

TII Standards Commission 2018

Updates to CC-SPW-00900 and CC-GSW-00900

Agenda

1. Updated documents
2. Changes made to the documents
3. Implications



Updated Documents

- CC-SPW-00900 – *Road Pavements – Bituminous Materials* – July 2022
- CC-GSW-00900 – *Notes for Guidance on the Specification for Road Works Series 900 – Road Pavements – Bituminous Bound Materials* – July 2022

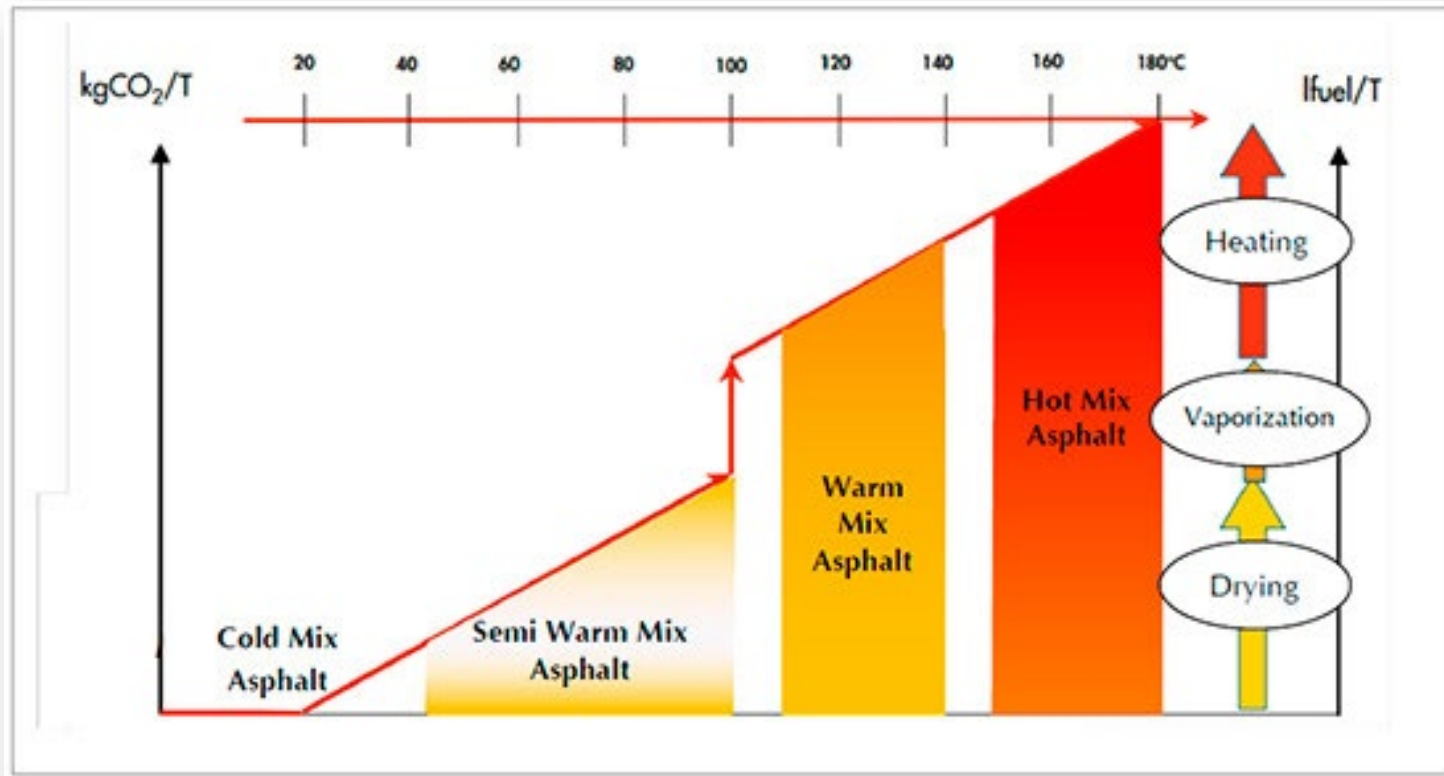


CC-SPW-00900

Road Pavements – Bituminous Materials – July 2022



Changes – Warm Mix Asphalt (WMA)



