

## Introduction

This section gives recommendations for use of mastic asphalt in tanking applied both internally and externally.

Mastic asphalt for tanking shall conform to type T1097 in BS6925:1988.



## Design considerations

### GENERAL

It is essential that a clear distinction should be drawn at the initial design stage between tanking and tank lining to liquid containing structures, as these two waterproofing systems differ in their fundamental purpose and impose their own design constraints which cannot be ignored without risk of failure and possible contravention of British Standard Code of Practice recommendations.

### TANKING PRINCIPLES

Tanking with mastic asphalt is a method of protecting areas below ground level against the penetration of ground or subsoil water. This water will invariably exert a pressure against the basement structure. The amount of water pressure will depend upon two interrelated factors:

1. The maximum water table level
2. The depth of the basement below the water table

In practice, it is advisable to assume that the head of water is developed from ground level, to the full depth of the excavation to allow for seasonal fluctuation in the water table.

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Water pressure increases with depth and is determined by the formula:  
Pressure in  $\text{kN/m}^2 = 9.8 \times \text{depth in metres}$ .

This pressure is exerted equally in all directions vertically and horizontally irrespective of the slope of the surface on which the pressure bears.

## TANKING DETAILS

The general arrangement details and the principles to be followed at skirtings, upstands and abutments, are as details illustrated.

## METHODS OF TANKING

Two methods of tanking are available to the designer. They are to apply the mastic asphalt waterproofing either to the outside of the structure or to the inside and are referred to as external or internal tanking respectively.

The decision on the method to be employed will depend upon site conditions and other design considerations. The use of external tanking is preferred if site and design conditions permit because the ground water pressure forces external mastic asphalt against the structure whereas in the case of internal tanking, the converse occurs.

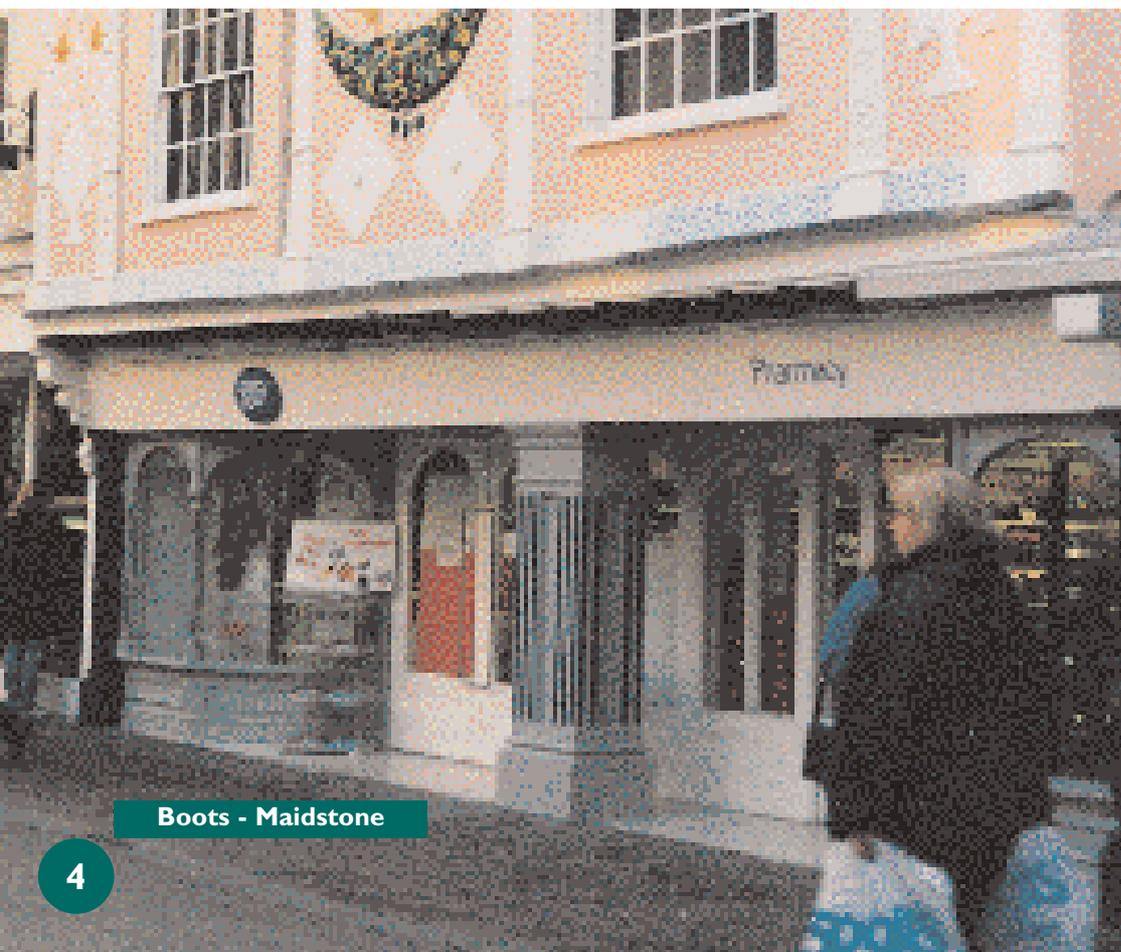
## SELECTION PARAMETERS

It is important that consideration is given at an early stage to the following:

- a) The type of construction to be employed
- b) How anticipated movement is to be accommodated and the locations of any movement joints
- c) The means by which the requirements of any regulations are to be met
- d) How condensation problems are to be prevented
- e) Design
- f) Sufficient working space for the application of materials
- g) Any other relevant information

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## EXTERNAL TANKING

When the mastic asphalt is applied to the external walls of a basement structure, the concrete base must extend at least 150mm beyond the outer face of the basement wall. The horizontal mastic asphalt is laid on the base concrete in three coats to a total thickness of 30mm and must cover the full slab area.

