BRITISH STANDARD

BS 6767-1:1999

Transportable accommodation units —

Part 1: Recommendations for design and construction of the basic unit

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Committees responsible for this British Standard

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Caravan Club
Chief and Assistant Chief Fire Officers' Association
Consumer Policy Committee of BSI
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Contents

Foreword

This part of BS 6767 has been prepared by Technical Committee B/511. It supersedes BS 6767-1:1992 which is withdrawn.

This revision of part 1 has been prepared to reflect updates in legislation, regulations, standards and safety provisions.

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Summary of pages

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Introduction

Modern transportable accommodation units developed as an alternative to huts and sectional buildings. Their specification and structural performance, installation and range of sizes, make them particularly suitable for a wide number of applications.

Relocatable and transportable accommodation units are delivered ready for immediate use. Units without wheels can either be craned, fork-lifted or winched into position or off-loaded from a flat-bed truck by one person using a telescopic jack-leg system. They can be linked end to end, side by side or end to side, or stacked to form a two or more storey structure.

Since the 1960's, transportable accommodation units have been manufactured in large numbers under factory-controlled conditions. The volume and diversity of their manufacture has made it desirable to standardize the basic unit. This part of BS 6767 gives recommendations for design and construction of a basic unit. BS 6767-2 gives recommendations for design and installation of services and fittings with guidance on the necessary fire precautions, transportation, handling and siting. Safety matters have been given a high priority. In addition, recommendations on providing information to ensure correct unit identification, handling and siting, on the manufacturer's certificate and also to be marked on the unit itself, have been included.

Conformity with appropriate legislation depends upon the size and end-use of a unit. Some units are designated as permanent buildings and therefore need to conform to the appropriate building regulations applicable in England and Wales, Scotland and Northern Ireland. This part of BS 6767 gives recommendations for the safe use and other technical performance aspects of land-based transportable accommodation units classified as "exempt buildings" in the building regulations.

It has been assumed in the drafting of this standard that the execution of its recommendations and provisions is entrusted to appropriately qualified and experienced people.

In particular attention is drawn to:

— Building Regulations, 1991 [1];

— Building Standards (Scotland) Regulations, 1990 [2];

— Building Regulations (Northern Ireland), 1994 [3];

— Telecommunications Act, 1984 [4];

— Chronically Sick and Disabled Persons Act, 1976 [5];

— Clean Air Acts, 1956 to 1993 [6];

— Consumer Protection Act, 1987 [7];

— Education Act, 1993 [8];

— Factories Act, 1961 [9];

— Fire Precautions (Workplace) Regulations, 1997 [10];

— Fire Precautions Act, 1971 [11];

— Gas Act, 1995 [12];

— Health and Safety at Work etc. Act, 1974 [13];

— Local Government (Miscellaneous Provisions Act), 1982 [14];

— Offices, Shops and Railway Premises Act, 1963 [15];

— Petroleum (Consolidation) Act, 1928 [16];

— Planning (Northern Ireland) Order, 1991 [17];

— Residential Homes Act, 1980 [18];

— Road Traffic Act, 1972 [19];

— Town and Country Planning Act, 1990 [20];

— Town and Country Planning (Scotland) Act, 1997 [21];

1 Scope

This part of BS 6767 gives recommendations for the design and construction of the basic shell of single transportable accommodation units that are "exempt buildings" as defined by the appropriate building regulations applicable in England and Wales, Scotland and Northern Ireland. The units can be leg-mounted, skid-mounted, wheel-mounted or platform-mounted.

Recommendations are also given for certain special considerations applying to some of the individual types.

These recommendations are intended for use by designers and manufacturers of the basic units. Part 2 of this standard gives recommendations on the design and installation of services, and fittings plus guidance on necessary fire precautions and also transportation, handling and siting.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of this British Standard. For dated references, subsequent amendments to, or revision of, any of these publications do not apply. For undated references, the latest edition of the publication referred to applies.

