

TII Standards Roadshow – May 2024

CC-SPW-00900 Road Pavements – Bituminous
Materials (October 2023)



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Transport Infrastructure Ireland

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CC-SPW-00900 Road Pavements – Bituminous Materials (October 2023)

- October 2023 updates promote sustainability in pavement material production and maintenance.
- Three focus areas:

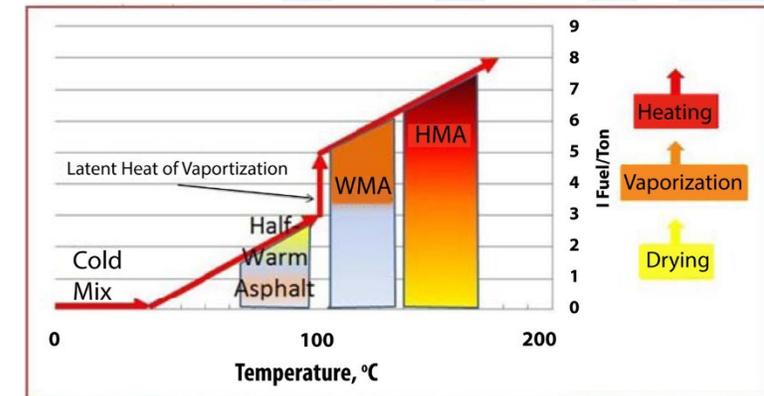
Reclaimed Asphalt (RA) re-use



Surface course preservation + life extension



Warm-mix asphalt – lowering energy consumption



Increasing allowable RA content

- Maximum Reclaimed Asphalt (RA) content – from 30% to 70% by mass
- Increased level of RA feedstock and mixture evaluation with increasing RA content
- Additional RA and mixture evaluation:

RA Characteristics	Mixture Design	Mixture from Works
Foreign Matter	Mixture binder penetration	Stiffness
Binder Type	Mixture binder softening point	Fatigue
Recovered binder penetration	Binder drainage	MIST
Recovered binder softening point	Stiffness	Dynamic Shear Rheometer
Aggregate grading	Fatigue	Falling Weight Deflectometer
Binder content		
Maximum RA particle size		
Cohesion Test		

Ensuring quality of the RA Feedstock - 9.2 Classification, Description and Requirements

Table 13b Requirements of the Reclaimed Asphalt Feedstock

Characteristic	RA content by mass of the mixture		
	≤20%	>20% and ≤50%	>50% and ≤70%
Source – mix group(s)	declared declared		
Foreign Matter	F ₁		
Binder type	Paving Grade or Polymer Modified	Paving Grade only	
Recovered Binder:			
Penetration	P ₁₅		
Penetration range ¹	Declared	<15	<10
Softening Point	Declared		
Grading of the Reclaimed Aggregate content	Declared declared		
Grading range ¹ % by mass of material:			
< 0.063mm	Declared	≤6	≤4
0.063mm to 2mm	Declared	≤16	≤12
≥ 2mm	Declared	≤16	≤12
Binder Content	Declared		
Binder Content range (% by mass)	Declared	≤1	≤0.8
Maximum size of RA particles U _{RA}	Declared		
Cohesion Test	Declared		

Notes

¹Range is defined as the difference between the maximum and minimum value from the set of values, as defined in EN13108-20, collected for a particular RA characteristic

Table 13a Assessment of the Reclaimed Asphalt Feedstock

Test	Reference in EN 13108-8	Test frequency by RA content by mass of the mixture			Test Method
		≤20%	>20% and ≤50%	>50% and ≤70%	
Source – mix group(s)	5.1	Declared	Declared	Declared	-
Foreign Matter	4.1	1 per 2000t	1 per 1000t	1 per 500t	EN 12697-42
Binder type	4.2.1	Declared	Declared	Declared	-
Binder recovered penetration ¹	4.2.2	1 per 2000t	1 per 1000t	1 per 500t	EN 12697-3 plus EN 1426
Binder recovered Softening Point	4.2.2	1 per 2000t	1 per 1000t	1 per 500t	EN 12697-3 plus EN 1427
Grading of the aggregate content	4.3	1 per 2000t	1 per 1000t	1 per 500t	EN 12697-2, Cl. 3.2.2
Binder content	4.4	1 per 2000t	1 per 1000t	1 per 500t	EN 12697-1 or 39
Maximum size of RA particles U _{RA}	4.5	1 per 2000t	1 per 1000t	1 per 500t	EN 933-1
Cohesion test	-	1 per 2000t	1 per 1000t	1 per 500t	Refer to CC-GSW-00900