Changes – Warm Mix Asphalt (WMA)

- Definition of ‘Warm Mix Asphalt – WMA’ added,
- WMA additives **permitted** for use in Asphalt Concrete (AC) and Stone Mastic Asphalt (SMA),
- WMA additives **not permitted** for use in Hot Rolled Asphalt (HRA) and Porous Asphalt (PA),
- ‘WMA additives’ added to the non-exhaustive list of additives where permitted,
- Requirement to add the letter ‘W’ in the mixture designation after the binder, when a WMA additive is being used – example: SMA 10 surf 40/60 **W** des.,
- Additional requirement applicable to **all additives** to ensure reusability and recyclability of bituminous mixtures at their end of life.

Changes – Warm Mix Asphalt (WMA)

Table 8 Stone Mastic Asphalt – Product Composition and Properties

hEN reference	EN 13108 – 5 Stone Mastic Asphalt						
Table column reference	1	2	3	4	5	6	7
Layer	Binder	Binder	Binder	Surface	Surface	Surface	Surface
Mixture designation	SMA 14 bin des	SMA 10 bin des	SMA 6 bin des	SMA 14 surf des	SMA 10 surf des	SMA 14 surf des	SMA 10 surf des
Sieve Size	% by mass passing						
20	100			100		100	
14	90 to 100	100		90 to 100	100	90 to 100	100
10	35 to 60	90 to 100	100	35 to 60	90 to 100	35 to 60	90 to 100
6,3	20 to 45	30 to 55	90 to 100	20 to 45	30 to 55	20 to 45	30 to 55
4			22 to 45				
2	15 to 30	20 to 35	20 to 34	15 to 30	20 to 35	15 to 30	20 to 35
0,063	6 to 12	6 to 12	8 to 14	6 to 12	6 to 12	6 to 12	6 to 12
Binder content B_{min}¹							
Paving grade	5,6	5,8	6,0			5,6	5,8
PMB 65/105-60	5,4	5,6	5,8	5,6	5,8		
Binder grade							
40/60	✓	✓	✓			✓	✓
70/100	✓	✓	✓				
PMB 65/105-60	✓	✓	✓	✓	✓		
Additives							
Stabilising additives (fibres) % by mass	0,3 to 1,5	0,3 to 1,5	0,3 to 1,5			0,3 to 1,5	0,3 to 1,5
Properties							
Binder drainage ²	D _{0,3}	D _{0,3}	D _{0,3}	D _{0,3}	D _{0,3}	D _{0,3}	D _{0,3}
Air Void content minimum ²	V _{min 2,0}	V _{min 2,0}	V _{min 2,0}	V _{min 2,0}	V _{min 2,0}	V _{min 2,0}	V _{min 2,0}
Air Void content maximum ²	V _{max 8,0}	V _{max 8,0}	V _{max 8,0}	V _{max 5,0}	V _{max 5,0}	V _{max 5,0}	V _{max 5,0}
Water sensitivity ²	ITSR ₈₀	ITSR ₈₀	ITSR ₈₀	ITSR ₈₀	ITSR ₈₀	ITSR ₈₀	ITSR ₈₀
Resistance to permanent deformation ²	WTS _{AIR 1,0} PRD _{AIR 0,6}	WTS _{AIR 1,0} PRD _{AIR 0,6}	WTS _{AIR 1,0} PRD _{AIR 0,6}	WTS _{AIR 1,0} PRD _{AIR 0,6}	WTS _{AIR 1,0} PRD _{AIR 0,6}	WTS _{AIR 1,0} PRD _{AIR 0,6}	WTS _{AIR 1,0} PRD _{AIR 0,6}
Temperature of the mixture – maximum³							
40/60	190	190	190			190	190
70/100	180	180	180				
PMB 65/105-60	3	3	3	3	3		

¹ The minimum binder content, expressed as B_{min}, is corrected for FPC purposes to B_i in accordance with CC-GSW-00900, Clause 5.3.3.

