
The preparation of British Standards for building and civil engineering

Part 5. Guide to technical committees on the preparation of performance specifications in British Standards for construction products

Elaboration des Normes Britanniques de construction et de génie civil

Partie 5. Guide des comités techniques chargés d'élaborer les spécifications techniques des Normes Britanniques de produits de construction

Erstellung von britischen Normen für das Bauwesen

Teil 5. Leitfaden für BSI-Arbeitsausschüsse bei der Aufstellung von Spezifikationen für Bauteile

Foreword

This Part of PD 6501 has been prepared under the direction of the Basic Data and Performance Criteria for Civil Engineering and Building Structures Standards Policy Committee. It amplifies the statements on the use of performance requirements included in BS 0 : Part 3 and sets out the steps to be taken by a committee that has decided to include the performance approach in a product specification that it is preparing as a British Standard, having considered appendix B of PD 6501 : Part 1 : 1982. This Part of PD 6501 intends to clarify the subject and to present principles and recommendations in a straight-forward manner that can be easily assimilated by committees. It should be borne in mind that performance standards tend to increase rather than decrease the number of products that meet a given set of requirements.

Specification of performance in British Standards is now more common, but its place in relation to descriptive standards is not well defined or understood; hence the need for the guidance given in this Published Document. Performance specifications are not intended to replace descriptive specification but should be used in conjunction with them.

In addition to amplifying information given in BS 0 : Part 3 and in PD 6501 : Parts 1 and 2, this Part of PD 6501 clearly sets out the Stages to be considered in planning the preparation of clauses in performance specifications and the Steps to be taken to ensure the satisfactory completion of each Stage. It emphasizes that methods of test should be related to behaviour in use. Background information, of use for a fuller understanding of each Stage, is also given.

IMPORTANT NOTE. BS 0 is the authoritative British Standard which provides the framework of policy and principles influencing the development and preparation of every type of British Standard.

Note has been taken of the work in hand in the International Standards Organization's (ISO) Technical Committee 59, Building construction, on functional/user requirements and performance. The recommendations of that international committee have been incorporated in this Published Document.

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Guide

0 Introduction

The performance of a product is defined as its behaviour related to use. For many years, product standards have included clauses setting requirements not only in terms of a description of materials or design, but in terms of performance (the way in which the product is required to behave). Standards referring to performance in appropriate cases are of value to the building industry and to its clients. They will assist in compliance with United Kingdom building regulations and with Directives of the European Economic Community (EEC). This Part of PD 6501 is written to help produce such standards.

The main aims of introducing performance into British Standards for construction products are to achieve documents which:

- (a) lead to products with all the features that will be required, and which will behave as intended, not only under test conditions, but also in practice;
- (b) permit a specifier to select an appropriate product for a particular purpose and, if necessary, to compare products in a way that will allow due weight to be given to the features offered, including quality and price;
- (c) allow the supplier as much choice of materials, methods and design as possible, consistent with the need to meet the requirements of the user of the building;
- (d) are in a form corresponding with national and international regulations written in terms of user requirements.

These aims will only be achieved if the standards are produced in accordance with the principles set out in this Published Document.

1 Scope

This Part of PD 6501 provides guidance for all Standards Policy Committees and Technical Committees concerned with construction which are considering the inclusion of performance in both wide-ranging and specific product standards. It states the principles involved, and recommends the extent to which, in practical terms, performance can be dealt with and how it should be included in such British Standard specifications.

It recommends stages to be considered in planning the inclusion of performance requirements in British Standard product specifications and steps to be taken, with particular reference to the following:

- (a) **performance requirements** for products in use;
- (b) **product specifications**, achieved either by
 - (1) describing particular materials or designs; or
 - (2) specifying one or more properties in terms of performance;
- (c) **methods of assessment** (measurement, test, calculation or judgement) required as essential to items (a) and (b) above.

Appendix A sets out the steps that are needed to verify compliance with performance requirements by testing.

This Part of PD 6501 does not deal in detail with quality assurance designed to give reassurance of the *consistency* with which a product or service is supplied to its specification; this is dealt with primarily in BS 5750. There is reference to *durability* (maintenance of performance over time), but this is the subject of a further standard that is in preparation.

NOTE. The titles of publications referred to in this Published Document are listed on the inside back cover.

2 Definitions

For the purposes of this Part of PD 6501 the following definitions apply. Particular attention is drawn to BS 6100 : Section 1.0, Section 1.6 and Subsection 1.7.1, from which certain definitions are repeated.

