

## B2 – Asphalt Concrete

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Asphalt concrete has the characteristics of the mixtures often known as bitumen macadam.

Bituminous mixtures have four components — coarse aggregate, fine aggregate, filler and bitumen. The difference between the many bituminous mixtures produced in the UK is based on the proportions of these four components.

In general terms, just over half of an asphalt concrete mixture is coarse aggregate — the aggregate retained on a 2mm size test sieve. Slightly less than half is fine aggregate passing a 2mm size test sieve. The remainder of the mixture consists of small and almost equal percentages of filler and bitumen.

Mixtures with the largest coarse aggregate size have a lowest proportion of bitumen. The maximum size of the coarse aggregate varies according to the intended use of the mixture: 32mm is the largest size, 4mm is the smallest.

Asphalt concretes are continuously-graded mixtures. There is a proportion of every aggregate fraction within the mixture.

Full details are given in:

Standard:        BS EN 13108-1, Bituminous mixtures – material specifications.  
                         Part 1: Asphalt concrete

BS Guidance:    PD 6691

BS EN 13108-1 replaced:

BS 4987-1        Coated macadam (asphalt concrete) for roads and other paved areas.  
                         Part 1: Specification for constituent materials and asphalt mixtures

The BS EN 13108 Standards present a menu of specification requirements from which individual specifications can be selected. Not all of the requirements in the Standard are appropriate to UK applications. The guidance in PD 6691 is important.

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### Mixture designation

The BS EN Standards use a system of mixture designation based on four sections. For asphalt concrete, the four sections are:

- AC
- D
- base/bin/surf
- binder.

This can be explained as:

- AC — Asphalt concrete
- D — Upper aggregate size of the mixture, mm
- base — base layer
- bin — binder course

- surf — surface course
- binder — grade of bitumen.

PD 6691 recommends that the BS 4987 descriptors such as ‘dense’ and ‘open graded’ should continue to be used, to help understanding of the new Standards.

### Designed and recipe mixtures

The BS EN Standard continues the recent practice of allowing the producer to design the target grading of base and binder course mixtures to reflect the characteristics of the aggregates used in the mixture.

Designed mixtures are made with the stiffer grades of bitumen and are often used in the lower layers of heavily trafficked roads. Recipe mixtures are suitable for general use.

Where necessary, an extra section is added to the mixture designation:

- des — designed base layer or binder course mixture
- rec — recipe mixture.

### Recipe mixtures in routine use

The table below lists the asphalt concrete mixtures in routine use, with the established BS 4987 name and typical bitumen content.

BS EN 13108-1 designation	BS 4987-1 mixture name	Typical bitumen content, %
<i>Base layers and binder course</i>		
AC 32 dense base	0/32mm dense base	4.0
AC 32 dense bin	0/32mm dense binder course	4.6
AC 20 dense bin	0/20mm dense binder course	4.6
AC 20 open bin	0/20mm open binder course	3.7
<i>Surface course</i>		
AC 10 close surf	0/10mm close-graded surface course	5.2
AC 10 open surf	0/10mm open-graded surface course	5.0
AC 6 dense surf	0/6mm dense surface course	6.0
AC 6 med surf	0/6mm medium-graded surface course	5.3
AC 4 fine surf	0/4mm fine-graded surface course	6.0

The actual bitumen content depends upon the type(s) of aggregate used in the mixture.