² Test methods and test conditions contained in Table 19

³ Supplier Declared Value

⁴ Does not apply to Warm Mix Asphalts. The manufacturer's requirements for the Warm Mix Asphalt additive shall apply instead.

Temperature of the mixture – maximum ³			
40/60	190	190	190
70/100	180	180	180
PMB 65/105-60	3	3	3

Surface regularity						
Temperature of the mixture – minimum ⁴	Delivery	Rolling	Delivery	Rolling	Delivery	Rolling
40/60	130	100	130	100	130	100
70/100	125	90	125	90	125	90
PMB 65/105-60	145	115	145	115	145	115

Table 9 Stone Mastic Asphalt – Requirements of the Works

hEN reference	EN 13108 – 5 Stone Mastic Asphalt													
Table column reference	1	2	3	4	5	6	7							
Layer	Binder	Binder	Binder	Surface	Surface	Surface	Surface							
Mixture designation	SMA 14 bin des	SMA 10 bin des	SMA 6 bin des	SMA 14 surf des	SMA 10 surf des	SMA 14 surf des ²	SMA 10 surf des ²							
Alignment, levels, tolerances, thickness & regularity (mm)														
Horizontal alignment								See Clause 702						
Levels								See Clause 702						
Tolerances								± 6	± 6	± 6	± 6	± 6	± 6	± 6
Adjacent to surface water or linear drainage channel								+ 10 - 0	+ 10 - 0	+ 10 - 0	+ 10 - 0	+ 10 - 0	+ 10 - 0	+ 10 - 0
Layer thickness - nominal								30 to 60	20 to 50	15 to 40	35 to 50	25 to 50	35 to 50	25 to 50
Layer thickness - minimum								25	15	10	30	20	30	20
Surface regularity								see Clause 702						
Temperature of the mixture – minimum⁴	Delivery	Rolling	Delivery	Rolling	Delivery	Rolling	Delivery	Rolling	Delivery	Rolling	Delivery	Rolling		
40/60	130	100	130	100	130	100					130	100		
70/100	125	90	125	90	125	90								
PMB 65/105-60	145	115	145	115	145	115	145	115	145	115				
Properties														
Air voids minimum ¹	V _{min 2,0}	V _{min 2,0}	V _{min 2,0}											
Air voids maximum ¹	V _{max 8,0}	V _{max 8,0}	V _{max 8,0}											
Water sensitivity ¹	ITSR ₈₀	ITSR ₈₀	ITSR ₈₀	ITSR ₈₀	ITSR ₈₀	ITSR ₈₀	ITSR ₈₀	ITSR ₈₀	ITSR ₈₀	ITSR ₈₀	ITSR ₈₀	ITSR ₈₀		
Resistance to permanent deformation ¹	WTS _{AIR 1,3} PRD _{AIR 14,0}	WTS _{AIR 1,3} PRD _{AIR 14,0}	WTS _{AIR 1,3} PRD _{AIR 14,0}	WTS _{AIR 1,3} PRD _{AIR 14,0}	WTS _{AIR 1,3} PRD _{AIR 14,0}	WTS _{AIR 1,3} PRD _{AIR 14,0}	WTS _{AIR 1,3} PRD _{AIR 14,0}	WTS _{AIR 1,3} PRD _{AIR 14,0}	WTS _{AIR 1,3} PRD _{AIR 14,0}	WTS _{AIR 1,3} PRD _{AIR 14,0}	WTS _{AIR 1,3} PRD _{AIR 14,0}	WTS _{AIR 1,3} PRD _{AIR 14,0}		
Surface Macrotexture (mm) ¹														
Mandatory speed of traffic > 60km/hr														
Average per 1000m - minimum	na	na	na		1,3	1,1	1,3	1,1						
Average per 1000m - maximum	na	na	na		1,8	1,6	1,8	1,6						
Average for a set of 10 measurements - minimum	na	na	na		1,0	0,9	1,0	0,9						
Mandatory speed of traffic ≤ 60km/hr and roundabouts														
Average per 1000m - minimum	na	na	na		1,0 ²	1,0	1,0 ²	1,0						
Average per 1000m - maximum	na	na	na		1,8 ²	1,6	1,8 ²	1,6						
Average for a set of 10 measurements - minimum	na	na	na		0,9 ²	0,9	0,9 ²	0,9						

