

The European Standards for Asphalt

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Venue Briefing
Speakers Company

WELCOME

B510/ 1 / 1
QPA Representatives

- Bob Allen
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- John Harris
- John Lay
- Colin Loveday
- Malcolm Simms (Secretariat)
- Steve Southam
- Nick Toy
- Maurice White (Secretariat) – RETIRED !

Crash Bang Wallop !

- We are now a few months away from dropping all the asphalt standards that you use.
- European Standards for Asphalt will replace them in **January 2008!!!**
- All the laying standards, SHW, test methods change at the same time.

A Byte of History

- Construction Products Directive (CPD) **1989**
- First EN standard (cement) **2000**
- Bitumen Standards (EN12591) **2000**
- European Standards for Aggregates **2004**

Principles of European Standards

- Harmonisation of individual countries' specifications and test methods
- 27 Countries currently represented and bound to implement the ENs *(12 in 1989)*
- Elimination of barriers to trade!

BS EN's have greater authority/legal standing than current BS's!

Key Change

- British Standards left compliance as part of the contract
- The European Standard brings compliance and conformity in to the standard

It's a Family Affair

- The Family of Material Specifications
- The Family of Test Methods
- UK Guidance documents for both



The EN 13108 Family of Standards - Products

- **BS EN 13108-1 Asphalt Concrete**
- **BS EN 13108-2 Asphalt Concrete for Very Thin Layers**
- **BS EN 13108-3 Soft Asphalt (Nordic countries)**
- **BS EN 13108-4 Hot Rolled Asphalt**
- **BS EN 13108-5 Stone Mastic Asphalt**
- **BS EN 13108-6 Mastic Asphalt**
- **BS EN 13108-7 Porous Asphalt**



The EN 13108 Family of Standards - Constituents

BS EN 13108-8 Reclaimed Asphalt



The EN 13108 Family of Standards - Conformity

- **BS EN 13108-20 Type Testing**
- **BS EN 13108-21 Factory Production Control**



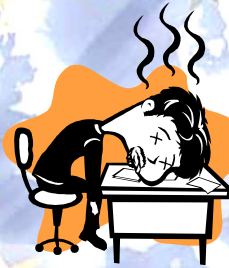
The Product Testing Standards

44 Standards covering the testing of
asphalt mixes!

The BS EN 12697 Family



And Breathe....



That was the Introduction !



The BS EN 13108 European Standards for Asphalt

- Scope
- References
- Terms and Definitions
- Constituent materials – binder, coarse/fine aggregate, added filler, reclaimed asphalt & additives
- Empirical and fundamental specifications



The European Standards for Asphalt

- Properties and other parameters – categories selected from tables
- Product identification
- Attestation of Conformity → EN 13108-20 and EN 13108-21 Initial Type Testing & FPC
- CE Marking



Important Differences

- ENs relate to the product....“In the back of the lorry”, but some properties are installation dependent (BS 594987)
- Target + Tolerance concept (introduced in BS 4987 & 594 in 2005)
- Some description changes - mixtures prefixed by an abbreviation of their type: AC, HRA, SMA e.g. SMA 14 surf 40/60
- CE MAP (more later)



Important Differences

- Provisions for the use of reclaimed asphalt – designated from EN 13108-8
- EME2 is IN !
- Some test method changes e.g. Wheeltracking – use method appropriate to material



Other Differences

- Mixtures are evaluated for Product Conformity against the “selected” properties within the EN.
- Product Conformity (Attestation of Conformity) is evidenced by CE Marking – akin to a product conformity certificate.



Other Differences

- The specification tolerances for grading and binder content are **NOT** included in the individual product standards - they sit within EN13108-21 (and PD6691).
- Target binder contents are adjusted according to the Relative Density of the aggregate combination used.
- Binder and filler contents are **NOT** adjusted to compensate for sampling bias



CE MAP

- Process for the Approval of CE Marked Asphalt Mixtures on Contracts
- **CE Marking and Approval Process**

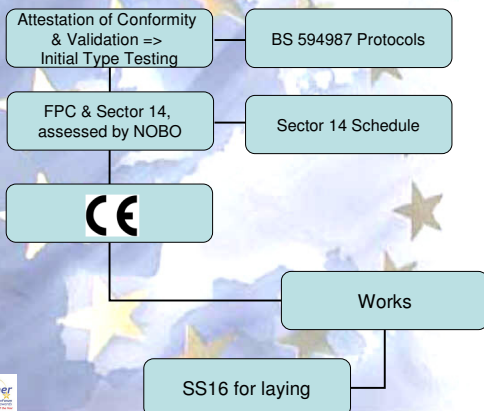


Which means ??

Before (typically):



But Now....



Evaluation of Conformity

- EN 13108-20 Type Testing
- EN 13108-21 Factory production Control

Type Testing

- Validation of constituents
- Declaration of composition
- Tests to validate every property being claimed for the mixture
- UK protocols found in BS 594987

N.B. Mixture specific!

