engineer.

Figure 8 **Example of a gas commissioning notice**

Gas Commissioning Notice

In the general interests of your safety and others that may use this residential park home, you should have the gas installation and appliances properly commissioned and checked for safety by a competent Gas Safe registered engineer after the unit has been delivered and a gas supply connected to it.

We recommend that the registered engineer completes this notice at the time of commissioning this residential park home when new. This record of first commissioning should not be removed.

Installation Company:

Gas Safe registration No:

Commissioning date:

Engineer's name:

Engineer's signature:

If the residential park home is to be let out (either permanently or short term), then by law (*The Gas Safety (Installation and use) Regulations* and health and safety legislation) the current owner or their agent must ensure that: commissioning and servicing checks of gas installations and gas appliances have been carried out by a Gas Safe registered engineer; the gas appliances are checked for safety at least once a year by a Gas Safe registered engineer; and a record of the installer's safety check is prominently displayed in the unit for occupants to see.

If the unit is being used solely for private use, other than commissioning, these checks are not required by law, but it is STRONGLY RECOMMENDED that the owner has them carried out and retains a record of the annual safety checks on appliances.

Warning: By law only competent persons can carry out gas installation and servicing work. Do not attempt to work on the gas installation yourself, as to do so could be illegal and/or dangerous and could put yourself or others at risk.

10 User's handbook

NOTE 1 The user's handbook typically consists of a portfolio of separate documents.

A user's handbook shall be provided with each residential park home and shall contain, at least, the following information:

a) the full specification of the residential park home;

b) the following warning instructions regarding fire and asphyxiation risks:

   1) do not block ventilators;

   2) flexible gas hoses shall be inspected regularly for deterioration. Renew with an approved type as necessary and not later than the expiry date marked on the hose;

   3) use only portable fire extinguishers of the dry powder type, except on liquid fires, where only fire blankets shall be used;

   4) use a fire blanket on a liquid fire. If a fire occurs in the oven, turn off the oven and leave the oven door closed to smother the fire;

   5) do not use portable gas or liquid fuel heating equipment, it is a source of danger and could cause fumes, asphyxiation and condensation;

c) safety instructions relating to all fixed installations provided;

d) the location of ventilation openings and the method of checking and cleaning any protective screens;

e) the position of chassis holding down points;

NOTE 2 A recommendation should be made in the user's handbook that the person responsible for the ground installation of the residential park home provide suitable ground anchorage points to prevent overturning if local climatic conditions are likely to result in wind velocities in excess of 48 m/s (107 mph). Each ground anchor should be capable of resisting a tensile load of 10 kN.

f) operating and maintenance instructions for all fitted appliances, unvented mains pressure water cylinders, heating systems and alternative and renewable energy systems (such as MVHR);

g) maintenance and testing instructions for smoke and CO alarms;

h) a description or floor plan giving the location of all designated means of escape; and

i) guidance for skirting the residential park home, e.g. ventilation openings and access panels.

The user's handbook shall also carry the following statement:

WARNING - do not carry out any modifications without first consulting the residential park home manufacturer or a suitably qualified person.

The warning notices specified in **9.1** and **9.2** shall be reproduced in full in the user's handbook.

Annex A (normative) Method of calculation of thermal characteristics and heating system requirements

A.1 Method of calculation of thermal transmittance for bridged elements

*COMMENTARY ON **A.1***

The calculation assumes that the building elements (floor, walls and roof) are composed of inhomogeneous bridged layers. In other words, they consist of a sheathed frame which has insulation in the voids. To take account of the different rates of heat transfer through the insulated areas compared to that through the framework, the combined calculation method is used. This assesses the upper (R_U) and lower (R_L) limits of thermal resistance (m^2K/W) and calculates a combined value for the thermal resistance based on the proportion of the two heat flow paths through the panel with respect to its total area.

The first step shall be to calculate the thermal resistance (R_b) of the bridged panels using the equation:

$$R_b = \frac{1}{2}(R_U + R_L) \tag{A.1}$$

The upper and lower limits of thermal resistance shall be calculated in terms of the proportion of total surface area using the equations:

$$R_U = \left(A_{bridged} + A_{unbridged}\right) \left[\frac{P_m}{R_{se} + R_{m2} + \left(R_1 \ldots + R_z\right) + R_{si}} + \frac{P_n}{R_{se} + R_{n2} + \left(R_1 \ldots + R_z\right) + R_{si}} + \frac{P_p}{R_{se} + R_{p2} + \left(R_1 \ldots + R_z\right) + R_{si}} \right]^{-1} \tag{A.2}$$

and

$$R_L = R_{se} + R_1 + \left[\frac{1}{(P_m/R_{m2}) + (P_n/R_{n2}) + (P_p/R_{p2})}\right] + R_3 \ldots + R_z + R_{si} \tag{A.3}$$

where:

A	is the area of the element in square metres (m^2);
R_U	is the upper limit of thermal resistance in square metres Kelvin per Watt (m^2K/W);
R_L	is the lower limit of thermal resistance in square metres Kelvin per Watt (m^2K/W);
R_{se}	is the external surface resistance in square metres Kelvin per Watt (m^2K/W);
R_{si}	is the internal surface resistance in square metres Kelvin per Watt (m^2K/W);
$R_1 - R_z$	are the thermal resistance of the unbridged layers 1 … *z* in square metres Kelvin per Watt (m^2K/W);
P_m, P_n and P_p	are the proportions of the total surface area of the panel occupied by materials *m, n* and *p* respectively; and

R_m, R_n and R_p are the thermal resistances of those materials in square metres Kelvin per Watt (m^2K/W).