¹ Notes

² Test methods and test conditions contained in Table 20

³ These mixture designations shall not be permitted for use on roads carrying greater than 100 cv/lane/day

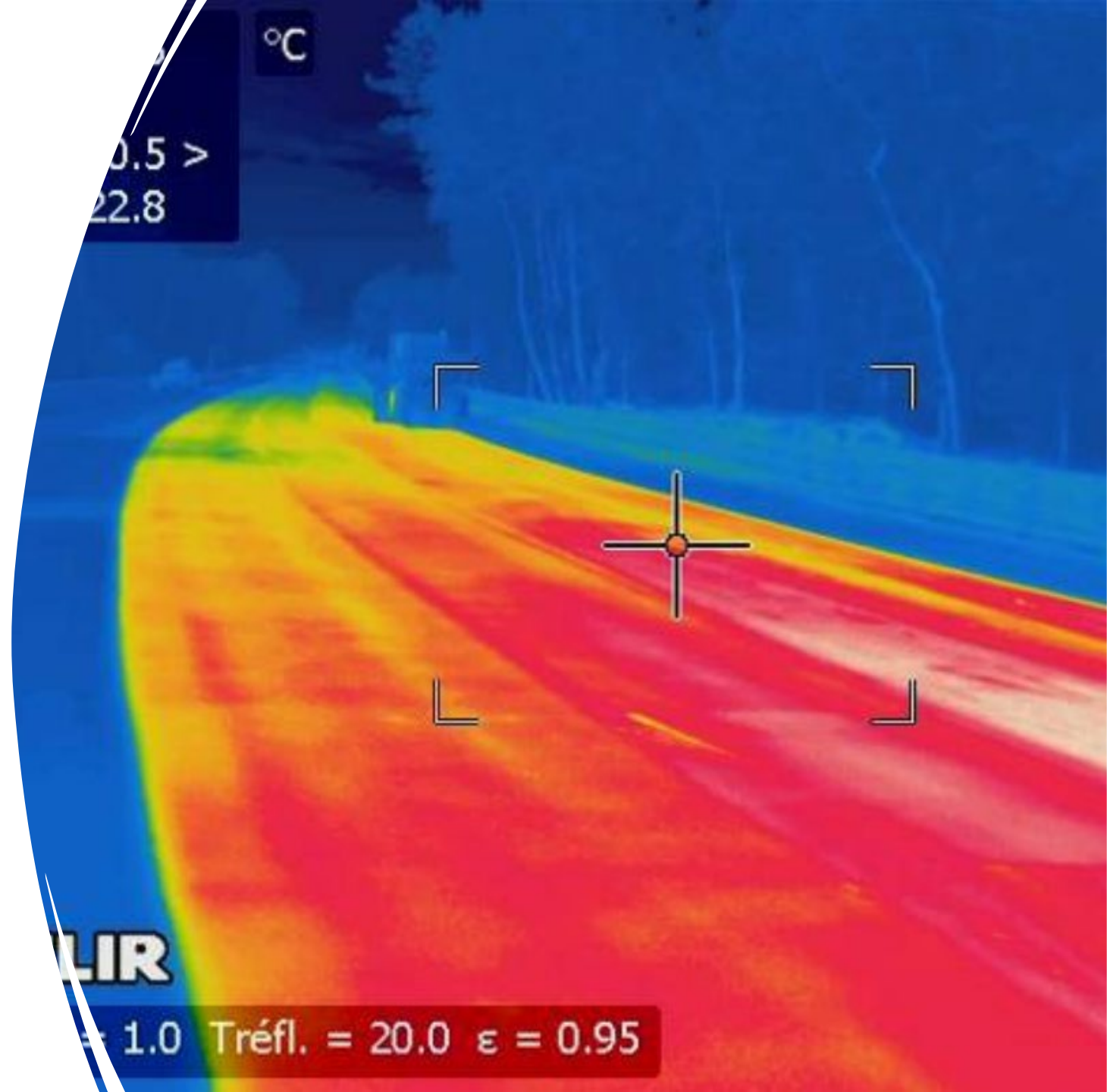
⁴ Restricted conditions apply, refer to DNI-PAV-03023

⁵ Does not apply to Warm Mix Asphalts. The manufacturer's requirements for the Warm Mix Asphalt additive shall apply instead.