- 2.1 user.** Organization, person, animal or object for which a building is designed.*
- 2.2 performance.** Behaviour related to use.[†]
- 2.3 agent.** Whatever acts on a building, structure, or its parts, e.g. person, water, load, heat.[†]
- 2.4 product.** Item manufactured or processed for incorporation in the construction works.*
- 2.5 property.** Inherent or acquired feature of an item.[†]
- 2.6 characteristic.** Property that distinguishes between the totality of items under consideration.[†]
- 2.7 attribute.** Characteristic that is assessed in terms of whether it meets or does not meet a given performance.[†]

* Taken from BS 6100 : Subsection 1.6.

† Taken from BS 6100 : Subsection 1.7.1.

2.8 performance aspect. Property, characteristic or attribute of a product.

2.9 user requirement. Statement of need to be fulfilled.

NOTE. This could be, for example, for a certain air temperature.

2.10 performance requirement. Performance to be fulfilled.[†]

NOTE. A wall, for example, has to possess a certain 'U' value (representing thermal transmission of the total construction); a heating system has to provide a certain output after commissioning.

2.11 wide-ranging standard. Standard for a group of products concerning, e.g. preferred dimensions, performance requirements, general test methods.

2.12 specific standard. Standard for a particular product defined as far as necessary uniquely, including details of material. Such a standard may also include performance provisions.

2.13 performance specification. Technical specification that concerns the behaviour of a product, process or service in or related to use.

2.14 descriptive specification. Technical specification that describes characteristics of a product, process or service in terms that include design and constructional details with sizes and material composition.

2.15 assessment. Examination of suitability of an item for a specific use.

2.16 verification. Provision of evidence or proof that a performance requirement has been met.[†]

2.17 test. Critical trial of one or more properties.[†]

3 Procedures

3.1 Stages

There are three procedures in eight Stages in preparing a British Standard specifying performance for a building product. These are detailed in clauses 4 to 6, and are as follows:

- (a) Planning (Stages 1 to 4, see clause 4);
- (b) Drafting (Stages 5 to 7, see clause 5);
- (c) Presenting (Stage 8, see clause 6).

3.2 Steps

Each Stage is divided into a number of Steps. The sequence of the Steps in each Stage should be applied in the light of the standard being drafted.

[†] Taken from BS 6100 : Subsection 1.7.1.

4 Planning

Stage 1. Define the aspects of the product that are to be dealt with in performance terms

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- Step 1** While following the checklist given in table 1, use tables 2 and 3 of this Part of PD 6501 as a guide to the relevant aspects, in broad terms, of the product *in relation to the intended use*. A change of the use may change the requirements.
- Step 2** Confirm the relevance and completeness of the aspects identified by Step 1 by checking for others that may be obtained after reference to the following:
- (a) any existing relevant national and international standards and codes;
 - (b) available user evidence on the subject;
 - (c) any bodies experienced in the subject.
- Step 3** Decide which of the identified aspects are to be dealt with and:
- (a) from those chosen, agree those to be dealt with in performance terms, and confirm that this approach is reasonable on the basis of existing knowledge/experience derived from Step 2, bearing in mind that each requirement will require an explicit method of assessment (see Stage 7).
 - (b) for the remainder, if any, from those chosen, confirm those that are to be dealt with in descriptive terms.
- Step 4** Record, e.g. in the committee minutes, a clear definition of the aspects to be dealt with in performance terms, together with the reasons.

BACKGROUND NOTES TO STAGE 1

Committees will usually standardize only a selection of significant aspects in performance terms for a class of products, i.e. where the state of knowledge and the availability of suitable assessment methods are sufficient. It is important for a drafting committee to take account of all relevant, up-to-date drafts or research papers from such sources as British Standards Institution (BSI), Building Research Establishment (BRE), British Board of Agrément (BBA), Trade Associations, etc., whether yet published or not.

Two kinds of product specification standard should be distinguished, the wide-ranging and the specific. A wide-ranging standard can specify a type of product or component in terms of performance properties only, which leaves a supplier free to meet the specification with any material or design that possesses the required characteristics in use, giving the greatest range of choice to the specifier. Wide-ranging standards are also called up in specific standards that specify their subjects in all relevant aspects, including materials and design, to define a unique product. A wide-ranging standard cannot be expected to serve as a sufficient specification when used as a single reference alone, because in any individual building many requirements are necessarily linked to the material nature of the product.

Remember that the product which is the subject of a standard should be defined in sufficient detail to allow appropriate choice by specifiers from among the greatest range of items that are on the market and the greatest freedom of technique and material for manufacturers and suppliers, while maintaining a technically sound standard.