BS 449-2, *Specification for the use of structural steel in building — Metric units.*

BS 476-3, *Fire tests on building materials and structures. External fire exposure roof test.*

BS 476-7 *Fire tests on building materials and structures. Method of test to determine the classification of the surface spread of flame of products.*

BS 4800, *Schedule of paint colours for building purposes.*

BS 5268-2, *Structural use of timber — Part 2: Code of practice for permissible stress design, materials and workmanship.*

BS 5493, *Code of practice for protective coating of iron and steel structures against corrosion.*

BS 5589:1989, *Code of practice for preservation of timber.*

BS 5639-3, *Fork arms for fork lift trucks — Part 3: Recommendations for dimensions of fork arms.*

BS 5950-1, *Structural use of steelwork in building. Code of practice for design in simple and continuous construction: hot rolled sections.*

BS 5950-5, *Structural use of steelwork in building. Code of practice for design of cold formed sections.*

BS 6262, *Code of practice for glazing for buildings.*

BS 6375-1, *Performance of windows — Part 1: Classification for weathertightness (including guidance on selection and specification).*

BS 6399-1, *Loadings for buildings. Code of practice for dead and imposed loads.*

BS 6399-2, *Loadings for buildings. Code of practice for wind loads.*

BS 6399-3, *Loadings for buildings. Code of practice for imposed roof loads.*

BS 8118-1, *Structural use of aluminium. Code of practice for design.*

BS 8118-2, *Structural use of aluminium. Specification for materials, workmanship and protection.*

3 Terms and definitions

For the purposes of this part of BS 6767, the following definitions apply.

3.1

transportable accommodation unit

relocatable accommodation, designed to be transported by road vehicle

[BS 6100-1:1.5:1.5.5:1991]

3.2

leg-mounted transportable accommodation unit

transportable accommodation unit with supporting legs, either fixed or telescopic, extending below its underside

[BS 6100-1:1.5:1.5.5:1991]

3.3

platform-mounted transportable accommodation unit

transportable accommodation unit mounted on a steel frame designed for moving by means of a fork-lift truck

3.4

skid-mounted transportable accommodation unit

transportable accommodation unit mounted on skid members of steel, timber or other suitable materials

3.5

wheel-mounted transportable accommodation unit

transportable accommodation unit mounted on a wheeled chassis and towed from one location to another

[BS 6100-1:1.5:1.5.5:1991]

3.6

formation

surface of the ground in its undisturbed state, or in its final shape after completion of earthworks, prior to the construction of any structure or foundation works

3.7

linking

process of connecting transportable accommodation units

3.8

stacking

process of linking vertically to form a two or more storey structure

3.9

basic mass

mass of a transportable accommodation unit without partitions, fittings and services

3.10

ex works mass

mass of a transportable accommodation unit with partitions, fittings and services

3.11

maximum mass

maximum permissible mass of a transportable accommodation unit for handling

4 Types

Units should be one of the following types:

a) leg-mounted;
b) platform-mounted;
c) skid-mounted;
d) wheel-mounted.

5 Sizes

The clear floor-to-ceiling height should be a minimum of 2 100 mm.

NOTE Guidance on size restrictions imposed by the need to transport the unit on the public highway is given in BS 6767-2.

6 Structure

6.1 General

The structural framework and fabric should be capable of withstanding all the dead loads and imposed loads, including all horizontal, inclined or uplift forces, described in **6.3** to **6.5**. The unit should transmit all such loads safely through the structure and distribute them to the underlying formation. The unit should be capable of withstanding any dynamic loads that can be encountered during lifting and transportation.

6.2 Materials

The structural use of materials should be as recommended for aluminium in BS 8118-1 and BS 8118-2, as recommended for timber as in BS 5268-2 and as specified for steel in BS 449-2, BS 5950-1 and BS 5950-5.

6.3 Floor loads

Floors should be capable of withstanding a uniformly distributed load of 2.5 kN/m^2 or a maximum concentrated load of 2.7 kN/m^2, whichever produces the greater stress, in accordance with BS 6399-1. Units requiring a greater floor load should also be designed in accordance with BS 6399-1.

6.4 Roof loads

The roof of the unit should be capable of carrying a uniformly distributed load of 0.75 kN/m^2 or a concentrated load of 0.9 kN/m^2, whichever produces the greater stress, in accordance with BS 6399-3.

6.5 Wind loads

The unit should be capable of withstanding a minimum lateral horizontal wind force of 0.75 kN/m^2. There should be an additional allowance for wind uplift of 0.5 kN/m acting over the net exposed area of floor and/or roof overhangs and projections. Further guidance on extremes of wind load is given in BS 6399-2.

7 External construction

7.1 Weather resistance

External cladding and roofing should prevent the penetration of rain and snow. Windows should be classified for watertightness in accordance with BS 6375-1 and should attain the performance required for test pressure class 50 Pa.