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Implications – Warm Mix Asphalt (WMA)

- Opportunity for bituminous mixture producers to bring more sustainable materials to the market.
- Opportunity for specifiers and employers using bituminous mixtures to come up with more sustainable solutions.



Changes – Binder Content

- Changes brought in to align with S.R. 28 (2018),
- Addition and amendment of definitions linked to the binder:
 - input and output binder content,
 - minimum binder content,
 - minimum binder volume, and
 - optimum binder content,
- *The binder content shall be expressed in percentage by mass of the total mixture. The binder content shall be expressed to the nearest 0,1 % for FPC purposes.*
- Clarification on binder content specifications reflected in Tables 2, 5, 8 and 11.



Changes – Binder Content

This process ensures that a mixture made with a denser stone has a similar binder film thickness as a mixture made with a less dense stone.

An example is two aggregate particles of the same mass but different densities and therefore different volumes, the particle with the lower density will have a greater surface area and therefore will require more binder to coat the particle. Conversely the particle of a higher density will have less surface area and will require less binder to coat the particle.

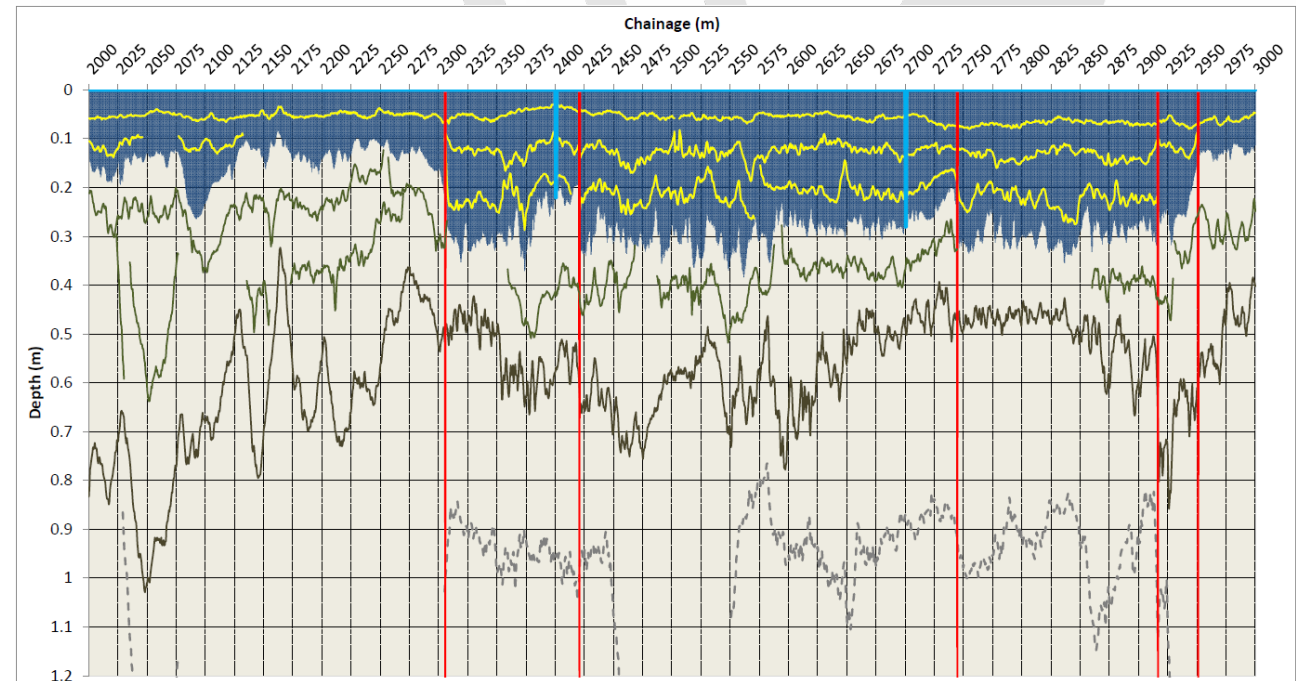


Implications – Binder Content

- Full alignment with S.R. 28 (2018) for all parties,
- Greater clarity on the various terms linked to binder content for all parties,