Example

Wide-ranging standardization of windows in general is achieved through BS 6375 together with BS 5368. BS 5368 deals only with testing for air permeability, watertightness under static pressure and wind resistance. EN 107 adds mechanical tests. These methods of assessment can be applied to any kind of window. Other requirements are taken into account, implicitly or explicitly, in British Standards specifically for aluminium, steel and timber windows. This pattern can be expected to remain, although the scope of wide-ranging standards will increase in the future.*

*Published by the European Committee for Standardization (CEN) and available from BSI Sales Department, Linford Wood, Milton Keynes MK14 6LE.

Table 1. Checklist	
Function	Details a set of requirements for a material product, or process suitable for its intended use, to provide a basis for understanding between a purchaser and supplier at one or more identified contractual interfaces May provide a reference for legislation May provide a basis for third party certification
Principle	Define purpose and use, relevant attributes and limitations in scope and identify the interface(s) the standard is intended to relate to Identify relationship to other standards and any need for guidance to be given on use Consider need for grading, and decide attributes and level according to intended use Limit specification to those requirements agreed as necessary to meet user needs Specify requirements by prescription and/or performance and include means of verification of compliance in all cases Use SI units (units in common practice may be included in addition) Check patent or registered design implications Consider need for reference materials and their availability Specify tolerances or maximum or minimum values (taking account of precision test methods) Include health and safety aspects Include sampling requirements when appropriate Include marking and labelling Exclude contractual matters and apportioning of responsibilities Exclude subjective requirements Exclude restrictive practices Exclude criteria which are third party dependent Exclude trade names
Contents	Contents list Introduction (optional) Scope Definitions Symbols and abbreviations Purpose and use (field of application) Materials, design and manufacture Requirements for: (a) testing type (b) testing routine Compliance criteria (means of verification and sampling) Marking and labelling Storage (if applicable)
Special features	Only include advice, supporting information, etc. as notes or in an appendix (not part of the specification unless specifically called up, e.g. test methods)

Table 2. Examples of user requirements (see note)

Category	Examples
Stability requirements	Mechanical resistance to static and dynamic actions, both individually and in combination. Resistance to impacts, intentional and unintentional abuse, and accidental actions. Cyclic (fatigue) effects.
Fire safety requirements	Risks of outbreak of fire and of spread of fire. Physiological effects of smoke and heat. Alarm time (detection and alarm systems). Evacuation time (escape routes). Survival time (fire compartmentation).
Safety in use requirements	Safety in respect of aggressive agents (protection against explosions, burning, sharp points and edges, moving mechanisms, electrocution, radioactivity, inhalation or contact with poisonous substances, infection). Safety during movements and circulation (limitation of floor slipperiness, unobstructed passage, guard rails, etc.). Security against human or animal intrusion.
Tightness requirements	Water tightness (rain, ground water, drinking water, waste water, etc.). Air and gas tightness. Snow and dust tightness.
Hygrothermal requirements	Control of air temperature, thermal radiation, air velocity and relative humidity (limitation of variation in time and in space, response of controls). Control of condensation.
Air purity requirements	Ventilation. Control of odours.
Acoustical requirements	Control of external and internal noise (continuous and intermittent). Intelligibility of sound. Reverberation time.
Visual requirements	Natural and artificial lighting (required illuminance, freedom from glare, luminance contrast and stability). Sunlight (insolation). Possibility of darkness. Aspect of spaces and surfaces (colour, texture, regularity, flatness, verticality, horizontality, perpendicularity, etc.). Visual contact, internally and with the external world (links and barriers for privacy, freedom from optical distortion).
Tactile requirements	Surface properties, roughness, dryness, warmth, suppleness. Freedom from discharge of static electricity.
Dynamic requirements	Limitation of whole body accelerations and vibrations (transient and continuous). Pedestrian comfort in windy areas. Ease of movement (slope of ramps, pitch of staircases). Manoeuvrability (operation of doors, windows, controls on equipment, etc.).
Hygiene requirements	Facilities for human body care and cleaning. Water supply. Cleanability. Evacuation of waste water, waste materials and smoke. Limitation of emission of contaminants.
Requirements for the suitability of spaces for specific uses	Number, size, geometry, subdivision, and interrelation of spaces. Services and equipment. Furnishability, flexibility.
Durability requirements	Retention of performance over required service life subject to regular maintenance.
Economic requirements	Capital, running and maintenance costs. Demolition costs.

NOTE. This table is taken from table 1 of ISO 6241 : 1984*.

* Published by the International Organization For Standardization (ISO) and available from BSI Sales Department, Linford Wood, Milton Keynes, MK14 6LE.