



An Overview of

BRE Product Standard

BPS 7014 : Issue 1.0 DRAFT

Standard for Modular Systems for Dwellings

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OVERVIEW OF A STANDARD FOR MODULAR SYSTEMS FOR DWELLINGS

A summary of the content is as follows:

FOREWORD

The BPS (7014) is designed to improve the global competitiveness of advanced manufacturing and supply chains. To support research and development skills training and capital investment to help supply chains achieve World-class standards and encourage major new suppliers.

The Standard will specify performance and verification requirements for modular building systems **and components**, to be used in UK residential construction, which are constructed using advanced manufacturing processes.

The BPS will provide a route to certification for modular systems for use in the construction of residential buildings. The key objectives of the standard being:

- to encourage new methods of construction and advanced manufacturing techniques whilst maintaining acceptable levels of safety and durability.
- to create confidence in the use of such methods in residential construction.
- to demonstrate compliance with relevant building regulations and national house building codes, as well as enhancing characteristics where appropriate.
- to identify/quantify the comfort and wellbeing benefits to the householder of such construction.

The Standard is being aimed primarily at the certification of modular building systems for residential construction that:

- are not wholly covered under current recognised standards and codes, and/or
- have a limited track record of service in the UK.

This objective is achieved by setting out requirements for performance in a number of areas to address the needs of all key stakeholders. These requirements are to be defined through detailed consultation with stakeholders including:

- The Department for Business, Energy & Industrial Strategy (BEIS)
- Housing England
- Association of British Insurers (ABI) and insurers

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- UK Finance (previously Council of Mortgage Lenders (CML)) and lenders
- Designers
- Manufacturers
- Specifiers
- Building Control (LABC)
- National House-Building Council (NHBC)
- BOPAS Buildoffsite
- Robust Details Ltd

Residents, owners and the financial sector have long term needs for the performance of residential buildings utilising modular systems. Historically, new building systems were often adopted without rigorous scrutiny, testing or certification, beyond that required by regulation. In some cases systematic problems emerged with particular building systems, with the result that over time these dwellings became unpopular with residents, landlords, owners, mortgage lenders and insurers. The purpose of the Standard, being:

- to help manage this risk for modular building systems by demonstrating that they have been subjected to a rigorous independent review, testing and certification process, and,
- to provide assurance to purchasers, insurers, lenders, designers, and other stakeholders using modular building methods, that they are at least equivalent to, if not better than, currently applied methods.

It is the intention that residential construction incorporating building systems certificated to this Standard should receive equivalent treatment for mortgage lending and insurance purposes to residential construction using currently applied methods.

The Standard will require building systems to meet the requirements of the UK Building Regulations for safety and functionality, a range of characteristics including buildability, durability, resilience, reparability, whole life performance, adaptability, and the provision of guidance on installation and maintenance. Manufacturers shall also have a factory production control system to ensure ongoing quality and undergo regular surveillance audits of these systems by the Certification Body.

In addition to meeting the requirements of UK Building Regulations, the Standard makes provision for manufacturers to submit building systems that exceed the requirements of building regulations, so that enhanced performance characteristics may be appropriately assessed and duly recognised. The new test methods and requirements are being developed to demonstrate additional characteristics of innovative building systems.

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The Standard also includes factors that make the accommodation a comfortable place to live, including additional acoustic, climate and wellbeing elements.

The Standard would be used in association with detailed site and configuration specific design procedures and site installation/quality control supervision. One output from the application of the Standard will be site check lists identifying critical features of the building system requiring appropriate monitoring during installation and construction. Those site check lists are to be used by the constructor and organisations responsible for providing inspection services.

There are five sections together with an Annex of relevant normative and other references:

- **Section 1** to outline the scope of the Standard and how it deals with normative references.
- **Section 2** to contain the definitions of terms requiring clarification or enhancement for use in the standard. Generally terms to be used in accordance with the BS 6100 series of standards: *Glossary of building and civil engineering terms*.
- **Section 3** is the main body of the Standard, to contain performance requirements and verification criteria for building systems. Each specific performance requirement being considered in respect to UK Building Regulations, the European Construction Products Regulation, together with sustainable use of natural resources and the alignment of the BPS with Home Quality Mark.
- **Section 4** to consider the requirements and verification criteria for the management system of the manufacturing process, from incoming goods of the supply chain through to installation on site.
- **Section 5** to list the current UK Regulations, Standards and other guidance documents relevant to residential construction.

The Standard shall be used in conjunction with BRE Global Construction Products Certification Scheme Document.

The Standard will be reviewed regularly and kept up-to-date. Current editions will be freely available from the BRE Global Construction Products Certification and Listings web site www.BREGloballistings.com.

