

Billian UK Ltd Type Testing Laboratory Report



1.0 Introduction

Billian UK Limited approached PTS to determine the suitability of a recycled SMA with the addition of their pelletized bitumen as a binder course compliant with BS EN 13108

2.0 Laboratory Work

The material was heated to 155 deg C before being mixed and compacted in accordance with BS EN 12697-33. The mixed material was subsequently tested for Binder content and particle size distribution, Compactability, water sensitivity & resistance to permanent deformation (Wheel tracking).

3.0 Results Summary

A summary of the results is included in table 1. The results of the Analysis are reproduced in table 2.

Table 1

Test	Test Method	Result	
Water Sensitivity	BS EN 12697-12	ITSR %	93
Wheel tracking	BS EN 12697-22	WTS_{air}	0.094
		PRD_{air}	6.9%
		Mean Rut Depth	3.5mm
Gyratory Compaction	BS EN 12697-32	Voids @ 200 Gyration	2.3%

Table 2

Sieve	% Passing
16	100
14	97
10	68
6.3	51
4	45
2	36
1	28
0.5	21
0.063	11.0
Soluble binder content	6.1

3.1 Interpretation of results

There are currently no specification limits for water sensitivity and gyratory compaction, however it is widely accepted that an ITSR result of >75% is a good indicator of a material resistance to damaged caused by water. The results of the gyratory compaction give an indication of density a material can achieve; the current SROH document permits a maximum air void content of 10% and a minimum of 2% for a binder course material. The current limits for Wheel tracking in very high stressed areas in PD 6691 is WTS_{air} 1.0


A summary of results against current specifications, where appropriate, are listed in table 3.

Table 3

Test	Result	Limit	Reference
Wheel tracking	0.094	1.0	PD 6691 tb. B4
Gyratory compaction	2.3%	<10 and >2	SROH tb.S10.1
Water Sensitivity	93%	>75%	n/a

4.0 Conclusions

The results indicate that the material as supplied to PTS achieves all the performance criteria for use as a suitable binder course layer in all situations.

<p>Signed:</p> 	<p>Darren Foster</p> <p>Laboratory Manager</p>
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Date: 09/08/16

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Laboratory Test Report
 Wheel Tracking Small Device Procedure B BS EN 12697-22:2003

Project	AC14 Binder Course	Report No PTS1619-B-02-D-01
Client	Billian	
Client Address	Butterthwaite Business Park Butterthwaite Lane Ecclesfield	
Supplier/Source	Billian	
Date and Time of Sampling	28/07/2016	
Sampled By	D Foster	
Location Sample Taken From	Laboratory Produced	
Details of Lab Prepared Samples	Sample compacted in accordance with BS EN 12697-33	
Material Description	AC14 Binder Course	
Sample Certificate Supplied	Yes	
PTS Sample Number	A16-0742	
Date of Receipt	19/07/2016	
Date of Test	29-30/07/16	
Tested By	D Foster	

Equipment Type	Coopers Modified Small Device Wheeltracker	
Storage Temperature (oC)	60	
Target Test Temperature (0.1°C)	60	
Target Load Cycles (N) and Rut Limit	10,000 / 20mm	
Mean Specimen Thickness (mm)	50	
Method used for Density Determination (in accordance with BS EN 12697-6:2012)	Method D Dimensions	
Test Result	Specimens	
	1	2
PTS Sample Number	A16-0742	
Client Ref	AC14 Binder Course	
Date Laid	N/A	
Date of Production	28/07/2016	
Date Sampled	28/07/2016	
Location Information	N/A	
Bulk Density (Mg/m ³)	2.373	2.372
Date of Test	30/07/2016	29/07/2016
Time of Test	09:05	16:30
Sample Thickness (mm)	49.8	49.9
Specimen Age at Test (days)	2	1
Actual Test Temperature (Target ± 1°C)	60.2	60.1
Wheeltracking slope in air (mm/10 ³ load cycles)	0.0952	0.0927
Rut Depth at N Cycles (± 0.1mm)	3.3	3.6
Proportional Rut Depth at N Cycles (%)	6.6	7.2
Mean Wheeltracking Slope In Air (mm/10 ³ load cycles)	0.094	
Mean Rut Depth (mm)	3.5	
Mean Proportional Rut Depth at N Cycles (%)	6.9	

Comments, additions or exclusions from the method

Signed: 	(X)	D. Foster (Laboratory Manager)
	()	A. Collier (Pavements Supervisor)
	()	