A cement, sand screed of 50mm minimum thickness must be laid immediately to protect the mastic asphalt against damage by following trade operations, taking care to ensure that the mastic asphalt is not damaged during screeding.

A loading coat of concrete, of sufficient strength to resist the maximum anticipated water pressure is laid over the screed as soon as possible and prior to any other work being undertaken. No loading concrete need be applied over the minimum 150mm wide 'pick-up', but the 50mm protective screed must be laid on building paper over the mastic asphalt 'pick-up' to avoid contamination of the mastic asphalt surface.

The walls of the basement are erected on the loading slab concrete and the vertical mastic asphalt tanking is applied to the external face of the walls in three coats to a total thickness of 20mm after the 50mm thick horizontal protective screed and building paper have been removed.

A two coat fillet must be applied at the angular junction between the vertical tanking and the mastic asphalt 'pick-up'. It is essential to ensure that the 'pick-up' is completely free of all cement slurry, mortar droppings or other contamination in order that complete fusion of the fillet to the mastic asphalt is achieved.

A protective wall of brickwork or blockwork should be built against the external vertical tanking membrane leaving a 40mm gap between the protecting wall and the mastic asphalt, which must be filled solid with mortar, course by course, as the work proceeds. This procedure is essential to protect the mastic asphalt membrane against the effects of solar heating and subsequent damage during the backfilling operation, or in the event of subsequent excavation.

The laying of dry-jointed brickwork is to be avoided or any form of blockwork or brickwork built directly against the mastic asphalt without the 40mm mortar filled gap. Such methods do not provide the degree of protection essential to achieve a sound and secure tanking operation.

## INTERNAL TANKING

When the mastic asphalt tanking is applied to internal surfaces of the basement structure, the concrete base and the structural walls of brickwork or concrete should be completed prior to commencement of mastic asphalt application. To ensure a sound waterproofing membrane, continuity in the mastic asphalt application is essential in order to avoid any contamination by mortar droppings, slurry, foot traffic etc. by other trades.

On completion of the horizontal mastic asphalt, the bottom bay of the vertical mastic asphalt and the angle fillets, a minimum 50mm thickness of protective cement, sand screed must be carefully laid over the mastic asphalt without delay, and preferably before the greater part of the vertical mastic asphalt is applied. Once the mastic asphalt tanking is completed, the structural concrete slab should immediately be laid, and the loading walls erected. **BOTH SLAB AND WALLS MUST BE DESIGNED TO RESIST THE MAXIMUM ANTICIPATED WATER PRESSURE.**

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## LOADING SLABS AND WALLS, PROTECTIVE WALLS AND SCREED

When placing concrete or erected brickwork, either for the loading of internal tanking, or the protection of external tanking, the greatest of care must be exercised by operatives in order to avoid impact or other damage to the mastic asphalt. Similar care must be taken when laying the 50mm protective screed, referred to under the heading for internal and external tanking.

## TANK LININGS FOR LIQUID-CONTAINING STRUCTURES

The purpose of a mastic asphalt lining is to prevent the escape of liquids from a containing structure. The lining is always applied in three coats to a total thickness of 30mm on horizontal and 20mm on vertical surfaces.

The internal pressure of the contained liquid, against the lining, should be calculated in a similar way to external pressure in tanking applications but taking into account the density of the liquid and, where the level of liquid in the container is at a relatively constant high level, this pressure will be sufficient to prevent any loss of adhesion of the mastic asphalt to the structural surfaces.

## PUMPING

It is essential that the ground water table is kept below the level of the base concrete throughout the entire tanking operation, and for this purpose, site de-watering or pumping must be provided on a continuous and uninterrupted basis until the loading slab and concrete walls have hardened and/or the mortar in the brickwork has set.

It must be emphasised that complete continuity of the pumping operation must be maintained throughout the entire tanking operation and no interruption of the pumping must be permitted for whatever reason until the loading slab and walls are fully hardened and set. In view of the extreme importance of this factor, those responsible for the operation should consider the provision of emergency standby facilities, to allow for any possible breakdown in the main pumping mechanism. The asphalter cannot take responsibility for any damage to the tanking which may occur due to water pressure on the unloaded mastic asphalt.

## BACKFILLING

No backfilling should be carried out until all the tanking and loading is complete.

## Design of the base

### GENERAL

The concrete slab on which mastic asphalt tanking is applied must be designed and laid in a manner to ensure that any superimposed loads, such as a protective screed, concrete loading slabs and plant, equipment or machinery subsequently used or installed, can be supported without deflection or other movement which could induce cracking in the mastic asphalt tanking.

Any substrate to receive mastic asphalt tanking should be reasonably dry, even, free from dust, laitance, grease, dirt, sharp arrisses or holes.

Where the mastic asphalt tanking meets the damp-proof course above ground level, it is essential to ensure that there is complete continuity between the mastic asphalt and the dpc in order to prevent water ingress at the high level. The dpc material should therefore be compatible with mastic asphalt both in terms of composition and manner of application.

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