The *R* value for each material shall be given by the equation:

$$R_{material} = \frac{d}{\lambda} \quad \text{(A.4)}$$

where:

d is the material thickness in metres (m);

λ is the thermal conductivity in Watts per metre Kelvin (W/m·K).

The thermal transmittance value, (*U*), in Watts per square metre Kelvin (W/m^2K) of the bridged panel shall be given by the equation:

$$U = 1/R_b \quad \text{(A.5)}$$

A.2 Method of calculation for the rated power output of the space heating system

The rated power output of the space heating shall be given by the equation:

$$P = 1.2[\frac{(k_w + k_v) \times \Delta T}{1\,000}] \quad \text{(A.6)}$$

where:

ΔT is the temperature difference between the outside air and the required internal temperature in Kelvins (K);

k_w is the heat loss through the floor, walls and roof of the residential park home in Kelvins (K);

k_v is the heat loss due to the renewal of air in Kelvins (K).

The heat loss though the floor, walls and roof (k_w) shall be given by the equation:

$$k_w = U_a \times (W_a + F_a + R_a) \quad \text{(A.7)}$$

where:

$$U_a = \frac{\{[(W_a - A_w) \times U_w] + (A_w \times U_g) + (F_a \times U_f) + (R_a \times U_r)\}}{(W_a + F_a + R_a)} \quad \text{(A.8)}$$

where:

W_a is the total internal area of the walls in square metres (m^2);

F_a is the total internal floor area in square metres (m^2);

R_a is the total internal roof area in square metres (m^2);

A_w is the total area of the doors and windows, including the frames in square metres (m^2);

U_w is the *U* value of the walls in Watts per square metre Kelvin (W/m^2K);

U_g is the *U* value of the doors and windows in Watts per square metre Kelvin (W/m^2K);

U_f is the *U* value of the floor in Watts per square metre Kelvin (W/m^2K);

U_r is the *U* value of the roof in Watts per square metre Kelvin (W/m^2K).

NOTE 1 W_a *should be calculated as [(length × 2) + (width × 2) × average height].*

NOTE 2 U_g *assumes that the* U *value for the doors and windows is the same. If this is not the case then they should be accounted for separately in the equation.*

The heat loss due to the renewal of air (k_v) shall be given by the equation:

$$k_v = 0.33 \times N \times V \quad \text{(A.9)}$$

where:

N is the number of air changes per hour;

V is the volume of the residential park home (floor area × average internal height) in metres cubed (m^3).

The lowest external temperature (θ_e) below which the heating system cannot raise the internal temperature of the residential park home to 20 °C shall be given by the equation:

$$\theta_e = 20 - \frac{P}{k_w + k_v} \times 1000 \quad \text{(A.10)}$$

A.3 Explanation of terms used and common values for each

A.3.1 Surface resistance, R_{si} and R_{se}

NOTE 1 R_{si} *and* R_{se} *are thermal resistance of the interior and exterior surfaces. Heat is transferred at the surface by radiation and convection and the rate of transfer depends on the type of surface, the direction of heat flow and air movement over the surfaces.*

Surface resistance shall be expressed in square metres Kelvin per Watt (m^2K/W).

NOTE 2 Typical surface resistance values are as given in Table A.1.

A.3.2 Thermal resistance, *R*

Thermal resistance, *R*, is a measurement of the overall resistance to heat transfer of a material or combination of materials and it shall be expressed in square metres Kelvin per Watt (m^2K/W).

The certified thermal resistance of low emissivity air spaces shall be acquired from the insulation manufacturer.

For air spaces, typical values of *R* shall be as given in Table A.2.

Table A.1 **Typical surface resistance values**

Surface	Resistance value (m^2K/W)
Interior surfaces, R_{si}	
Walls	0.13
Roofs	0.10
Floors	0.17
Exterior surfaces, R_{se}	
Walls	0.04
Roofs	0.04
Floors	0.04
Combined $R_{si} + R_{se}$	
Walls	0.17
Roofs	0.14
Floors	0.21

Table A.2 **Air space thermal resistance**

Air space thickness (m)	Thermal resistance, R (m^2K/W)
0.005	0.11
0.01	0.14
0.02	0.16

A.3.3 Thermal conductivity, λ

Thermal conductivity, λ, is the measurement of a material's ability to conduct heat energy and it shall be expressed in Watts per metre Kelvin (W/m·K).

The certified thermal conductivity values for the various materials used in the construction of the residential park home shall be acquired from the manufacturer or supplier of the material.

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