



# **BRICK PAVING INSTITUTE KZN**

## **Code of Practice for the Laying of Brick and Block Paving Laying Code of Practice February 1992**

The Brick Paving Institute recommend that the following specification be adopted when laying brick and block paving. These specifications are accepted as minimum standards by all members of the Institute.

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## 1. INTRODUCTION

Clay pavers or paving blocks have been used since Roman times for the construction of aesthetically pleasing and durable functional surfaces. These surfaces are used for a variety of purposes such as roadways, parking areas, pedestrian walkways, shopping and civic malls, patios and swimming pool surrounds, and simple decorating of landscape features.

Every project will have different requirements and therefore varying construction specifications to suit the situation. When designing a paved surface, due consideration must be given to the aims of the developer and the use to which the paving will be put, e.g. aesthetics, usage, existing ground conditions, material properties and cost.

This Laying Code of Practice is an attempt to set a minimum standard and a guide for the design and construction of brick and block paving with due consideration for the tolerances and properties of various paving modules.

1.1 This specification gives the main requirements for the laying of segmental paving for the construction of paved surfaces to be used by vehicles and pedestrian traffic.

### 1.2 Preliminary Consideration

- (a) The type of traffic expected e.g. light or heavy vehicles.
- (b) Imposed loads.
- (c) In situ soil conditions and materials.
- (d) Climatic conditions.
- (e) Surface and sub-surface drainage.
- (f) Expected service life of the area.
- (g) The type of paving unit to be used.

## 2. SUB BASE OR SUB-GRADE

2.1 The various usages of the paved area together with consideration of the existing sub-grade conditions, must be taken into account when designing the base construction under the area to be paved. As the sub-grade preparation and the base construction can vary from site to site, it is assumed for the purposes of this document that the sub-grade or sub-base has been properly constructed, that there are no soft or unstable areas and that the sub-grade or sub-base has been compacted and trimmed to within the specified level. (See 8.1 and 8.2)

It is of prime importance that the sub-grade and base be adequately constructed. If there is any reason to suspect a latent failure it may be necessary to seek further professional advice. (Refer SABS Code 0120 MJ, C.M.A. Code, Corobrik Code).

For this reason this Laying Code of Practice does not encompass the sub-grade or base preparation.

2.2 Where there is not a given structured design the contractor will be required to inspect the in situ material and to satisfy himself that the conditions and specification as he designs will be adequate. This is with due consideration to the intended use of the paving.

## 3. BEDDING SAND

3.1 Sand for bedding and jointing shall be free from substance that may be deleterious to bricks or blocks. In addition, the grading of the sand shall conform to that given in (a) or (b) below, as applicable, except that,

where evidence satisfactory to the Engineer has been provided of the successful previous use of sand having another grading, sand of such other grading may be used.

(a) Bedding Sand

| <u>Normal Sieve Size (mm)</u> | <u>% Passing</u> |
|-------------------------------|------------------|
| 9,52                          | 100              |
| 4,75                          | 95 – 100         |
| 2,36                          | 80 – 100         |
| 1,18                          | 50 – 85          |
| 0,600                         | 25 – 60          |
| 0,300                         | 10 – 30          |
| 0,150                         | 5 – 15           |
| 0,075                         | 0 – 10           |

(b) Jointing Sand

Shall pass a 1,18 mm sieve and shall contain 10 – 50% (m/m) of material that passes a 0,075 mm sieve.

- 3.2 Bedding sand shall be maintained in a loose condition and protected against pre-compaction. Any pre-compaction areas shall be removed and replaced.
- 3.3 The loose sand bedding layer shall be evenly laid and shall not be used to fill hollows in an uneven subgrade or sub-base surface.
- 3.4 The sand layer shall have a compacted thickness of not less than 10 mm and not more than 50 mm.

4. BRICK / BLOCK PAVING

- 4.1 All bricks/blocks shall be laid true to line and level. Full bricks/blocks shall be laid first, care being taken that joint lines are straight and square. Where the pattern involves continuous lines, deflections off line shall not exceed 15 mm measured over a distance of 3000 mm.

The visual accuracy of line of perp-end joints is in no case warranted. However, care must be taken to ensure that adjacent perp-ends are not closer than  $\frac{1}{4}$  of the length of the brick or block. An attempt should be made to keep perp-ends as close to line as possible.

Where patterns e.g. stretcher bond, basket weave and English bond are to follow a specific direction such as along straight or curved driveways, there shall be no visual deviation from that line. In the case of herringbone pattern, straight diagonal lines must be maintained.

- 4.2 Disturbance of laid bricks/blocks shall be prevented and any areas distorted or damaged during construction shall be lifted and relaid by the contractor.
- 4.3 The maximum joint width shall be limited to 5 mm with concrete blocks or 7 mm with clay brick; unless jointed paving is specified where paving or edging is laid to a small radius this may result in splayed joints. These joints must not exceed 75 mm at the outer radius. Such a joint must be separately grouted with a stronger mortar mix 4:1 (See 7.1)

## 5. EDGE RESTRAINTS

The brick/block shall be laid with an adequate edge restraint in order to prevent them from outward migration.

### 5.1 Walls.

### 5.2 Concrete kerbs or channels.

5.3 Edge beams consisting of a header course of bricks bedded into 75 mm deep x 220 mm wide concrete of 1:3:5, 13 mm stone mix (15 Mpa). These bricks should be jointed and pointed with +/- 8mm mortar joints.

5.4 Mortar edge consisting of edge brick bedded into mortar on top of an adequate base. Mortar to be of 1:4 cement sand mix.