BRE Global Construction Products Certification listing of products and services for construction is based on the following;

- i. Satisfactory product performance during initial testing and audit testing by BRE Global Construction Products Certification
- ii. Satisfactory product construction
- iii. Satisfactory system installation

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- iv. Satisfactory manufacturing processes, incorporated with a certified Factory Production Control process.
- v. Satisfactory product or system service experience
- vi. Satisfactory verification by BRE Global Construction Products Certification of the establishment and maintenance of the manufacturer's or service provider's quality management systems

1 SCOPE

The Standard specifies performance and verification requirements for modular building systems, to be used in UK residential construction, which are constructed using advanced manufacturing processes.

The standard can be applied to four categories of modular building system as described below.

The modular building systems are considered for use in new build residential as well as for application in the refurbishment of existing residential buildings.

Category 1: Floor	
1a. Ground Floor	<i>A floor located directly above (or in contact with) the ground – may include rising damp or soil gas protection, and thermal insulation.</i>
1b. Intermediate Floor	<i>A floor that separates an upper and lower living space</i>
1c. Floor over an open space	<i>A floor located above an open area such as an under-croft, car park, alleyway or similar.</i>
Category 2: Wall	
2a. Load Bearing Wall	<i>An internal or external wall that is load bearing</i>
2b. Infill Wall	<i>An internal or external wall that is non-load bearing</i>
2c. Facade	<i>An external non-load bearing cladding or walling system that provides weathertightness or rain-screening</i>
Category 3: Roof	

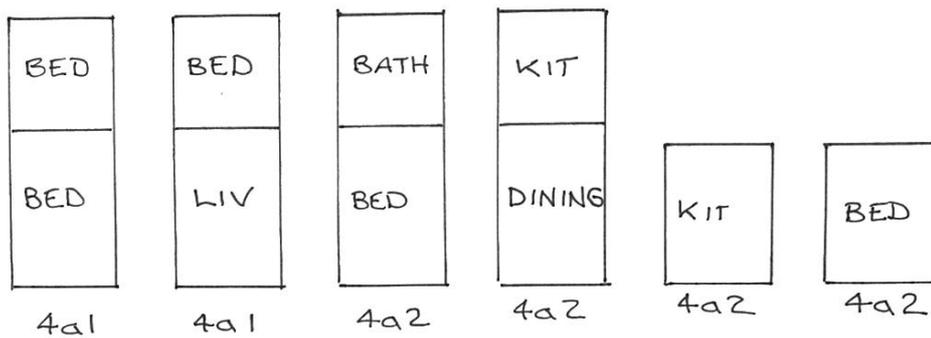
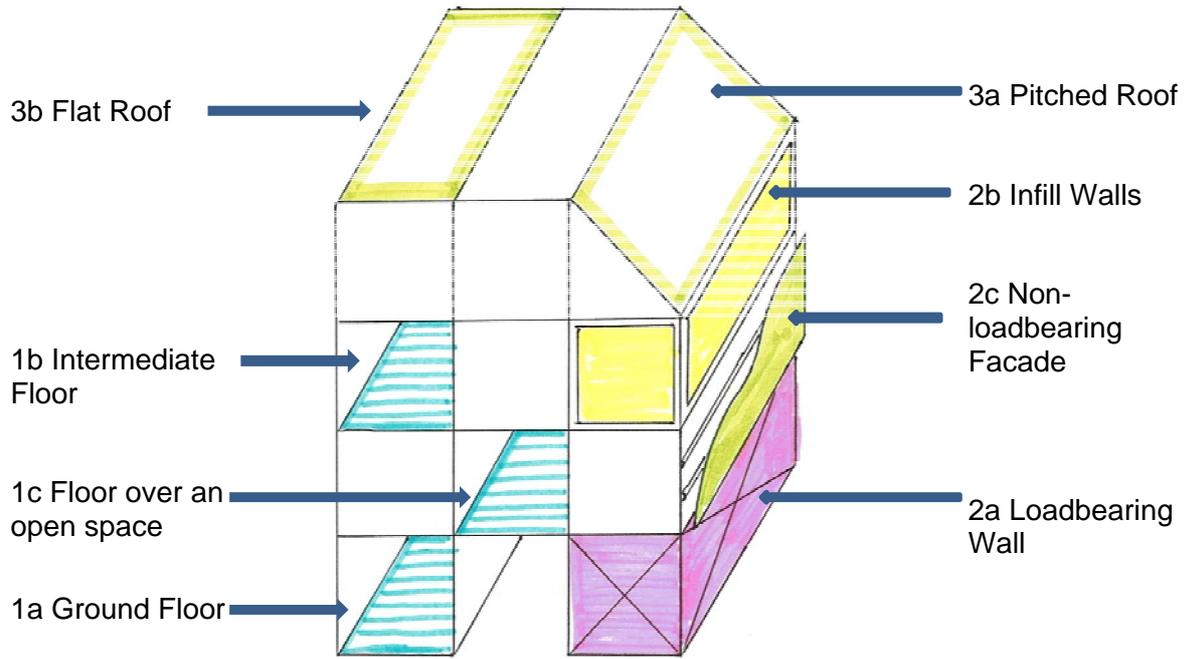
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3a. Flat Roof	<i>Structure and covering to a flat roof and its connection to the module (Note: where a roof is used as access space it should be treated as a floor to take account of vibration in use.)</i>
3b. Pitched Roof	<i>Structure and covering to a sloping roof and its connection to the module</i>
Category 4: Module	
4a. Three Dimensional Module	<p><i>A whole module or a part module featuring three interconnecting components i.e. junction between two walls and a floor, or the junction between a roof and two walls.</i></p> <p>4a1 (aligns with HQM) – Single module comprising living spaces only will be assessed in factory as a single entity. Will be used in conjunction with other modules/products that may or may not be manufactured in the same factory to form a complete building.</p> <p>4a2 (aligns with HQM) – Single module, (specifically comprising a bathroom (i) and/or kitchen (ii) pod) that will be assessed in factory as a single entity. Will be used in conjunction with other modules/products that may or may not be manufactured in the same factory to form a complete building.</p>
4b. Multiple Modules	<p><i>Two or more connected modules</i></p> <p>4b1 – (aligns with HQM) Multiple modules manufactured in the same factory that will be assessed in the factory (offsite) to form a complete building.</p> <p>4b2 – (aligns with HQM) Multiple modules manufactured in the same factory that will be assessed in the factory (offsite) to form a near complete building with a closed external envelope but without a roof or external cladding.</p>

