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English Version

Bitumen and bituminous binders - Development of performance-related specifications: status report 2005

Bitumes et liants bitumineux - Elaboration de spécifications axées sur les performances : rapport d'avancement 2005

Bitumen und bitumenhaltige Bindemittel - Entwicklung von auf das Gebrauchsverhalten bezogenen Spezifikationen: Statusbericht 2005

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: rue de Stassart, 36 B-1050 Brussels

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Foreword

This Technical Report (CEN/TR 15352:2006) has been prepared by Technical Committee CEN/TC 336 "Bituminous binders", the secretariat of which is held by AFNOR.

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1 Executive summary

This Technical Report contains a synthesis of TC 336/WG 1 work on the development of second generation (performance-related) specifications for paving grade bitumens. It is a CEN Technical Report (TR) and will be regularly updated by TC 336.

TC 336 Working Groups are completing their work to produce 'harmonised' first generation European specifications and test methods for paving bitumens, including EN 12591 (paving grades), prEN 13924 (hard grades) and EN 14023 (PMB). These are based on existing (empirical) national standards.

A process, involving industry-wide participation, is being followed to ensure that, for the second generation standards, the performance relationships of a binder property are assessed before a specification is developed. The basic sequential steps are as follows:

- **Step 1:** identify the binder properties linked to the performance requirements of asphalt pavements,
- **Step 2:** select and standardise appropriate (new) test methods to measure these properties,
- **Step 3:** collect data and ensure field validation for establishing (new) binder specifications,
- **Step 4:** review the grading system according to the (new) specification.

The development work has reached Step 3. Although new tests methods, when identified, could still be added, the main thrust currently is on validation of the test methods selected by WG 1. There are two major tasks being undertaken;

- Literature review.

A project, named "BiTVal", is being undertaken by FEHRL. The first phase of the project is to evaluate the published literature on relationships between bitumen characteristics and asphalt/pavement behaviour. A FEHRL report will make recommendations on use of binder tests by WG 1, and also identify gaps in the knowledge.

- Collection of data for existing bitumens using the selected test methods.

This CEN/TR contains a framework of properties and test methods, which is being used as the basis for data collection. The intention is to encourage widespread input from member states and the industry around Europe. As confidence in the validation of the (new) test methods is established it may be decided to introduce them progressively into the existing specifications according to priority of need.

It is, of course, recognised that the binder properties alone do not determine pavement performance. Other parameters, such as aggregate characteristics, mix design, manufacture and laying are also considered as important. Nevertheless the goal of the work of WG 1 is to propose a framework, which could include levels or classes, and which can be used in new performance-related specifications for paving grade binders.

The TC 336 business plan recognises that the development of new P-R specifications will be a long-term process. This Technical Report will be a living document, being regularly updated, to indicate the current state of progress of the work of WG 1.

2 Scope of the report

TC 336/WG 1 has agreed to produce a Technical Report (CEN-TR) to summarise and illustrate the ongoing work in the standardisation area with reference to the process of developing from traditional “empirical” based specifications to new “performance-related” specifications for paving bitumens, as required by the Mandate M/124. It was decided that it would be better to maintain such a report as an ‘informative’ document, which can be regularly amended and updated by TC 336/WG 1 as appropriate.

3 Introduction

The European Committee for Standardization (CEN) was formed in the early sixties and was charged with preparing common rules and standards to be used in all member countries to ensure no barriers to trade.

As part of that programme, new harmonised European specifications for paving grade bitumens are being developed in two stages:

- a) First generation (CEN/TC 19/SC 1, since 1990) – The working groups have completed their work to produce specifications and test methods for paving bitumens, for use throughout Europe, which were based on existing national standards. Such specifications (already published in 1999 as EN 12591, and now under revision after 5 years in use) are well known as empirical tests based specifications.

The first generation standards, including EN 12591, EN 13924 (hard grades) and EN 14023 (PMB), and their associated test methods, are summarised in Annex A.

- b) Second generation (CEN/TC 336, since 2000) – The next task of the working groups is to produce specifications that are more Performance-Related, to reflect the binder contribution to the performance of the asphalt pavement, with the inclusion of existing or new properties and test methods, as appropriate.

Bitumen specifications have remained relatively unchanged over the last forty years and the specifications now being developed represent a very significant step forward for all involved contributors such as producers, asphalt suppliers, contractors and administrations all over Europe.

4 Motivation and expected benefits

In the EC’s acceptance of the CEN/TC 336 response to the Mandate, it was stated:

“The Commission understand that the standards, which will be developed, are the generation of empirical specifications. CEN/TC 336 is encouraged to develop new specifications, performance-related, as soon as possible, after finalisation of the first generation standards. If TC 336 considers there is a need to change some of the performance characteristics for the second generation of standards, in line with a performance based approach, a revision of the mandate should be proposed by CEN/TC 336 to the Commission.”

The second generation of standards can be more ‘market-driven’. The aim is good quality asphalt roads that perform well throughout their lifetime. Specifications and standards should meet both the technical and commercial needs of the asphalt industry and its customers, and it is important these needs are properly identified and understood.

The overall purpose of the specification system will be to ensure that binders can be evaluated on a fair and comparable basis, that the appropriate binder can easily be selected for a particular application and that the binder can be used with confidence in its quality. Ideally, the system should be suitable throughout Europe, for all types of climatic and traffic conditions, for a large variety of pavement applications, and applicable to all categories of binders: conventional, special and modified bitumens.