Road Pavement Forum

9-10 November 2010

Revision of

- **SANS 307 – Pen Bitumen**
- **SANS 308 – Cutback Bitumen**

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•SANS 308 – Cutback Bitumen

SANS 308 – Cutback bitumens

Removal of grades:

MC 70 and MC 800 no longer covered!

SANS 308 – Cutback bitumens

Removal of grades:

MC 70 and MC 800 no longer covered!

New grade:

MC 10 - Prime

SANS 308 – Cutback bitumens

Other proposed changes:

- **Lower Flash Point (Safety)**
- **Inclusion of Dynamic viscosity**

  (Brookfield for field and 3rd party testing)
- **Viscosity to replace Penetration**
- **Kinematic Viscosity**

  (Primary certification and reference method)

PROPOSED REVISION OF SABS FOR MC30

PROPERTY	UNITS	LIMITS	TEST METHOD		NOTE
			ASTM	Other	
Kinematic Viscosity @ 60 °C	cSt	30-60	D2170/01		Used by refineries only
Brookfield Viscosity @ 60 °C	mPa.s	*30 – 70*	D4402		•Added as note to specification •Used as field test
Flash Point	°C	38 min	D93		Safety requirement
Water, % by mass or vol		0.2 max			
Density at 20 ℃	kg/l	??	??		•Density at 60 ℃ •General rule of thumb is that 0.024 kg/l to be subtracted from density determined at 20 ℃ to get approximate density at 60 ℃
Distillation @ 101.325 kPa abs			D402/02		
Distillate % (v/v) of total distillate up to 360 °C					
up to 190 °C	**vol %**	**0-15**			
up to 225 °C	**vol %**	**15-60**			
up to 260 °C	**vol %**	**50-85**			
up to 316 °C	**vol %**	**80-100**			
Residue From Distillation to 360 °C (by difference)	vol %	50 min			
Viscosity @ 60 °C on residue from distillation	Pa.s	30 min	D4402		To replace penetration test
Spraying Temperature	°C	45 – 65			Guideline for applicators

PROPOSED REVISION OF SABS FOR MC3000

PROPERTY	UNITS	LIMITS	TEST METHOD		NOTE
			ASTM	Other	
Kinematic Viscosity @ 60 °C	cSt	3000 - 6000	D2170/01		Used by refineries only
Brookfield Viscosity @ 60 °C	mPa.s	***3000 - 7000***	D4402		•Added as note to specification •Used as field test
Flash Point	°C	38 min	D93		Safety requirement
Water, % by mass or vol		0.2 max			
Density at 20 ℃	kg/l	??	??		•Density at 60 ℃ •General rule of thumb is that 0.024 kg/l to be subtracted from density determined at 20 ℃ to get approximate density at 60 ℃
Distillation @ 101.325 kPa abs			D402/02		
Distillate % (v/v) of total distillate up to 360 °C					
up to 190 °C	**vol %**	Report			
up to 225 °C	**vol %**	0-25			
up to 260 °C	**vol %**	0-40			
up to 316 °C	**vol %**	35-85			
Residue From Distillation to 360 °C (by difference)	vol %	80 min			
Viscosity @ 60 ℃ on residue from distillation	Pa.s	30 min	D4402		To replace penetration test
Spraying Temperature	°C	125 - 145			Guideline for applicators

PROPOSED SPECIFICATION OF MC 10 IN SABS 308

PROPERTY	UNITS	LIMITS	TEST METHOD		NOTE
			ASTM	Other	
Kinematic Viscosity @ 60 °C	cSt	10 - 20	D2170/01		Used by refineries only
Brookfield Viscosity @ 60 °C	mPa.s	***10 - 25***	D4402		•Added as note to specification •Used as field test
Flash Point	°C	38 min	D93		Safety requirement
Water, % by mass or vol		0.2 max			
Density at 20 ℃	kg/l	??	??		•Density at 60 ℃ •General rule of thumb is that 0.024 kg/l to be subtracted from density determined at 20 ℃ to get approximate density at 60 ℃
Distillation @ 101.325 kPa abs			**D402/02**		
Distillate % (v/v) of total distillate up to 360 °C					
up to 190 °C	**vol %**	**0-20**			
up to 225 °C	**vol %**	**20-70**			
up to 260 °C	**vol %**	**60-90**			
up to 316 °C	**vol %**	**80-100**			
Residue From Distillation to 360 °C (by difference)	vol %	40 min			
Viscosity @ 60 ℃ on residue from distillation	Pa.s	30 min	D4402		To replace penetration test
Spraying Temperature	°C	10 - 30			Guideline for applicators

Road Pavement Forum

9-10 November 2010

- **SANS 308 – Cutback Bitumen**

RPF APPROVAL OF PROPOSED AMMENDMENTS????