Report Date: 31/07/2016

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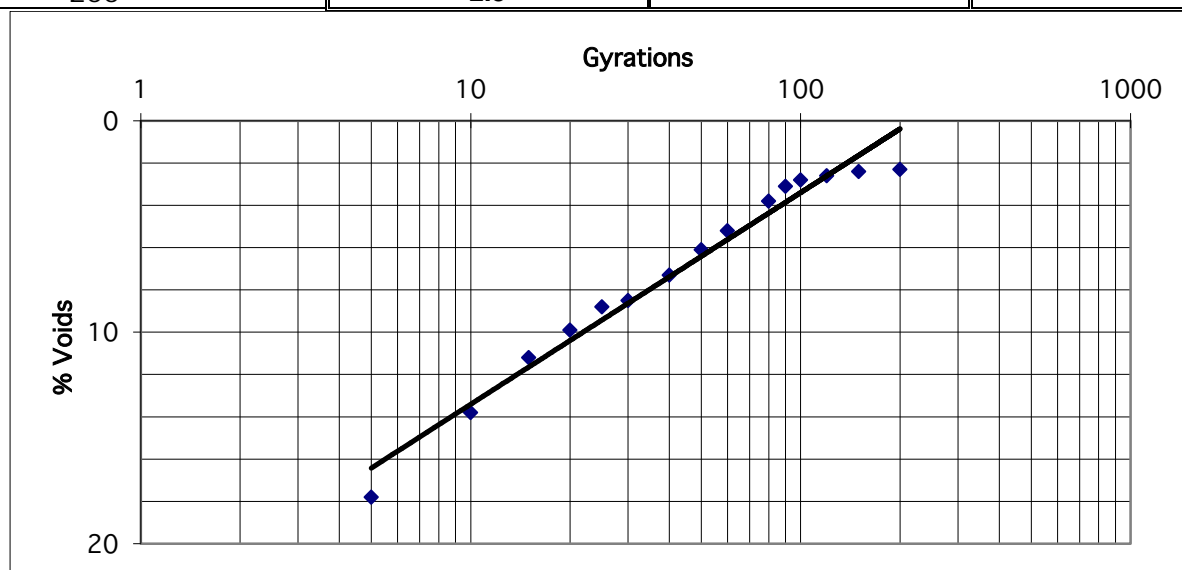
E: info@ptsinternational.co.uk



EN 12697-31:2007 Specimen preparation by gyratory compactor

Equipment Type	Vectra – PCG 3		
Project Number and Name	PTS1619-B-02-D-02		
Client	Billian		
Client Address	Butterthwaite Business Park Butterthwaite Lane Ecclesfield		
Material Supplier / Source	14mm SMA planings plus 1% Pellets		
Material Type / Specification	AC14 Binder Course		
Details of Lab prepared samples	Laboratory produced in Baustoff mixer		
Height of specimen	150mm	Speed of Rotation	30
Diameter of specimen	150mm	Angle of Inclination	55'
Test temperature	160 deg	Compaction Pressure	662 kPa

TEST RESULTS	Void contents		
	1	2	3
5	17.8		
10	13.8		
15	11.2		
20	9.9		
25	8.8		
30	8.5		
40	7.3		
50	6.1		
60	5.2		
80	3.8		
90	3.1		
100	2.8		
120	2.6		
150	2.4		
200	2.3		



Tested By:

D. Foster

Report Date:

31/07/2016

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Laboratory Test Report

**Soluble Binder Content (Pressure Filter) BS EN 12697-1:2012
 Particle Size Distribution BS EN 12697-2:2015**

Project	AC14 Binder Course	Report No:	PTS1619-B-02-D-03
Client	Billian		
Client Address	Butterthwaite Business Park Butterthwaite Lane Ecclesfield		
Supplier/Source	Aggregate Industries / Sheffield		
Date and Time of Sampling	28/07/2016		
Sampled By	Client		
Location Sample Taken From	Laboratory Mixed		
Material Description	AC14 Binder Course		
Client Ref	AC14 SMA Planings Plus 1% pellets		
Sample Certificate Supplied	No		
PTS Sample Number	742654		
Date of Receipt	17/07/2016		
Date of Test	31/07/2016		
Tested By	L Hughes		

Sieve Size (mm)	% Passing	Specification Limits (%)
40		
31.5		
20		
16	100	
14	97	
10	68	
8	57	
6.3	51	
4	45	
2	36	
1	28	
0.5	21	
0.25	16	
0.125	12	
0.063	11.0	

Binder Content (%)	Binder Specification	Aggregate Description /colour
6.1	n/a	n/a

Specification Used	n/a
Comments, Deviations, additions or exclusions from the method	

Signed: 	<input checked="" type="checkbox"/>	D. Foster (Laboratory Manager)
	<input type="checkbox"/>	A. Collier (Pavements Supervisor)
	<input type="checkbox"/>	

Report Date: 09/08/2016

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Laboratory Test Report
Determination of the Water Sensitivity of Bituminous Specimens
to BS EN 12697-12:2008 Method A

Project	AC14 Binder Course	Report No:	PTS1619-B-02-D-04
Client		Billian	
Client Address	Butterthwaite Bus. Pk. Butterthwaite Lane Ecclesfield		
Supplier/Source		Billian	
Date and Time of Sampling		28/07/2016	
Sampled By		PTS	
Location Sample Taken From		Laboratory	
Material Description	AC14 Binder Course		
Client Ref	AC14 SMA planing plus 1% Pellets		
Sample Certificate Supplied		No	
PTS Sample Number		A16-0742	
Date of Receipt		19/07/2016	
Date of Test		01/08/2016	
Tested By		D Foster	

Date Prepared	29/07/2016
Number of Specimens	6
Specimen Type	100mm
Test Temperature °C	25

Results			
Condition	Dry	Soaked	
Average Diameter mm	101	101	
Average Height mm	61	60	
Average Bulk Density Mg/m ³	2.317	2.306	
Average ITS kPa	1027	954	
ITSR %	92.9		
Failure Type Specimen 1	Combination	4	Combination
Failure Type Specimen 2	Combination	5	Combination
Failure Type Specimen 3	Combination	6	Combination

Comments, Deviations, additions or exclusions from the method

Signed: 	<input checked="" type="checkbox"/>	D. Foster (Laboratory Manager)
	<input type="checkbox"/>	A. Collier (Pavements Supervisor)
	<input type="checkbox"/>	

Report Date: 02/08/2016