Bitumen and Bituminous binders –Part 2: Cutback bitumen -- Specifications
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Foreword

Development of the East African Standards has been necessitated by the need for harmonizing requirements governing quality of products and services in the East African Community. It is envisaged that through harmonized standardization, trade barriers that are encountered when goods and services are exchanged within the Community will be removed.

The Community has established an East African Standards Committee (EASC) mandated to develop and issue East African Standards (EAS). The Committee is composed of representatives of the National Standards Bodies in Partner States, together with the representatives from the public and private sector organizations in the community.

East African Standards are developed through Technical Committees that are representative of key stakeholders including government, academia, consumer groups, private sector and other interested parties. Draft East African Standards are circulated to stakeholders through the National Standards Bodies in the Partner States. The comments received are discussed and incorporated before finalization of standards, in accordance with the Principles and procedures for development of East African Standards.

East African Standards are subject to review, to keep pace with technological advances. Users of the East African Standards are therefore expected to ensure that they always have the latest versions of the standards they are implementing.

The committee responsible for this document is Technical Committee EASC/TC 021, Building and Civil Engineering.

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INTRODUCTION

The use of cutback materials in road works is considered to have challenges of safety, environmental and cost concerns relatively to the bitumen emulsions. The EASC/TC021 after consultation with experts and stakeholders is recommending the preference in the use of bitumen emulsion for primarily in priming and other uses as they are cost effective, safe, sustainable and environmentally friendly.

Though cutback-based primers are primarily used in East African for road works, it’s our recommendation that Partner States to advocate the use of emulsion based bituminous materials that are safer to handle and environmentally friendly.
Bitumen and Bituminous binders—Cutback bitumen Specifications.

1 Scope
This East African Standard applies to bituminous materials and covers the requirements for cutback bitumen types suitable for road construction and similar purposes.

2 Normative references
The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 2592, Petroleum and related products - Determination of flash and fire points - Cleveland open cup method

ASTM D92, Standard Test Method for Flash and Fire Points by Cleveland Open Cup Tester

ASTM D36M, Standard test method for softening point of bitumen (ring-and-ball apparatus)

ASTM D93, Standard test methods for flash-point by Pensky-Martens closed cup tester.

ASTM D95, Standard test method for water in petroleum products and bituminous materials by distillation.

ASTM D140, Standard practice for sampling bituminous materials.

ASTM D402, Standard test method for distillation of cutback asphaltic (bituminous) products.

ASTM D2170, Standard test method for kinematic viscosity of asphalts (bitumen).

ASTM D8, Standard terminology related to materials for roads

ASTM D4402, Standard test method for viscosity determination of asphalt at elevated temperatures using a rotational viscometer.

CD T153 2018 - Penetration grade bitumen specifications.

3 Definitions and abbreviations
For the purposes of this document, the definitions and abbreviations given in ASTM D8 and the following apply.
3.1 Definitions

3.1.1 Bitumen or Asphalt Cement
non-crystalline solid or viscous mixture of complex hydrocarbons that possesses characteristic agglomerating properties, softens gradually when heated, is substantially soluble in trichloroethylene and or N-Propyl bromide, and is obtained from crude petroleum by refining processes.

3.1.2 Cracked Bitumen
bitumen that has been treated either thermally, catalytically or by the addition of hydrogen at high pressure and elevated temperature, resulting in the large hydrocarbon molecules breaking down into smaller molecules

3.1.3 Cutback Bitumen
penetration grade bitumen blended with a small quantity of volatile solvents to reduce viscosity for ease of handling and application, which, after the volatile solvents have evaporated, essentially reverts to the penetration-grade bitumen base.
3.1.4 Curing
the process of evaporation of the volatile petroleum oils from bitumen in cut-back bitumen

3.1.5 cutback bitumen
are blend of penetration grade bitumen with volatile solvents such as Naphtha kerosene, or diesel

3.1.6 Lot
that quantity of cutback bitumen of the same batch identification, from one manufacturer, submitted at any one time for inspection and testing

3.2 Abbreviations
EAC: East African Community
NSB: National Standardization Bureau

4 Requirements
4.1 General
The cutback bitumen shall be homogeneous, free from visible water and other impurities, and shall not foam when heated to application temperature. The solvent used in the preparation of cutback bitumen shall comply with the “relevant national legislation”.

