

## B1 – Rolled Asphalt

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Rolled asphalt is a material specified almost exclusively in the UK and Ireland, where it is often made using sand as the fine aggregate fraction.

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.

The proportions of the four constituents vary depending on the application. Generally, rolled asphalt mixtures have between 30% and 60% coarse aggregate, most of it from only one size fraction. The fine aggregate content varies between 20% and 50%.

The remainder of the mixture is made up of bitumen and limestone filler in approximately equal proportions. The mixtures with the lowest proportion of coarse aggregate have the highest proportion of bitumen and filler.

Rolled asphalts are often referred to as gap-graded because some of the intermediate aggregate size fractions contain few particles. The bitumen, filler and fine aggregate (sand) form a ‘mastic’ that is resistant to the ingress of moisture. The coarse aggregate particles are surrounded by mastic — like ‘the chocolate chips in a muffin’.

In the Standard, 32mm size is the largest base mixture and 14mm size is the largest surface course mixture. There are also 10mm and 2mm size (sand carpet) mixtures for use on footways.

Full details are given in:

Standard:        BS EN 13108-4, Bituminous mixtures – material specifications.  
                      Part 4: Hot rolled asphalt

BS Guidance:    PD6691

BS EN 13108-4 replaced:

BS 594-1         Hot rolled asphalt 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 rolled asphalt, the four sections are:

- HRA
- grading designation
- base/bin/surf
- binder.

This can be explained as:

- HRA — Rolled asphalt
- grading designation, %/D — % is the percentage of coarse aggregate, D is the upper aggregate size of the mixture. mm
- base — base layer
- bin — binder course
- surf — surface course
- binder — grade of bitumen.

### Designed and recipe mixtures

The BS EN Standard continues the practice of allowing the producer to design the bitumen content of surface course mixtures to reflect the characteristics of the aggregates used in the mixture.

Recipe mixtures are suitable for general use.

### Recipe mixtures in routine use

The table below lists the recipe type rolled asphalt mixtures in routine use. The equivalent BS 594-1 name and typical bitumen content are also given.

BS EN 13108-4 designation	BS 594-1 mixture designation	Typical bitumen content, %
<i>Base layers and binder course</i>		
60/32	60% 0/32 (Column 2/5)	5.6
60/20	60% 0/20 (Column 2/4)	5.6
50/20	50% 0/20 (Column 2/3)	6.4
50/14	50% 0/14 (Column 2/2)	6.4
50/10	50% 0/10 (Column 2/1)	6.4
<i>Surface course (Type F)</i>		
35/14	35% 0/14 (Column 6/5)	7.3
30/14	30% 0/14 (Column 6/4)	7.7
30/10	30% 0/10 (Column 6/3)	7.7
15/10	15% 0/10 (Column 6/2)	8.8
0/2 (sand carpet)	0% 0/2 (Column 6/1)	10.2

The actual bitumen content depends upon the type(s) of aggregate used in the mixture. Type F mixtures are made with sand fine aggregate.

Mixtures with designation 50/10, 50/14 and 50/20 can also be used as a regulating course below a new surface course.

Mixtures with designation 15/10 are often used to surface footways in Scotland and Northern Ireland.

## Coated chippings

Mixtures with designation 30/10, 30/14 and 35/14 are usually used with coated chippings to give adequate surface texture and skidding resistance.

The recommended sizes are:

- 14/20mm size
- 8/14mm size.

The smaller size is only suitable for low-speed traffic. Categories for resistance to polishing (PSV) and resistance to abrasion (AAV) should also be specified.

Coated chippings have a target binder content of 1.5%.