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9-10 November 2010

- **SANS 307 – Penetration Grade Bitumen**

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9-10 November 2010

International Specs:

- **USA**
- **CEN**

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9-10 November 2010

Penetration

PENETRATION RANGES IN CURRENT SANS 307-2005 SPECIFICATIONS

Penetration - RSA				ASTM D5			CEN: EN1426 (IP49)				
Grade	min	max	Target value	Single Operator precision dmm	Multi lab precision dmm	As per EN ISO 4259 4 X Multi Lab (ASTM) dmm	Repeatability (r) dmm	Reproducibility (R) dmm	4 X R (EN) dmm	Minimum Range (per CEN based on mid-range of current SANS spec)	CEN 12591
40/50	40	50	45	2	7	28	1.8	3.0	12	**35-50**	35 - 50
60/70	60	70	65	3	8	32	2.6	3.9	16	**50-70**	50 - 70
80/100	80	100	90	5	11	44	3.6	5.4	22	**70-100**	70 - 100
150/200	150	200	175	12	23	92	7.6	10.5	42	**150-200**	160 - 220

EN ISO 4259 "Determination and application of precision data in relation to methods of tests"

Penetration: Proposed amendment

Current range	Proposed range
40 – 50	35 – 50
60 – 70	50 – 70
80 – 100	70 – 100
150 – 200	150 - 200

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9-10 November 2010

Viscosity

VISCOSITY RANGES IN CURRENT SANS 307-2005 SPECIFICATIONS

Viscosity @ 60C				ASTM D5					
Grade	**min Pa.s**	**max Pa.s**	**Target value Pa.s**	**Single Operator (r) %**	**Multi lab (R) %**	4 X R (ASTM) Pa.s	**Possible Minimum Range (based on mid-range of current spec) Pa.s**	CEN12591:2009 equivalents (approx) minimum	AS 2008 (1997) minimum
40/50	220	400	310	3.50%	12.10%	150	**230-390**	225 (35/50) 175 (40/60)	260-380
60/70	140	250	195	3.50%	12.10%	94	**145-245**	145 (50/70)	140-200
80/100	75	150	112.5	3.50%	12.10%	54	**80-140**	90 (70/100)	-
150/200	30	60	45	3.50%	12.10%	22	**30-60**	30 (160/220)	40-60

Viscosity @ 135C									
40/50	0.27	0.65	0.46	3.50%	12.10%	0.22	**0.35-0.57**	0.36 (35/50) 0.31 (40/60)	-
60/70	0.22	0.45	0.34	3.50%	12.10%	0.16	**0.26-0.42**	0.28 (50/70)	-
80/100	0.15	0.40	0.28	3.50%	12.10%	0.13	**0.22-0.35**	0.22 (70/100)	-
150/200	0.12	0.30	0.21	3.50%	12.10%	0.10	**0.16-0.26**	0.13 (160/220)	0.2-0.3

EN ISO 4259 "Determination and application of precision data in relation to methods of tests"

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9-10 November 2010

•SANS 307 – Penetration/Softening Point based

Viscosity: Proposed amendments

- Slight “tightening” of limits

Bitumen Test Data Chart

- Propose to incorporate into specification.

Bitumen Test Data Chart

- Propose to incorporate into specification
- Penetration Index: No additional testing – only Pen & SP
- In case of “dispute” – alternative method – Pen determined @25 + 40 deg
- Setting of limits: -1,5 to +0,7 seems appropriate but could be widened to -2,0 to +1,0 ???

Dynamic Shear Rheometer (DSR)

- Performance grading
- Used more & more internationally
- Acceptability of G*/sin Δ ????
- Availability of apparatus locally
- Mandatory or “Report only”

Durability Requirement

- PAV ???
- Looking at local long term ageing test:

Rolling Cylinder Ageing Test/ Extended RTFOT??

Performance Grading System

- Compilation of a binder selection guide in progress
- Expansion of climatic data base being expanded
- Dependant on introduction of DSR

Road Pavement Forum

9-10 November 2010

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RPF APPROVAL OF PROPOSED AMMENDMENTS w.r.t

- **Penetration grades**
- **Viscosity limits**

Review of other binder types?

- **Modified binders**
- **Emulsions**

Review of other binder types?

Modified binders/Emulsions

- **Different role players!**
- **Reconvene appropriate RPF working group?**