Ensuring quality of the RA Feedstock - 9.3 Storage

"Reclaimed Asphalt Pavement and Reclaimed Asphalt feedstock protection and handling has a significant impact on the quality of the Reclaimed Asphalt and the resulting bituminous mixture"

- Guidance on the storage of Reclaimed Asphalt Pavement (RAP) and production of RA is provided in:
 - CC-SPW-00900, 9. Reclaimed Asphalt, 9.3. Storage
 - CC-GSW-00900 Notes for Guidance – Road Pavements – Bituminous Bound Materials

Records of RA characteristics to be recorded per RA feedstock:

- Data collection start and end date
- Recovered binder Softening Point
- Recovered binder Penetration
- Grading of the aggregate content (% by mass):
- Recovered Binder content (% by mass)
- Maximum size of RA particles
- Cohesion Test results

"Feedstock data sheet(s) shall be included in a mixture Type Test report where feedstock is a constituent of the mixture."

Ensuring quality of the mixture - 9.4 Mixture Design

- Blending formulas provided to assist with RA binder activity evaluation.
- Where RA content is >20% by mass further mixture evaluation is required:

Table 13c Mixture Design Evaluation when Reclaimed Asphalt is a Constituent

Characteristic	RA content by mass of the mixture			Test Method
	≤20%	>20% and ≤50%	>50% and ≤70%	
Recovered Penetration of mixture	n/a	To be reported		EN 12697-3 plus EN 1426
Recovered Softening Point of mixture	n/a	To be reported		EN 12697-3 plus EN 1427
Binder drainage	n/a	Maximum 0,3%		EN 12697-27
Stiffness ¹	n/a	To be reported		EN 12697-26:2018 Annex C IT-CY 20°C, 124ms
Fatigue ¹	n/a		To be reported	EN 12697-24:2018 Annex E, IT-CY at 20°C, 0.1Hz

Notes:

The above requirements are in addition to the product composition and properties requirements of Table 2.

¹ Refer to CC-GSW-00900 for further guidance on performance testing.

*"The penetration of the **combined virgin and recovered binder** shall be calculated as detailed below and shall fall within the permitted range for the mixture designation."*

*"the grade of the **combined Reclaimed Asphalt and Virgin Binder** added to the mixture shall be calculated using the formula below"*

$$a \log_{10}(\text{pen}_1) + b \log_{10}(\text{pen}_2) = (a + b) \log_{10}(\text{pen}_{\text{mix}})$$

Ensuring quality of the mixture - 9.5 Type Test Report

- Additional information is required on the TT report where RA content is a constituent of the mixture:
 - Percentage of Reclaimed Asphalt in the mixture
 - Reclaimed Asphalt binder content
 - Grade of the binder recovered from the Reclaimed Asphalt
 - Virgin Binder content added to the mixture
 - Grade of Virgin Binder added to the mixture
 - RA feedstock datasheets appended to the TT report

"Individual Type Test reports" shall be produced for each mixture, according to the quantity of Reclaimed Asphalt used".

Ensuring quality of the mixture - 9.6 Works Requirements

- Where RA forms part of the bituminous mixture, additional assessment of the Works is required:

Table 13d Additional Works Requirements when Reclaimed Asphalt is a Constituent

Characteristic	RA content by mass of the mixture			Test Frequency	Test Method
	≤20%	>20% and ≤50%	>50% and ≤70%		
Stiffness ^{1,2}	nr	to be reported		1 pair of 150mm diameter cores per 1000m laid	EN 12697-26:2018 Annex C, IT-CY 20°C, 124ms
Fatigue ^{1,2}	nr		to be reported	16 cores per project	EN 12697-24:2018 Annex E, IT-CY at 20°C, 0.1Hz
ITS Ratio with Moisture Induced Sensitivity Test (MIST) conditioning ¹	nr	to be reported		3 pairs of 100mm diameter cores per 1000m laid Minimum 3 pairs of cores per project less than 1000m in length	EN 12697-23 ASTM D7870/D7870M
Dynamic Shear Rheometer (DSR) ^{1,2}	nr	Complex shear modulus (G*) and phase angle (δ) to be reported		1 per project	EN 12697-3 plus EN 14770
Falling Weight Deflectometer ¹	nr		to be reported	At 50m station intervals in the left wheel path of each lane	AM-PAV-06050 CC-SPW-04008