7.2 Spread of flame

Materials used for the construction of the external cladding should have surfaces with a spread of flame of class 3 or higher when tested in accordance with BS 476-7. Depending on use and particularly where units are designed to be linked or stacked, consideration should be given to further upgrading the fire performance. Guidance is given in BS 6767-2.

8 Internal finishes

8.1 Walls and ceilings

Materials used for the internal linings of walls and ceilings should have surfaces with a spread of flame of class 3 or higher when tested in accordance with BS 476-7. Finishes based on nitrocellulose should not be used.

8.2 Floors

Floors should be finished with a covering that is impervious to water and water vapour.

9 Roofing

Material used for the roof covering and its supporting deck should have a fire performance classification of P15 or higher when tested in accordance with BS 476-3.

10 Glazing

Glazing in doors and windows should be carried out in accordance with BS 6262.

11 Natural lighting

Where natural lighting is required, each unit should be provided with a total glazed area of not less than 10 % of the total floor area, by means of rooflights, windows or glazed door panels in the external walls. Single glazed windows should incorporate a condensation channel.

12 Ventilation

12.1 Fixed ventilation

Fixed ventilation should be provided. The total effective fixed free area of ventilation should be divided equally between opposite sides of the unit at high level and should be either 4 000 mm^2 or $65V$ mm^2, whichever is the greater,

where:

V is the numerical value of the internal volume of the unit (in m^3).

12.2 Adjustable ventilation

Adjustable ventilation should be provided by means of external doors and openable windows to give a total effective free area of ventilation of not less than 5 % of the floor area of the unit. The area of ventilation provided by openable windows should be not less than 10 000 mm^2. Recommendations for additional ventilation when services and heating are installed are given in BS 6767-2.

12.3 Protection of ventilators

All permanent openings for ventilation should be designed to give protection against the entry of vermin and against the weather. They should be accessible for cleaning.

13 Means of escape

Each unit should be provided with a means of escape by a door that gives direct access to the open air and that can be opened easily from the inside without the use of a key. It should have a clear opening of not less than 1 800 mm in height and 700 mm in width.

Recommendations for the provision of additional escape doors particularly where units are linked or stacked are given in BS 6767-2.

14 Maximum mass for handling

Care should be taken to ensure that if a unit is modified in any way, the maximum permissible mass for handling is not exceeded.

15 Lifting points

Where lifting points are provided, each should be designed to accept a safe working load of at least the maximum mass of the unit as stated by the manufacturer and marked on the unit (see clauses **24** and **25**), applied at any angle up to 60° from the vertical and in any direction within the vertical planes enclosing the lifting points.

Allowance should be made in the structural design of units, for the horizontal forces induced at lifting points by the use of slings with inclined legs. Holes in lifting points including those in eye bolts should be sized to receive suitably rated lifting equipment.

16 Anchor ties

Units should be provided with at least four symmetrically positioned perimeter lugs, rings, hooks, eyes or other devices to enable them to be secured by ropes, cables or chains to:

a) motor vehicles for safe transportation;

b) suitable anchors embedded into or fixed to the ground, foundations or other prepared base.

17 Roof drainage

The roof of the unit should discharge rainwater by means of a gutter or roof trough. Gutter outlets should be positioned clear of doors, windows and ventilators.

18 Avoidance of decay

Where directly exposed to the weather or used in a situation where intermittent wetting or condensation may occur, timber should either be treated with a wood preservative in accordance with section one and section two of BS 5589 or be a species that has a service life equivalent to that of treated timber. In either case, detailing should allow discharge of any moisture collected on surfaces or in joints. Where appropriate, the preservative treatment should be chosen on the basis of the guidance for performance category B, according to BS 5589:1989, Table 5.

NOTE Particular attention is drawn to BS 5589:1989, **7.3** with regard to corrosion of metal in contact with treated timber.

19 Avoidance of corrosion

19.1 Protection against rust

Iron and steel components exposed to the weather, or to hostile environments, should be protectively coated against corrosion in accordance with BS 5493. The degree of protection provided should be stated in the manufacturer's certificate (see clause **27**).

19.2 Bimetallic corrosion

Where bimetallic corrosion is likely, the contact faces of dissimilar metals should be electrically insulated from one another or effectively sealed against the ingress of moisture.

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

20 Thermal insulation

20.1 Thermal transmittance

The unit (excluding door and window openings) should be constructed and finished to ensure that the thermal transmittance (U) value does not exceed 0.8 W/(m^2·K) for the floor and walls and 0.6 W/(m^2·K) for the roof.

