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DRAFT TANZANIA STANDARD

Standard Specification for Viscosity-Graded Asphalt Binder for use in pavement Construction

TANZANIA BUREAU OF STANDARDS

1st Edition

0 National Foreword

The Tanzania Bureau of standards is the statutory national standards body for Tanzania, established under the act.No.3 of 1975, amended by act.No.2 of 2009.

This draft Tanzania Standard is being prepared by BCDC 5 Roads Technical Committee under the supervision of the Building and Construction Divisional Standards committee (BCDC).

In the preparation of this draft Tanzania Standard assistance was derived from ***ASTM D3381/D3381M-18 Standard Specification for Viscosity-Graded Asphalt Binder for Use in pavement Construction published by American Society for Testing and Materials (ASTM)***

1 Scope

This draft Tanzania standard covers asphalt binders graded by viscosity at 60°C [140 °F] for use in pavement construction.

The purchaser shall specify the applicable table of limits. In the event the purchaser does not specify limits, Table 1 shall apply. For asphalt binders graded by penetration at 25°C [77°F], see specification D946/D946M. If needed, volume corrections for binders should be made according to Practice D4311/D4311M.

The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in nonconformance with standard.

2 Normative references

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

ASTM D5 Test Method for Penetration of Bituminous Materials

ASTM D36/D36M Test Method for Softening Point of Bitumen (Ring-and-Ball Apparatus)

ASTM D70 Test Method for Density of Semi-Solid Asphalt Binder (Pycnometer Method)

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

ASTM D95 Test Method for water in Petroleum Products and Bituminous Materials by Distillation

ASTM D113 Test Method for Ductility of Asphalt Materials

ASTM D1140/D140M Practice for Sampling Asphalt Materials

ASTM D946/D946M Specification for Penetration-Graded Asphalt Binder for use in Pavement construction

ASTM D1754/D1754M Test Method for Effects of Heat and Air on Asphaltic Materials (Thin-Film Oven Test)

ASTM D2042 Test Method for Solubility of Asphalt Materials in Trichloroethylene

ASTM D2170/D2170M Test Method for Kinematic Viscosity of Asphalts

ASTM D2171/D2171M Test Method for Viscosity of Asphalts by Vacuum Capillary Viscometer

ASTM D2872 Test Method for Effect of Heat and Air on a Moving Film of Asphalt (Rolling Thin-Film Oven Test)

ASTM D4311/4311M Practice for Determining Asphalt Volume Correction to a Base Temperature

ASTM D7553 Test Method for Solubility of Asphalt Materials in N-Propyl Bromide

3 Manufacture

The viscosity graded asphalt binder shall be prepared from crude petroleum oil by suitable methods.

4 Physical Requirements

The asphalt binder shall be homogeneous, free from water, and shall not foam when heated to 177°C [350 °F].

The asphalt binders shall conform to the requirements given in Table1, Table 2, Table 3 or Table 4, as may be specified by purchaser.

5 Packaging and marking

5.1 Packaging

The condition of each drum and tanker into which the viscosity-graded asphalt binder is packed shall be such that it will have no detrimental effect on the quality of the product during normal transport and storage.

5.2 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 grade designation
d) manufacture date
e) the batch identification, and
f) the quantity.

6 Methods of sampling and Testing

6.1 Sample and test of viscosity-Graded asphalt in accordance with the methods found on table of requirement (table 1, 2, 3 and 4)

TABLE 1- Requirements for Asphalt Binder, Viscosity Graded at 60°C [140 °F] Based on Original Asphalt

Test	Viscosity Grade						Test methods
	AC-2.5	AC-5	AC-10	AC-20	AC-30	AC-40	
Viscosity at 60°C[140°F], Pa. s	25 ± 5	50 ± 10	100 ± 20	200 ± 40	300 ± 60	400 ± 80	ASTM D-2171
Viscosity at 135°C[275°F], Min, mm^2/s	80	110	150	210	250	300	ASTM D-2170
Penetration at 25°C[77°F], 100g, 5sec, Min, (1/10mm)	200	120	70	40	30	20	ASTM D-5
Flash point, (Cleveland open cup), Min, °C [°F]	165[325]	175[350]	220[425]	230[450]	230[450]	230[450]	ASTM D-92