The Standard will primarily aim to consider a basic modular unit (which may or may not include internal or external finishes).

The testing of modules is biased towards assessment within the factory, to minimise and potentially remove the need for in-situ assessment.

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This figure shows combinations of living space, kitchen and bathrooms

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2 DEFINITIONS

Checked against Approved Documents (AD) and NHBC handbook.

The definition of terms used in this Standard is generally that given in the British Standard BS 6100 series: Glossary of building and civil engineering terms. Where the meaning of any term requires clarification or modification for use within this document then a definition is given in this section.

3 REQUIREMENTS

This section identifies the requirements to be met for each characteristic of the building system in fulfilment of the relevant regulations and standards given in the later Section and other stakeholder requirements.

The manufacturer shall demonstrate compliance with the requirements. This may be through calculation or appropriate testing or, via one of the following, as stated in each section:

- Classification without need for testing (applies with some performance in fire characteristics or where Robust Detailing is adopted)
- Classification without further testing declarations (applies with some performance in fire characteristics),
- Assessment by laboratories accredited by UKAS (or an equivalent accreditation body) for the relevant test.
- Assessment by visual inspection.
- Use of CE Marked products covered by Harmonised Standards under European Construction Products Regulations, or other third party approved components
- Any other means referenced within the BPS;

In all cases the minimum requirement for each category is to meet UK Building Regulations requirements. For each category the BPS identifies areas where more strenuous requirements can be applied to provide an improved product. These are intended to raise standards in terms of quality of construction, user comfort and satisfaction, and enable the manufacturer to demonstrate the benefits of their product.

The Standard will require compliance with the relevant requirements of the UK Building Regulations and the Basic Works Requirements of the Construction Products Regulations 305-2011 (CPR):

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3.1 Mechanical resistance and stability

Loads – static

Resistance – load deformation and deflection

Vibration in use

Whole module test

3.2 Safety in case of fire

Reaction to fire

Resistance to fire

Whole module test

3.3 Hygiene, health and environment

Weathertightness

Ground Moisture

Flooding (internal and external)

Soil gases

Vapour permeability, moisture, resistance

Ventilation

Dangerous substances

Daylighting

Electric lighting

3.4 Safety and accessibility

This section considers a wide range of structural, safety and accessibility issues. It includes stairs, barriers, room layout and the positioning of equipment to allow for accessibility and safe use.

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3.5 Protection against noise

The aim of this section is to reduce noise disturbance to occupants in internal and external areas of dwellings by promoting low levels of sound from external noise sources and building services, and by promoting good levels of sound insulation between neighbouring homes and different rooms within the home.”

3.6 Energy economy and heat retention

Airtightness

Insulation

Energy use

3.7 Security

This section considers security in terms of:

- Structure – to ensure that the module structure is adequately protected against attempted theft access by attack. The manufacturer can consider physical security testing of walls, roofs etc. for classifying the burglary resistance of building components, strongpoints and security enclosures. Consideration must be given to the compatibility of approved components within the wall/module to ensure the security rating of the installed component is maintained.
- Hardware – to ensure appropriate security devices such as locks, alarms etc. are provided.