The calculated mean overall U value of external walls, including any door and window openings, should not exceed 1.8 W/(m^2·K).

20.2 Protection of insulation

Insulation should be protected from animal attack.

20.3 Prevention of condensation

Means should be provided to prevent water vapour condensing within the insulating material. Guidance on the control of condensation in buildings is given in BS 5250.

21 Decoration

Guidance on the selection of colours for external finishes is given in BS 6770. Colours for internal painted finishes should be selected from BS 4800.

22 Mechanical and electrical services

Services should be designed in accordance with BS 6767-2.

23 Special considerations for leg-mounted units

Jacking points and mechanisms should be designed to withstand at least a load equal to the maximum mass of the unit, as stated by the manufacturer and marked on the unit (see clauses **27** and **28**).

Where leg-mounted units are intended for double stacking, it is essential that each leg of the lower unit should be capable of carrying the additional dead and imposed loads of the upper unit appropriate to floor loading of that unit.

Where legs are attached to timber structures the connections should be made by captive bolts from the interior of the structure with retaining nuts accessible from the exterior.

24 Special considerations for platform-mounted units

In addition to the lifting points described in clause **15**, designated fork pockets, capable of transferring the maximum gross mass of the unit as stated by the manufacturer and marked on the unit (see clauses **27** and **28**), should be provided on the underside of platform-mounted units for lifting by fork-lift truck. The fork pockets should be designed to accept fork arms which have been dimensioned in accordance with the recommendations of BS 5639-3.

25 Special considerations for skid-mounted units

Skid-mounted units should be provided with at least two lugs, rings, hooks, eyes or other devices attached symmetrically to each end of the skid assembly for horizontal winching.

26 Special considerations for wheeled units

Attention is drawn to the fact that when wheeled units are used on public highways they may be subject to the provisions of: The Road Vehicles (Construction and Use) Regulations, 1986 [22]; The Motor Vehicles (Construction and Use) Regulations Northern Ireland, 1989 [23]; The Road Vehicle Lighting Regulations, 1989 [24]; The Road Vehicle Lighting Regulations, Northern Ireland, 1995 [25].

27 Manufacturer's certificate

The purchaser should be provided with a dated certificate which should include the following:

a) name and address of the manufacturer;

b) model, type, serial number and maximum permissible distributed floor load;

c) basic mass;

d) ex-works mass;

e) maximum mass;

f) internal sizes of the length, width and height of the unit;

g) suitability for stacking;

h) degree of corrosion protection provided;

i) designed maximum gross capacity for the chassis (wheel-mounted units only);

j) recommendations for periodical checking and maintaining in roadworthy condition (wheel-mounted units only);

k) recommended tyre pressures (wheel-mounted units only).

28 Marking

The following information should be permanently and clearly marked in a visible place on the exterior fabric of the unit:

a) name and address of the manufacturer;

b) type, serial number and maximum permissible distributed floor load;

c) maximum external sizes;

d) basic mass;

e) ex-works mass;

f) maximum mass;

g) special instructions for handling;

h) suitability for stacking;

i) position of lifting points;

j) position of anchor points;

k) tyre pressures (wheel-mounted units only);

l) maximum and minimum nose load (wheel-mounted units only);

m) maximum gross mass for moving on its skids (skid-mounted units only);

n) instructions for the safe operation of jacking equipment (leg-mounted units only).

29 User's handbook

The purchaser should be provided with a handbook giving instructions for the use and maintenance of the unit with particular reference to the recommendations given in BS 6767-2. The manufacturer's certificate (see clause **27**) may be incorporated in the handbook.

Bibliography

Standards documents

BS 5250:1989, *Code of practice for control of condensation in buildings.*

BS 6100-1.5.5:1991, *Glossary of building and civil engineering term. General and miscellaneous. Operations; associated plant and equipment. Plant and equipment.*

BS 6767-2:1998, *Transportable accommodation units — Part 2: Recommendations for design and installation of services and fittings with guidance on transportation, siting and aspects relating to habitation.*

BS 6770:1988, *Guide for exterior colours for park homes (mobile homes), holiday caravans and transportable accommodation units.*

BS 6399-2:1997, *Loadings for buildings — Part 2: Code of practice for wind loads.*

PD 6484:1979, *Commentary on corrosion at bimetallic contacts and its alleviation.*

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