4.2 Base bitumen
The cutback bitumen shall be made from a penetration grade bitumen base that complies with all the requirements of DEAS 982 – 1: 2019 (see clause 2) except that, if cutback bitumen that is made from thermally or catalytically cracked bitumen is acceptable, the bitumen need not comply with the requirement for the n-heptane-xylene equivalent.

4.3 Grade requirements
4.3.1 The cutback bitumen shall comply with the requirements relevant to the grade designation specified by the purchaser (see annex A) and given in the appropriate columns of either table 1, 2 or 3 depending on the type specified by the purchaser or supplier.

4.3.2 Consumers whose equipment or conditions of use necessitate a viscosity grade other than as given in table 1, 2 and 3 should consult the supplier of the cutback bitumen, and any specific viscosity requirement shall be the subject of agreement between the purchaser and the supplier (see annex A).
Table 1 — Cutback bitumen-rapid curing (RC) grades

<table>
<thead>
<tr>
<th>Property / Test method</th>
<th>RC-70</th>
<th>RC-250</th>
<th>RC-800</th>
<th>RC-3000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kinematic viscosity @ 60°C, cSt</td>
<td>Min</td>
<td>Max</td>
<td>Min</td>
<td>Max</td>
</tr>
<tr>
<td>Flash Point (Tag Open-Cup), °C</td>
<td>-</td>
<td>-</td>
<td>26.7</td>
<td>26.7</td>
</tr>
<tr>
<td>Distillate to 360°C</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>to 190°C</td>
<td>10</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>to 225°C</td>
<td>50</td>
<td>35</td>
<td>15</td>
<td>-</td>
</tr>
<tr>
<td>to 260°C</td>
<td>70</td>
<td>60</td>
<td>45</td>
<td>25</td>
</tr>
<tr>
<td>to 315°C</td>
<td>85</td>
<td>80</td>
<td>75</td>
<td>70</td>
</tr>
<tr>
<td>Residue from Distillation to 360°C, Volume % by difference test on residue from distillation</td>
<td>55</td>
<td>65</td>
<td>75</td>
<td>80</td>
</tr>
</tbody>
</table>

Tests on residue from distillation:

<table>
<thead>
<tr>
<th>Property</th>
<th>RC-70</th>
<th>RC-250</th>
<th>RC-800</th>
<th>RC-3000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Penetration @25deg C, 100g Ss, (0.1 mm)</td>
<td>80</td>
<td>120</td>
<td>80</td>
<td>120</td>
</tr>
<tr>
<td>Viscosity at 60°C, Pa·s</td>
<td>100</td>
<td>-</td>
<td>100</td>
<td>-</td>
</tr>
<tr>
<td>Ductility at 25°C</td>
<td>100</td>
<td>-</td>
<td>100</td>
<td>-</td>
</tr>
<tr>
<td>Solubility in trichloroethylene or n-Propyl Bromide</td>
<td>99</td>
<td>-</td>
<td>99</td>
<td>-</td>
</tr>
<tr>
<td>Water by volume</td>
<td>-</td>
<td>0.2</td>
<td>-</td>
<td>0.2</td>
</tr>
</tbody>
</table>

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### Table 2 — Cutback Bitumen—medium curing (MC) grades