- Greater clarity for bituminous mixture producers when developing and declaring the performances of their materials,
- Greater clarity for specifiers and employers using bituminous mixtures when comparing and sourcing materials.

Changes – Compaction Control

- The use of a density gauge as an alternative to cores was introduced to demonstrate compliance with compaction control requirements in terms of air voids content.
- The strict requirement to demonstrate compliance with layer and combined layers nominal and minimum compacted thicknesses solely using cores has been eased to allow for other methods.



Implications – Compaction Control

- On any pavement work and in particular small ones, non intrusive compaction control techniques are now permitted.
- Contractors can use alternative methods to cores to demonstrate compliance with single and combined layers nominal and minimum thicknesses.

Changes – Resistance to Permanent Deformation

- Under some specific conditions, exemption to demonstrate compliance with resistance to permanent deformation requirements using cores is now permitted.



Implications – Resistance to Permanent Deformation

- On any pavement work and in particular small ones, non intrusive resistance to permanent deformation control techniques are now permitted.

Other Changes – for AC, HRA and SMA only

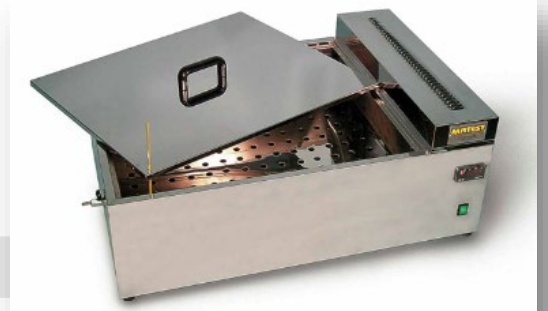
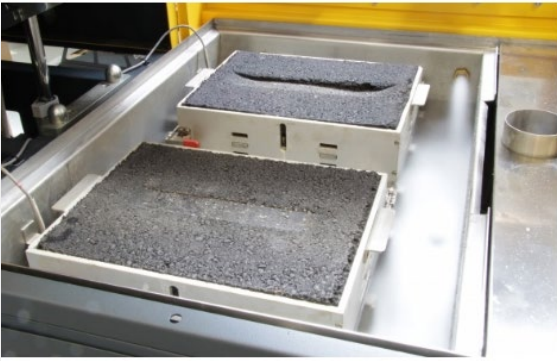
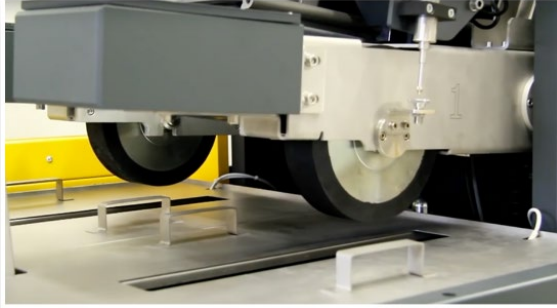
Table 6 Hot Rolled Asphalt – Requirements of the Work