TABLE 1 -Requirements for Asphalt Binder, Viscosity Grade at 60°C [140 °F] Based on Original Asphalt (Continued table)

Test	Viscosity Grade						Test methods
	AC-2.5	AC-5	AC-10	AC-20	AC-30	AC-40	
Solubility in trichloroethylene, [A]min, %wt	99.0	99.0	99.0	99.0	99.0	99.0	ASTM D-2042
Test on residue from thin-film oven test:							
Viscosity, 60°C [140 °F], poises, Max	125	250	500	1000	1500	2000	ASTM D-2171
Ductility, 25°C [77 °F], 5cm/min, Min, cm	100[B]	100	50	20	15	10	ASTM D-113

[A]Solubility in N-Propyl Bromide can be an alternate method to solubility in Trichloroethylene (TCE)
[B]If ductility is less than 100cm, material will be accepted if ductility at 15°C [60 °F] is 100cm minimum at a pull rate of 5 cm/min
NOTE: AC- Asphalt Cement.

TABLE 2-Requirements for Asphalt Binder, Viscosity Graded at 60°C [140 °F] Based on Original Asphalt

NOTE 1-TABLE 2 specifies asphalts that are less temperature susceptible than those specified by Table 1. Asphalts that meet Table 2 requirements shall also meet Table 1 requirements of the same grade.

Test	Viscosity Grade						Test methods
	AC-2.5	AC-5	AC-10	AC-20	AC-30	AC-40	
Viscosity at 60°C[140°F], Pa. s	25 ± 5	50 ± 10	100 ± 20	200 ± 40	300 ± 60	400 ± 80	ASTM D-2171
Viscosity at 135°C[275°F], Min, mm^2/s	125	175	250	300	350	400	ASTM D-2170
Penetration at 25°C[77°F], 100g, 5sec, Min, (1/10mm)	220	140	80	60	50	40	ASTM D-5
Flash point (Cleveland open cup), Min, °C [°F]	165[325]	175[350]	220[425]	230[450]	230[450]	230[450]	ASTM D-92
Solubility in trichloroethylene, [A]min, %	99.0	99.0	99.0	99.0	99.0	99.0	ASTM D-2042
Test on residue from thin-film oven test:							
Viscosity at 60°C [140 °F]	125	250	500	1000	1500	2000	ASTM D-2171
Ductility at 25°C [77 °F]	100[B]	100	75	50	40	25	ASTM D-113

[A]Solubility in N-Propyl Bromide can be an alternate method to solubility in TCE
[B]If ductility is less than 100cm, material will be accepted if ductility at 15°C [60 °F] is 100cm minimum at a pull rate of 5 cm/min.

TABLE 3- Requirements for Asphalt Binder, Viscosity Grade at 60°C [140 °F] Based on Residue from Rolling Thin-Film Oven Test

Test on Residue from rolling thin-Film oven Test	Viscosity Grade					Test methods
	AR-1000	AR-2000	AR-4000	AR-8000	AR-16000	
Viscosity at 60°C[140°F], Pa. s	100 ± 25	200 ± 50	400 ± 100	800 ± 200	1600 ± 400	ASTM D-2171
Viscosity at 135°C[275°F], Min, mm^2/s	140	200	275	400	550	ASTM D-2170
Penetration at 25°C[77°F], 100g, 5s, Min, (1/10mm)	65	40	25	20	20	ASTM D-5
% of original penetration, 25°C[77°F], Min		40	45	50	52	ASTM D-5
Ductility at 25°C[77°F],5cm/min, Min, cm	100[B]	100[B]	75	75	75	ASTM D-113
Flash point (Cleveland open cup), Min, °C [°F]	205[400]	220[425]	225[440]	230[450]	240[460]	ASTM D92
Solubility in trichloethylene, [C]min, %	99.0	99.0	99.0	99.0	99.0	ASTM D2042

[A]Thin-film oven test may be used, but the rolling thin-film oven test shall be the referee method.
[B]if ductility is less than 100, material will be accepted if ductility at 15°C[60°f] is minimum at pull rate of 5cm/min.
[C]Solubility in N-Propyl Bromide can be an alternate method to solubility in Trichloroethylene (TCE)
NOTE: AR-Aged Residue.