

**A Review of the
Code of practice for laying
precast concrete paving blocks
and clay pavers for flexible pavements
BS 7533 : Part 3 : 2005**

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Introduction

The *Code of practice for laying precast concrete paving blocks and clay pavers for flexible pavements*, BS 7533 : Part 3 : 2005, has been extensively revised and amended following a long consultation period, and came into effect on 20th October 2005. The objective of this review document is to highlight the most important changes and revisions over the previous edition of the standard.

All formal British Standards are developed with a period of public enquiry and consultation, utilising expertise from a wide range of sources including academics, special interest groups, consumers, business and industry – including, of course, Interpave and Interlay. As a result, the standards produced represent a consensus on current best practice. In addition to this consultation, Interpave has reviewed the revised standard as published: the objective of this document is to highlight the most important changes and revisions over the previous edition of the standard.

Unlike the Building Regulations, British Standards are not mandatory but they do offer important guidance. They are also generally accepted as the preferred method of work and often referred to in specifications. Unless a specification stipulates a particular edition of the Code, the latest version should apply. Also, the Interlay Code of Practice clearly states that work carried out by members should be undertaken in accordance with the relevant British Standards - particularly BS 7533 Part 3.

This review document is not exhaustive and it is recommended that readers familiarise themselves with the revised Code of Practice itself. Copies of BS 7533 Part 3 can be purchased via the British Standards website www.bsi-global.com/index.xalter or by telephoning BSi on 0208 996 9000.

Scope

This revised standard now includes requirements for permeable pavement construction.

The scope incorporates an update of the specification of products to the European standards.

The aggregate size and grading of the laying course and jointing materials for conventional pavements have not changed; they are the same materials as used previously but the grading analysis is assessed in accordance with the new sieve sizes given in the BSEN standard.

Definitions

'Edge restraint' has been expanded to include 'temporary edge restraint'.

The pavement types have been divided into two: conventional and permeable pavements

CONSTRUCTION OF PAVEMENTS

Overall Procedure

The procedure for pavement construction has been detailed in the form of a flow chart. This flow chart lists the chronological order of construction including cleaning the area before compaction and self-assessment of the area for compliance before the application of jointing material and after final compaction.

Lower Pavement Layers

Preparation of the subgrade and construction of the sub-base and road base for conventional and permeable pavements should generally be in accordance with relevant current practice as described in the Highways Agency's specification for Highway Works, except for reinstatements where reference should be made to BS 7533 11.

However, for permeable pavements Type 1 material should not be used. A material that allows water to percolate through should be used. Table 3.2.1 gives grading requirements for this material.

Permeable Pavements

Grading for sub-base material for permeable pavements is shown in Table D.5

**Table D.5 — Grading for sub-base material for permeable pavements
(BS EN 13242 Gc85/15 4/40 and 4/20 coarse aggregate)**

Sieve size mm	Percentage by mass passing %	
	4/40	4/20
80	100	—
63	98 – 100	—
40	85 – 99	100
31.5	—	98 – 100
20	20 – 70	85 – 99
10	—	20 – 70
4	0 – 15	0 – 15
2.8	0 - 5	0 - 5

Further information is contained in the Interpave document *Guide to the Design, Construction and Maintenance of Concrete Permeable Pavements Edition 3*.

Surface Gradients

Permeable Pavements may be constructed with zero gradients.

Laying course

The sieve sizes of laying course material for conventional pavements have been changed using the limits specified in the BSEN. For permeable pavements, in addition to naturally occurring aggregates, recycled aggregates are allowed.

The grading of laying course material for conventional and permeable pavements is different.

Permeable pavement laying course material is designed to allow water to pass through quickly and consists of larger single size aggregate. Information should be obtained from the block manufacturer on grading requirements appropriate for a specific block type.

Experience has shown that angular shaped particles perform better than rounded material.

The requirement that laying course material, for conventional pavements, is at optimum moisture content has been replaced with a more commonsense statement i.e.: *the material should be moist without being saturated. It should show no free water and should bind together when the material is squeezed in the hand and the pressure released. If the prepared laying course becomes saturated prior to laying the paving units, it may be removed and replaced, or allowed to dry to acceptable moisture content. To control the moisture content of a stockpile, covers may be used.*

It is not necessary to assess the moisture content of the laying course material for permeable pavements as it is free draining.

For conventional pavements the final compacted thickness of the laying course material should be 30 mm. Previously, a 30mm thickness was required when laying on road base and 50 mm thickness when laying on sub base.

