



Road Emulsion Association Limited

REAL Technical Data Sheet No. 12 - Miscellaneous Uses of Bitumen Road Emulsions

Introduction

The intent of the REAL Technical Data Sheets is to describe the detailed uses of bitumen emulsion in the road maintenance and construction industry. Most uses involve the production of emulsions specifically designed for the requirements of individual processes such as rapid-breaking emulsions for surface dressing and medium-breaking emulsions for bituminous mixtures.

This data sheet covers some additional uses of emulsions which have relevance in road construction and civil engineering but are not necessarily related to trafficked surfaces. The list of examples is by no means complete but it does illustrate the impressive versatility of bitumen emulsions.

Grass Growing

For the normal gardener, the promotion of very rapid growth of grass seed is unnecessary. In new road construction, it is essential that the grass establishes a root system as quickly as possible to stabilise slopes and other soiled areas.

Bitumen emulsion is a very convenient medium for covering the seed bed with a layer that assists the germination of grass seed in the following ways:

- (a) The bitumen layer prevents evaporation of water from the surface and keeps the soil moist.
- (b) The 'black' bitumen layer absorbs heat during the day and gives it up slowly each night, creating temperature conditions that encourage germination.
- (c) The seed bed is less likely to become waterlogged, blown or washed away, or eaten by birds.

An accepted method of application is as follows:

- (a) The seed bed is prepared in the normal way to produce a fine tilth of soil, a good grass seed mixture is applied at the recommended rate and the seed bed is rolled lightly and watered if necessary.
- (b) A layer of clean sharp sand is evenly applied to a depth of about 5 mm.
- (c) Grade C55 B 5 or C55 BF5 (Class K2) emulsion is applied at a rate of about 0.7 litres/m².
- (d) The emulsion film is covered with another layer of clean sharp sand to a depth of about 5 mm, but not greater than 10 mm. This prevents damage in the early stages of grass growth.

Blowing Sand Stabilisation

Sand dunes and other areas often require treatment to prevent the surface being eroded by wind. The use of an emulsion stabilises the surface to a depth of about 40 mm whilst still allowing effective drainage.

The emulsion commonly used is Grade C55 B 5 or C55 BF5 (Class K2). This is diluted with 3-4 times its volume of potable water before it is applied to sand, at the rate between 8.5 and 11.0 litres/m². Care should be taken to ensure that surplus bitumen is not left on the surface.

Slip-Coat

Emulsions are often used to create a bitumen membrane between the base and upper layers of a concrete slab pavement. This stops rigid adhesion between layers of different ages and strengths, allowing them to mature without setting up internal stresses. The slip coat also helps to retain the strength of the lower layer by preventing water seeping into through cracks in the surface.

Emulsions of Grade C60 B 3 or C60 BF3 (Class K1-60) is preferred. The emulsion may be applied in one application at a rate of about 1.8 litres/m² or in two applications at a rate of about 0.9 litres/m². If two applications are used, it has the added benefit in that the first application can be used as a curing agent for the lower layer, as long as it is allowed to break completely before the second application is made.

Joints in Pavement Courses

Stable and watertight joints can make an important contribution to the long-term performance of a flexible pavement. They help to keep water out of the structure and reduce the risk of fretting along the joint.

The Specification for Highway Works (Clause 901) recognises that cold-applied polymer modified and premium grade bitumen emulsions can be used instead of hot bitumen to coat the vertical face of longitudinal and transverse joints in surface courses. BS 594-2 and BS 4987-2 also permit the use of cold applied thixotropic bitumen compounds (modified bitumen emulsions) as an alternative to hot bitumen for coating the vertical face of joints, manhole covers, kerbs, concrete channels and similar projections.

The advantages of the use of cold applied products instead of the traditional hot bitumen include:

- (a) No heat is required, reducing the cost of plant and fuel.
- (b) Safe and easy application; the hazards associated with the use of a hot material are eliminated.
- (c) Small areas can be dealt with quickly; no need to wait for the bitumen heater to heat up before work begins.
- (d) Easier to transport; no need to wait for the bitumen heater to cool down before it is moved.

The use of specially formulated bitumen emulsions for joint painting is firmly established in the UK.

Protection

Emulsions are used for the protection of exposed or buried concrete and ironwork. In order to impart more 'body' to the emulsion and to strengthen the surface film, polymer modified emulsion is normally used.

Filling Surface Cracks

Polymer modified bitumen emulsion can be an effective material for sealing cracks in pavement surfaces. They provide a way of taking prompt corrective action before the underlying road structure is affected by moisture and detritus.

A number of bitumen emulsion-based compounds are available with the skid resistance characteristics needed for use on the surface of a public highway.

Prolonging the life of or altering the colour of paved surfaces

Mixtures of fine aggregates and bitumen emulsion can be applied to an asphalt or macadam surfaces

to provide a surface seal. These ready mixed slurries are available in containers of various sizes. Part of the aggregate can be replaced by pigment to achieve a variety of colours including grey, red and green.

Several coats may be applied depending on the type of traffic. These materials are normally only applied at paint film thickness and will not be very resistant to abrasive trafficking and scuffing action. However, they provide an economical and colourful means of sealing paved surfaces in low traffic density areas where colour definition and surface renovation is required

Skid Pans

A surface suitable for skid testing is provided by depositing a film of hard bitumen on a smooth surface. This may be achieved very simply by application of a specialised hard grade of emulsion. The emulsion is sprayed evenly on to the surface and dries to a hard shiny surface with a low resistance to skidding. The surface film of bitumen can conveniently be sprayed again if it loses its smooth texture with use.

There are many other uses to which bitumen emulsion may be put in the civil engineering and constructions industries, and it is hoped that the above techniques will illustrate the scope and variety of possibilities. Member companies of The Road Emulsion Association Limited should be contacted for further information.

Note: Descriptions of emulsion grades in accordance with BS EN 13808 may change when the UK Guidance document PD 6690 is finalised. During the period of change from BS 434-1 to BS EN 13808, typical BS EN 13808 grade descriptions are used in the text of this data sheet followed by the BS 434-1 description in brackets. Technical Data Sheet No 1 gives a basic interpretation of grade descriptions from BS EN 13808, but for a full understanding of the specification and variations in grade descriptions, reference should be made to PD 6690 when it is available.

For further information see **Summary and Reference Sheets on the Association's website** www.rea.org.uk

Revised by the Technical Committee, July 2006.