Notes

The above requirements are in addition to the requirements of the works testing contained in Table 3

¹These tests form part of on-going research sponsored by Transport Infrastructure Ireland, the requirement is to make test results available to the Employer's Representative and the TII network management inspectorate

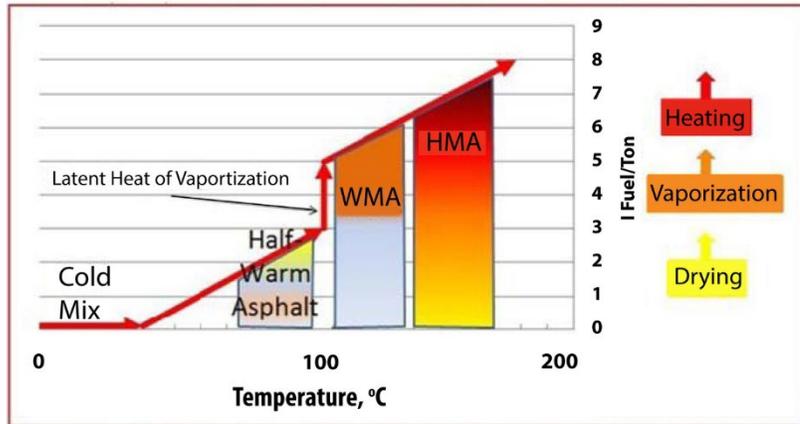
² Refer to CC-GSW-00900 for further guidance on performance testing

"Where Reclaimed Asphalt constitutes greater than 20% by mass of a bituminous mixture, additional works requirements shall be adhered"

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Warm-mix bituminous mixtures:

- Warm-mix additives allowed
- Mixture designation
- Minimum delivery and rolling temperatures



3.1 Mixture Designations

The mixture designations available are:

3.1.1	AC	32	dense	base	40/60	des
3.1.2	AC	32	dense	base	70/100	des
3.1.3	AC	32	HDM	base	40/60	des
3.1.4	AC	20	dense	bin	40/60	des
3.1.5	AC	20	dense	bin	70/100	des
3.1.6	AC	20	HDM	bin	40/60	des
3.1.7	AC	14	close	surf	70/100	des
3.1.8	AC	14	close	surf	160/220	des
3.1.9	AC	10	close	surf	70/100	des
3.1.10	AC	10	close	surf	160/220	des
3.1.11	AC	14	open	surf	70/100	des
3.1.12	AC	14	open	surf	160/220	des
3.1.13	AC	10	open	surf	70/100	des
3.1.14	AC	10	open	surf	160/220	des
3.1.15	AC	6	dense	surf	70/100	des
3.1.16	AC	6	dense	surf	160/220	des

"For mixtures produced with a WMA additive, the letter "W" shall be added to the mixture designation after the binder designation".

Example: "AC 32 dense base 40/60 W des".

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- Surface course preservations system requirements:
 - Surface texture
 - Softening point reduction
 - Penetration value reduction
 - **Provisional Type Approval Installation Trial**

1. Penetrative Treatments

- *These are solvent based and as such on application facilitate some penetration of the binder coating.*
- *They comprise a blend of bitumen and/or, hydrocarbon resins, diluents, plasticisers and may be fortified with natural based bitumen.*