Permeable Pavements should have a compacted thickness of 50 mm of the laying course material.

The preparation of laying course of conventional pavements involves one of two methods: -

1. pre-compaction of the laying course, or
2. uncompacted laying course method

For permeable pavements, only the uncompacted laying course method is used.

Conventional Pavement - Laying Course Material

Sieve size mm	Percentage by mass passing %
8	100
6.3	95 – 100
4	85 – 99
0.5	30 – 70
0.063 (fines content)	See Table D.3

Table D.3 — Fines content of laying course material for conventional pavements

Laying course material category	1A	1B	II	III	IV
Percentage by mass passing 0.063 mm	0.3	0.5	1.5	3.0	4.0
BS EN 12620 fines content category	$f_{0.3}$	$f_{0.5}$	$f_{1.5}$	f_3	f_4

Permeable Pavement - Laying Course Material

For permeable pavements the same grading is used for both the laying course and joint filling material. This material is substantially coarser than the materials required for conventional pavements.

Table D.6 — Grading for laying course and jointing material for permeable pavements

(BS EN 12620 Gc85/20 2/6.3 coarse aggregate)

Sieve size mm	Percentage by mass passing %
14	100
10	98 - 100
6.3	80 - 99
2	0 - 20
1	0 - 5
0.063	0 - 2 (BS EN 12620 fines category f_2)

Block Laying

There is now guidance on the laying operation for dimensionally large projects i.e.:
For large projects, such as container yards and car parks, it might be desirable to:

- a) lay paving units from a particular batch in the sequence or reverse sequence in which they were manufactured;*
- b) develop and implement procedures that compensate the dimensional differences that can occur between different batches of paving units.*

Joint Widths

The joint width for conventional pavements remains the same, >2 mm to <5 mm but permeable pavements typically have joints greater than 6 mm (this is dependant on block shape) to maintain a joint or void.

Cutting and Trimming

An example is illustrated in the revised standard of how to avoid small pieces of paving less than one quarter of the original size.

Compaction

If there is a tendency during the compaction operation for individual blocks to move or misalign, then a small amount of jointing material may be applied to assist in maintaining blocks in their correct position.

It is advised that compaction should preferably be carried out as soon as possible after laying of the paving units but not within one metre of the laying face. It is also advised that, other than the area within one metre of the laying face, laid paving should not be left un-compacted at the cessation of a day's work.

Jointing Material

Conventional Pavements - Jointing Material

**Table D.4 — Grading for jointing material for conventional pavements
(BS EN 12620 G_{F85} 0/1 (FP) fine aggregate)**

Sieve size mm	Percentage by mass passing %
2	100
1	85 – 99
0.5	55 – 100
0.063 (fines content)	0 – 2 (BS EN 12620 fines category f_2)

Joint Filling

Prior to the joint filling operation the following checks are required:

- a) the surface should be free of debris
- b) the surface level tolerance conforms to table B1
- c) the flatness of the pavement conforms to table B2
- d) the difference in the level at the joint of adjacent paving units complies with table B. 2
- e) joint widths are consistent
- f) joints are correctly aligned
- g) there are no damaged or broken blocks.

Appropriate corrective action should be taken to ensure that the pavement conforms to the above items.

Final Compaction

Compaction should be completed as soon as practicable after laying and the pavement should be checked to ensure compliance with table B.1, table B.2, joint width consistency and joint alignment, and to ensure there are no damaged or broken blocks.

Permeable Pavements Special Requirement

It is essential that any soil, fine material and other materials that arise during construction should be prevented from contaminating the pavement surface. This is to ensure that the material in the joints remains free-draining, enabling the pavement to remain permeable throughout its design life.

Surface Tolerance

Tolerance for each layer has been changed and the table now includes permeable pavement requirements.

Layers of pavement	Maximum permissible deviation from the design level	
	Conventional pavements mm	Permeable pavements mm
Sub-base	+ 5 - 10	+ 20 - 20
Roadbase	+ 5 - 10	+ 20 - 20
Laying course	30 + 10 - 5	50 +20 - 20
Surface course	+ 6 - 6	

5.0 Surface Regularity of the Surface Course

Recommended surface regularity of the surface course is given in table B2

	Conventional pavements	Permeable pavements
Flatness of pavement	10 mm under 3m straight edge	Not applicable
Difference in level at the joint of adjacent paving units	2 mm	2 mm