5.5 Brick kerbs consisting of bricks laid on edge or bricks laid on end bedded into a concrete footing.

## 6. ROLLED PAVED SURFACE

6.1 After laying the bricks/blocks a flat plate vibrator shall be applied to the surface of the bricks/blocks to bed them.

6.2 Rolling of paving shall follow laying as closely as possible, but shall not be attempted within 1 m of the laying face.

6.3 Sufficient passes shall be made to compact the brick/block pavement fully and to produce an even surface. The number of passes shall, however, not be less than two.

6.4 For thickness up to and including 80 mm the vibrator shall be capable of producing a centrifugal force of approximately 7 to 16 KN at a frequency of approximately 75 – 100 HZ.

## 7. JOINTING/GROUTING

7.1 Joints between concrete blocks shall be filled with sand. Joints between clay bricks shall be filled with 6:1 sand, cement. This grouting material will be applied with hosed water to allow for full depth filling of joints during grouting and continuously missed by means of a broom or squeegee. This will stop separation of the sand and cement. Joints wider than 10 mm must be filled with 4:1 cement mortar. Due to the method used in grouting with mortar, it is not always possible to fill all the joints to the top. An attempt should however be made to achieve a filled up result.

7.2 The jointing sand shall be clean river sand and shall pass through 1,18 mm sieve.

7.3 Where paving is cement grouted, the paving must be adequately cleaned. No cement residue or greying of bricks after grouting is acceptable.

## 8. SURFACE TOLERANCES

Surface tolerances on the finished paving are largely reliant on the sub-grade or base course directly below the bedding sand. The sub-grade must comply with the maximum deviation in surface level from the true surface level of not more than 40 mm. This deviation must not cause thickening of the sand bed to more than 50 mm.

The paving to have a maximum deviation from a 3 m straight edge placed on the brick/block surface of 15 mm, except where vertical curves necessitate a greater deviation. On kerb lines and edge restraints, this deviation is not to exceed 10 mm.

The finished paving shall be so laid as to create a regular and smooth appearance, with due consideration for the efficient evacuation of stormwater. Puddling deeper than 5 mm should not remain longer than 5 minutes after rain has ceased.

Levels for adjacent bricks/blocks shall not differ by more than 3 mm, except for clamp fired bricks where the difference shall be no more than 5 mm.

## 9. BROKEN OR CHIPPED BRICKS

A chip is defined as an imperfection of the visible surface of the brick/block to a depth greater than 10 mm and which the surface cannot be covered by a 25 mm diameter disc or 30 mm disc in the case of a clamp fired brick. The Brick Paving Institute does not accept more than 5% by number of chipped bricks or blocks. All broken bricks/blocks i.e. bricks/blocks broken from top to bottom must be removed.

## 10. CUTTING OF BRICKS/BLOCKS

This is to be done either by means of a mechanical brick saw or sharpened bolster. Care must be maintained to ensure that cut bricks/blocks remain true to line and level.

## 11. EXPANSION JOINTS

Clay bricks are susceptible to irreversible expansion. Various types of bricks and even batches have differing expansion properties. Most expansion takes place in the early life of the bricks. It is necessary therefore that the contractor is aware of this tendency and makes allowance in the design. It is strongly recommended that an adequate expansion joint should be placed around all swimming pools immediately adjacent to the coping.

Concrete pavers undergo irreversible drying shrinkage coupled with high thermal movement (equivalent to the movement characteristics of steel). Again suitable movement joints must be allowed.

## 12. SEGMENTAL PAVING UNITS

Although there are many different types, shapes and sizes of paving units, this document refers to units of such a size that it can be lifted and laid with one hand.

### 1. Precast Concrete Blocks

Shape : Various, interlocking and rectangular  
Size : Approx. 200 mm x 100 mm thickness 50 mm to 80 mm  
Units per square metre : 40 to 50  
Compressive Strength : Individual Minimum 20 Mpa  
Average Minimum 25 Mpa

### 2. Clay Bricks

Shape : Rectangular  
Size : Length 222 Width 106 Thickness 50 mm to 75 mm  
Tolerances : Length +/- 7 mm. Width +/- 4 mm. Thickness +/- 3 mm.  
Compressive Strength : 25 MPa to 60 MPa average.

The specifier should select the correct materials and construction of the paved area, taking into account existing conditions and expected usage of the area. Consideration to be given to size and thickness of units, final slopes and in situ material consistency.

## 13. COBBLESTONE & FLAGSTONE PAVING

- 13.1 All units shall be laid reasonably true to line and level. Full stones shall be laid first. Where the pattern involves continuous lines, deflections offline shall not exceed 20 mm over a distance of 3000 mm. The visual accuracy of line of perp end joints is in no case warranted. An attempt should be made to keep perp ends as close to line as possible.
- 13.2 Disturbance of laid stones shall be prevented and any areas distorted or damaged during construction shall be lifted and relaid by the contractor.
- 13.3 The maximum joint width shall be limited to 10 mm, unless jointed paving is specified. Where paving or edging is laid to a small radius which may result in splayed joints these joints must not exceed 75 mm at the outer radius. Such joints must be separately grouted with a stronger mortar mix of 4:1.
- 13.4 After laying cobblestones a flat plate vibrator shall be applied to the surface of the cobblestones to bed them.
- 13.5 Plating of paving shall follow laying as closely as possible, but shall not be attempted within 1,0 m of the laying face.
- 13.6 Joints between units shall be filled with a 6:1 sand / cement mix. The grouting material shall be applied with hosed water to allow for full depth filling of joints during grouting and continuously mixed by means of a broom or squeegee.

## 14. COLOUR, TEXTURE & SIZE OF PAVING PRODUCTS

Slight variations in colour, texture and size of paving products do occur during the manufacturing process.