hEN reference	EN 13108 – 4 Hot Rolled Asphalt						
Table column reference	1		2		3		
Layer	Surface		Surface		Surface		
Mixture designation	HRA 35/14F surf des		HRA 35/14C surf des		HRA 30/14F surf des		HRA
Alignment, levels, tolerances, thickness and regularity (mm)							
Horizontal alignment	See Clause 702						
Levels	See Clause 702						
Tolerances	± 6		± 6		± 6		
Adjacent to a surface water or linear drainage channel	+ 10 - 0		+ 10 - 0		+ 10 - 0		
Layer thickness - nominal	45		45		40		
Layer thickness - minimum	40		40		35		
Surface regularity	See Clause 702						
Temperature of the mixture – minimum	Delivery	Rolling	Delivery	Rolling	Delivery	Rolling	Delivery
40/60	155	110	155	110	155	110	155
PMB 65/105-60	2	2	2	2	2	2	2
Properties							
Air Void content ¹	$V_{max 11.0}$		$V_{max 11.0}$		$V_{max 11.0}$		
Resistance to permanent deformation ¹	$WTR_{AIR 23.0}$ $RD_{AIR 12.0}$		$WTR_{AIR 23.0}$ $RD_{AIR 12.0}$		$WTR_{AIR 23.0}$ $RD_{AIR 12.0}$		
Water sensitivity ¹	$ITSR_{80}$		$ITSR_{80}$		$ITSR_{80}$		
Surface Macrotexture (mm)¹							
Mandatory speed of traffic > 60km/hr							
Average per 400m – minimum	1,5		1,5		1,5		
Average per 400m – maximum	2,0		2,0		2,0		
Average per set of 10 measurements – minimum	1,2		1,2		1,2		
Minimum individual value per set of 10 measurements	1,0		1,0		1,0		
Maximum individual value per set of 10 measurements	2,3		2,3		2,3		
Number of individual values <1,2mm per set of 10 measurements	no more than three individual values < 1,2		no more than three individual values < 1,2		no more than three individual values < 1,2		no individual values < 1,2
Mandatory speed of traffic ≤ 60km/hr and all roundabouts							
Average per 400m – minimum	1,2		1,2		1,2		
Average per 400m – maximum	1,7		1,7		1,7		
Average per set of 10 measurements – minimum	1,0		1,0		1,0		
Minimum individual value per set of 10 measurements	0,8		0,8		0,8		
Maximum individual value per set of 10 measurements	2,0		2,0		2,0		
Number of individual values < 1,0mm per set of 10 measurements	no more than three individual values < 1,0		no more than three individual values < 1,0		no more than three individual values < 1,0		no individual values < 1,0
Notes							
¹ Test methods and test conditions contained in Table 20							
² Supplier Declared Value							
³ Refer to CC-SPW-02000 for HRA 0/2F use							

Table 6: Hot Rolled Asphalt – Requirements of the Works

hEN reference	EN 13108 – 4 Hot Rolled Asphalt						
Table column reference	1		2		3		
Layer	Surface		Surface		Surface		
Mixture designation	HRA 35/14F surf des		HRA 35/14C surf des		HRA 30/14F surf des		
Alignment, levels, tolerances, thickness and regularity (mm)							
Horizontal alignment	See Clause 702						
Levels	See Clause 702						
Tolerances	± 6		± 6		± 6		
Adjacent to a surface water or linear drainage channel	+ 10 - 0		+ 10 - 0		+ 10 - 0		
Layer thickness - nominal	45		45		40		
Layer thickness - minimum	40		40		35		
Surface regularity	See Clause 702						
Temperature of the mixture - minimum	Delivery	Rolling	Delivery	Rolling	Delivery	Rolling	Delivery
40/60	155	110	155	110	155	110	155
PMB 65/105-60	2	2	2	2	2	2	2
Properties							
Air Void content ¹	To be recorded		To be recorded		To be recorded		
Resistance to permanent deformation ¹	To be recorded		To be recorded		To be recorded		
Water sensitivity ¹	To be recorded		To be recorded		To be recorded		
Surface Macrotexture (mm)¹							
Mandatory speed of traffic > 60km/hr							
Average per 400m – minimum	1,5		1,5		1,5		
Average per 400m – maximum	2,0		2,0		2,0		
Average per set of 10 measurements – minimum	1,2		1,2		1,2		
Minimum individual value per set of 10 measurements	1,0		1,0		1,0		
Maximum individual value per set of 10 measurements	2,3		2,3		2,3		
Number of individual values <1.2mm per set of 10 measurements	no more than three individual values < 1.2		no more than three individual values < 1.2		no more than three individual values < 1.2		no more than three individual values < 1.2
Mandatory speed of traffic ≤ 60km/hr and all roundabouts							
Average per 400m – minimum	1,2		1,2		1,2		
Average per 400m – maximum	1,7		1,7		1,7		
Average per set of 10 measurements – minimum	1,0		1,0		1,0		
Minimum individual value per set of 10 measurements	0,8		0,8		0,8		
Maximum individual value per set of 10 measurements	2,0		2,0		2,0		
Number of individual values < 1.0mm per set of 10 measurements	no more than three individual values < 1.0		no more than three individual values < 1.0		no more than three individual values < 1.0		no more than three individual values < 1.0
Notes							