3.8 Design life/ durability/ service life planning

This section considers the need to demonstrate that the building can successfully meet its declared design life.

3.9 Durability resilience, materials and workmanship

These regulations require systems and materials to be of a suitable nature and quality in relation to their purposes and conditions of use. In this Standard the following requirements are adopted:

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- The life expectancy of the structural system and inaccessible elements or components **shall not be less than 60 years**. (assumed to be from date of Handover)
- Individual elements or components with shorter life expectancies shall be clearly identified in the installation and/or user manual(s) and their life expectancies stated. In addition, appropriate maintenance, refurbishment and/or replacement schedules for such elements or components shall be supplied.

3.10 Sustainable use of natural resources

The Manufacturer should demonstrate that they are applying sustainable measures to minimise the use of natural resources. Issues that need to be considered include:

- Reducing the consumption of mains water in the home through efficient fixtures and fittings and water recycling systems.
- Encouraging economic sustainability by recognising and encouraging the use and sharing of life cycle costing analysis to reduce maintenance and operational costs.
- Reducing the burden on the environment from construction products used in a building by recognising and encouraging measures to optimise material efficiency and the selection of products with a low environmental impact (including embodied carbon) over the life cycle of the building.
- Improving environmental, economic and social sustainability of construction products through responsible sourcing.
- Providing sufficient recyclable waste storage and disposal options to support the reduction of waste to landfill.

4 QUALITY MANAGEMENT REQUIREMENTS

This section considers all of the actions necessary to manage the quality of the building system throughout its life.

4.1 Practicability of installation (buildability)

The manufacturer shall provide a set of clear instructions detailing the assembly and installation for the system as appropriate. These instructions shall cover factory and site assembly as required.

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4.2 Practicability of repair, replacement and adaptability

The manufacturer shall provide repair and adaptability procedures for the building system as appropriate. This should include for replacement of components.

4.3 Identification of building systems

To prevent inadvertent damage from works or to enable repair and maintenance to be carried out effectively, future occupants of residential buildings, and any professionals/contractors engaged by them, should have ready access to information about the design and construction of that building. Each system supplied shall have a data sheet provided to the owner and also logged in the BRE Global Construction Products Certification database.

4.4 Factory production control

The manufacturer's Factory Production Control procedures shall be in accordance with BRE Global Construction Products Certification document PN111 '*Factory Production Controls*'. An audit against these requirements is performed as part of the product certification process (See PN 110 'the product certification and technical approvals process') to confirm consistency of manufacture and that the requirements have been effectively implemented and that the Factory Production Control is capable of maintaining product approval requirements.

4.5 Handling and storage

Handling (lifting and transporting) and storage activities shall not cause damage and/or ingress of moisture, nor impair the intended performance of building systems when subsequently erected to form the building. Guidance should be provided for handling and lifting activities. This should include factory activity and site installation requirements.

4.6 Site Assembly

Well executed site assembly is essential for ensuring that modular construction achieves a reputation for construction excellence. It is essential for the manufacturer to understand the installer's needs for maintaining quality on site. Poor installation can result in reputational damage to the product.

4.7 Home information

The Construction Design and Management Regulations require a Health and Safety File to be prepared and handed over to the Client. The file is a record of all information for the client/end user, which tells those persons who might be responsible for the structure in the future of the risks that have to be managed during maintenance, repair, renovation and demolition. Typical contents include; as built drawings, operational manuals for any equipment, mechanical and electrical service drawings, details of

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emergency provisions, details of hazardous substances/materials which could give rise to risk of injury, maintenance schedules, etc.

4.8 Building information modelling/management (BIM)

Whilst non-mandatory it is considered Construction Industry best practice to utilise Building Information Modelling (BIM) in co-ordinating construction projects. BIM can be used to assist in demonstrating compliance with the BPS. BIM can be used to demonstrate that all processes including, design, materials, components, manufacture, construction and maintenance procedures comply with the BPS. Internationally BIM is addressed in BS ISO 12006 – 2 and BS ISO 12006 4. For the UK national implementation of ISO 12006 see Uniclass 2015.

5 RELEVANT UK REGULATIONS, STANDARDS, AND PUBLICATIONS

The construction system will be evaluated to determine its satisfying the relevant requirements of the building regulations current at the time of the assessment. The relevant regulations at the date of publication of this standard are listed for completeness. BRE Global Construction Products Certification reserve the right to include other regulations in the list if appropriate and will notify the manufacturer accordingly.