<table>
<thead>
<tr>
<th>Property</th>
<th>Requirements</th>
<th>Type and grade designation</th>
<th>Test method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kinematic viscosity @ 60°C, cSt</td>
<td></td>
<td>MC-30</td>
<td>MC-70</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Min</td>
<td>Max</td>
</tr>
<tr>
<td>Flash Point (Tag Open-Cup), °C</td>
<td></td>
<td>38</td>
<td>-</td>
</tr>
<tr>
<td>Distillate to 360°C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>to 190°C</td>
<td></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>to 225°C</td>
<td></td>
<td>-</td>
<td>25</td>
</tr>
<tr>
<td>to 260°C</td>
<td></td>
<td>40</td>
<td>70</td>
</tr>
<tr>
<td>to 315°C</td>
<td></td>
<td>75</td>
<td>93</td>
</tr>
<tr>
<td>Residue from Distillation to 360°C, Volume % by difference test on residue from distillation</td>
<td></td>
<td>50</td>
<td>-</td>
</tr>
</tbody>
</table>

**NOTE 1** — If the ductility at 25°C is less than 100, the material will be acceptable if its ductility at 15 °C is more than 100.
## Table 3 — Cutback bitumen-slow curing (SC) grades

<table>
<thead>
<tr>
<th>Property</th>
<th>Requirements</th>
<th>Type and grade designation</th>
<th>Test method</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>SC-70</td>
<td>SC-250</td>
</tr>
<tr>
<td>Kinematic viscosity @ 60°C, cSt</td>
<td>Mi</td>
<td>Max</td>
<td>Min</td>
</tr>
<tr>
<td>Flash Point (Cleveland Tag Open-Cup), °C</td>
<td>66</td>
<td>-</td>
<td>79</td>
</tr>
<tr>
<td>Distillate to 360°C</td>
<td>10</td>
<td>30</td>
<td>4</td>
</tr>
<tr>
<td>Residue from Distillation to 360°C, Volume % by difference test on residue from distillation</td>
<td>100</td>
<td>0</td>
<td>50</td>
</tr>
<tr>
<td>Kinematic viscosity on distillation residue at 60°C, cSt</td>
<td>100</td>
<td>0</td>
<td>800</td>
</tr>
<tr>
<td>Asphalt Residue</td>
<td>100</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>Solubility in trichloroethylene or n-Propyl Bromide</td>
<td>100</td>
<td>0</td>
<td>99</td>
</tr>
<tr>
<td>Water, %</td>
<td>0.5</td>
<td>0</td>
<td>0.5</td>
</tr>
</tbody>
</table>
5 Packaging and marking

5.1 Packaging

The condition of each drum and tanker into which the penetration grade bitumen is packed shall be such that it will have no detrimental effect on the quality of the product during normal transport and storage.

5.1 Marking

The following information shall appear in legible and indelible marking on each drum or, when the bitumen is supplied in tankers, on the relevant consignment documents:

a) the manufacturer's identification;

b) a description of the contents;

c) the type and grade designation;

d) manufacture date;

e) the batch identification;

f) the quantity; and

g) when relevant, that the product contains cracked bitumen.

6 Sampling and compliance

6.1 General

This clause applies to the sampling for inspection and testing before acceptance or rejection of single lots (consignments) in cases where no information about the implementation of quality control or testing during manufacture is available to help in assessing the quality of the lot. It is also used as the procedure for adjudicating in cases of dispute.

6.2 Sampling

The relevant sampling procedure as described in ASTM D140 shall be applied in determining whether a lot complies with the appropriate requirements of this East African Standard. The samples so drawn shall be deemed to represent the lot.

6.3 Compliance

The lot shall be deemed to comply with the requirements of this East African Standard if, after inspection and testing, the sample taken in accordance with 6.2 is found to comply with all the appropriate requirements of this East African Standard.

7 Test methods

Use the methods listed in either table 1, 2 or 3 depending on the type of cutback you are dealing with.
Annex A
(informative)

Notes to purchasers

A.1 The following requirement shall be specified in tender invitations and in each order or contract: the grade designation (see 4.3.1)

A.2 The following requirement shall be agreed upon between the purchaser and the supplier when relevant, the supply of a special viscosity grade (see 4.3.2)

A.3 Information on currently valid national and international standards can be obtained from the NSBs Office.