Other changes



- The requirement to assess and record the stiffness of AC during the works has been removed.
- Note to Table 19 – *Test Methods and Conditions – Products* amended to add the requirement on the method of compaction to ensure the resultant air void content of the specimens is within the range specified for the mixture.

Implications – Other changes

- Performance requirements added and removed to reflect best practices in the industry.

CC-GSW-00900

*Notes for Guidance on the Specification for Road Works Series 900 –
Road Pavements – Bituminous Bound Materials – July 2022*



Changes – Binder Content

- Changes brought in to align with S.R. 28 (2018) and provide guidance on changes made to CC-SPW-00900.
- Examples of calculations to convert the ‘input/output binder content’ to ‘the minimum binder content’ and vice versa.
- Guidance on the various types of binder content and which shall or may be reported where.
- The guidance on temperature has been moved, for each product, to its own clause to reflect the structure in CC-SPW-00900.

Changes – Binder Content – $B \leftrightarrow B_{min}$

The ' B_{min} ' can be calculated with Formula (1):

$$B_{min} = \frac{B \times \rho_a}{2,650}$$

and ' B ' can be calculated with Formula (2):

$$B = \frac{B_{min} \times 2,650}{\rho_a}$$

where

ρ_a is the apparent particle density of the aggregate mixture in Mg/m^3 ;

B is the binder content in % by mass; and

B_{min} is the binder content in % by mass where the aggregate density is assumed to be equal to 2,650 Mg/m^3 .

Changes – Binder Content – B ↔ B_{min}

Table 3.1

Example of calculations for varying aggregate densities from a defined 'B' value

			Requirement
B (input/output binder content)	ρ_a	B_{min}	B_{min} (CC-SPW-00900 Table 2 for AC 20 dense bin des)
4,8	2,550	4,6	4,8
	2,650	4,8	4,8
	2,750	5,0	4,8
<i>Note: The greyed-out cells highlight where the minimum binder content requirement is not met.</i>			

In the above example, where the density of the aggregate mixture is 2,550, the calculated B_{min} of 4,6% is below the Table 2 requirement of B_{min} 4,8%.

Table 3.2 contains an example of calculating B using Formula (2) above for an AC 20 dense bin des with a Binder Content B_{min} of 4.8%.

Table 3.2

Example of calculations for varying aggregate densities from a defined 'B_{min}' value

			Requirement
B_{min}	ρ_a	B (input/output binder content)	B_{min} (CC-SPW-00900 Table 2 for AC 20 dense bin des)
4,8	2,550	5,0	4,8
	2,650	4,8	4,8
	2,750	4,6	4,8

In the above example, where the density of the aggregate mixture is 2,750, the calculated binder content B of 4,6% is still compliant because the requirement for a B_{min} of 4,8% is still met.

Changes – Binder Content – Reporting

Table 3.3 below summarises in which documents, 'B' and 'B_{min}' shall or may be reported:

Table 3.3 Binder Content reporting requirements – TII Requirements

	'B'	'B_{min}'
Type Test Report	Shall be reported	Shall be reported
Declaration of Performance (DoP)	May be reported	Shall be reported
CE Marking Certificate	May be reported	Shall be reported

Implications – Binder Content

- Full alignment with S.R. 28 (2018) for all parties,
- Greater clarity on the various terms linked to binder content for all parties,
- Greater clarity for bituminous mixture producers when developing and declaring the performances of their materials,
- Greater clarity for specifiers and employers using bituminous mixtures when comparing and sourcing materials.



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Questions