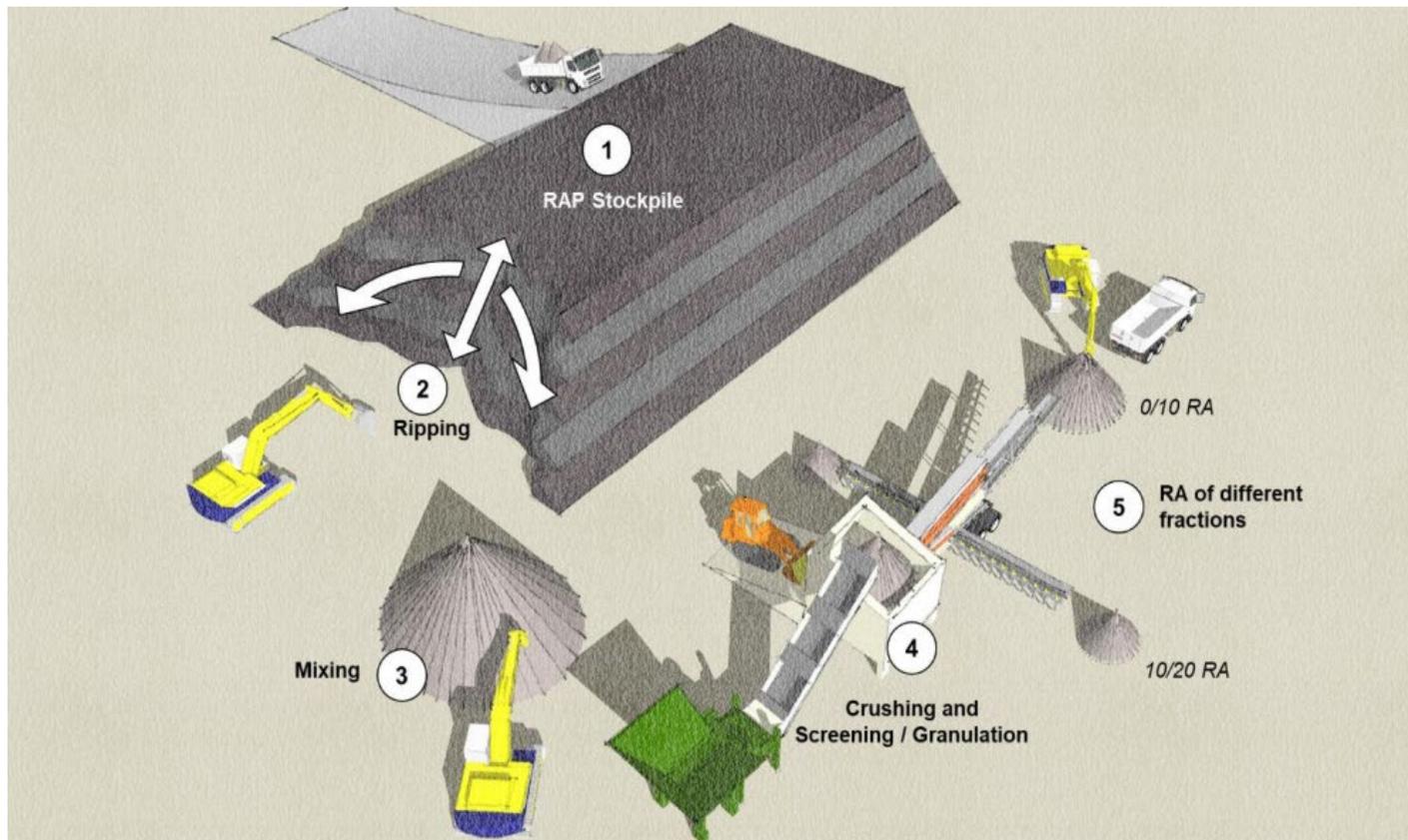
2. Non-Penetrative Treatments

- *These are bituminous emulsions.*
- *They comprise of proprietary blends of bitumen, polymers and other additives designed to seal and protect the road surface.*



CC-GSW-00900 Notes for Guidance

- CC-GSW-00900 also updated to support CC-SPW-00900
- Updates focus on guidance for:
 - Mixture performance evaluation – target values for fatigue and stiffness of mixtures



An example Reclaimed Asphalt feedstock datasheet is provided in Figure B9.1.

Reclaimed Asphalt Feedstock Data Sheet			
General Information			
Reclaimed Asphalt Designation:	eg. 40 RA 0/8		
Company:			
Stockpile Identification Number:			
Location:			
Storage / Protection:	Hardstanding	Fixed cover	Tarpaulin
	Yes / No	Yes / No	Yes / No
Data collection period:	From	To	
	DD/MM/YYYY	DD/MM/YYYY	
Reclaimed Binder Characteristics			
Polymer Modified Bitumen (PMB)?	Yes / No		
Other Additives?	Yes / No	Type	
Binder Content (%)	Average	Max	Min
	Penetration (mm)		
	Softening Point (°C)		
Aggregate Grading - (% by mass)	Average	Max	Min
	< 0.063mm		
	0.063mm to 2mm		
	≥ 2mm		
Reclaimed Asphalt Particle Size	Average	Max	Min
	Max. size of RA particle (U_{RA}) (mm)		
Cohesion Test - % retained ITS	Average	Max	Min
	@ 20°C		
	@ 70°C		
	@ 140°C		

Figure B9.1 Reclaimed Asphalt Feedstock Datasheet Example



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