Factory Production Control

- Schedule for operational quality system
- Tolerances and rules for consideration of analysis results
- Conformity criteria and test frequencies
- Similar to old Sector 14 schedule. Called up in new Sector 14 schedule.

CE MAP Methodology

- Select target grading and binder content from the tables in the annex in PD 6691
- Same approach as Clause 929
- Carry out Type Testing according to EN 13108-20 to prove target mix conformity



The Methodology (contd.)

- Apply FPC tolerances to the target composition to formulate the compliance specification
- Follow the FPC requirements to manufacture the product
- Scheme 14 will complement FPC requirements



The Methodology (contd.)

- Follow the FPC procedures to check conformity of the product supplied:
 - Conformity checked on single results
 - Determine Mean Deviation from target **[new and more onerous than SS14]**
- FPC (+ Sector 14) assessed by Notified Bodies (NoBo's) to enable producers to self-certify CE Mark



The Methodology (there's more !)

- The OCL is very similar to Q value
- OCL determines testing frequency



EN 13108-1 Asphalt Concrete for roads and other trafficked areas	
AC 16 surf 70/100 euro asphalt class S24	
General requirements = empirical requirements	
Void content ¹	V ^{max} 7,0 (7 %) – maximum V ^{min} 2,0 (2 %) – minimum
Minimum voids filled with bitumen ²	VFB min 60 (60 %)
Maximum voids filled with bitumen ³	VFB max 83 (82 %)
Voils in mineral aggregate ⁴	V _{MA} 14 (14 %)
Void content after 10 gyrations ⁵	V ₁₀ 10 (10 %)
Water sensitivity ⁶	W ₁₀ 50 (50 %)
Resistance to abrasion by studded tyres ⁷	T ₁₀ 40 (40 %)
Reaction to fire	Euroclass C5*
Temperature of the mixture	140 °C to 160 °C
Grading (passing)	1,4 C16 sieve 100 % C16 sieve 95 % C11,2 sieve 88 % 5,5 mm sieve 62 % 2 mm sieve 40 % 0,500 mm sieve 33 % 0,250 mm sieve 22 % 0,063 mm sieve 5,8 %
Blinder content	B min 6,0 (6,4 %)
Marshall values ⁸	S (Smin 7,5 kN) 10 kN P _{max} 4 mm F (Fmin 2 mm, Fmax 5 mm) 2,5 kN/mm Q (Q min 2,0 kN/mm) 2,5 kN/mm
Resistance to permanent deformation ⁹	P 5 (5 %) – Large size device: proportional rut depth – small size device: wheel tracking slope (%) proportional rut depth (%) sliding test conditions selected in accordance with EN 13108-20



WAKE UP AT THE BACK !!



The UK Guidance Documents

- **PD 6691 – the EN 13108 family of asphalt mixtures applicable to the UK**
- PD 6692 - the EN 12697 family of 44 standards covering the testing of asphalt mixtures.



PD 6691:2007

*Guidance on the use of BS EN 13108
“Bituminous Mixtures – Material specifications”*

The indispensable document for selection of an appropriate asphalt mixture for use in the UK.



Similarity and Familiarity

- PD6691 has been drafted in a format which is similar to BS 4987 & 594.
- PD6691 contains detailed guidance on EN13108 Parts 1, 4, 5 (material specific requirements), 20 & 21 (Attestation of Conformity)
- PD6691 Annexes contain stand-alone example specifications for all commonly used asphalt mixtures.



PD 6691:2007

- Relationship between BS standards and EN 13108 explained
- The UK approach to specification is empirical and uses where necessary Performance-related tests (E.g. Wheel Tracking)



PD 6691:2007

- **Binder content** - its expression and the method of calculation based on RD of aggregate – back calculation formula
- **Annexes** - give detailed information and guidance in the form of examples on Mixture specifications



PD 6691:2007

- **Use of Reclaimed asphalt**
 - Classification system used in EN 13108-8 for foreign matter and binder properties
 - Recommended maximum of 10% in S/C and 50% in Bases & Binder Courses
 - More than 10% in S/C & more than 20% in Bases and Binder Courses - recovered binder from the mixture - penetration testing




PD 6691:2007

- Additional detail used in the mixture designation to identify the grading characteristics - very important for Asphalt Concretes!
 - AC 32 dense base
 - AC 20 open bin
 - AC 14 close surf
 - AC 6 med surf
 - AC 6 fine surf



PD 6691:2007

- PSV of the aggregate **can** be used in the UK mixture designation - not mandatory in the EN's!!
 - AC 32 HDM base 40/60
 - AC 10 close surf 100/150 PSV60
 - HRA 35/14 surf 40/60 des
 - SMA 10 surf 40/60 PSV65



PD 6691:2007

Annexes - Mixture Specifications



- B - Asphalt Concrete
- C - Hot Rolled Asphalt (including PCC)
- D - Stone Mastic Asphalt



EN 13108-1 Limits for target grading


The fundamental differences between specifying using the European Standards and the UK method covered in BS and other documents.

Easier to understand from an example

EN 13108-1 Limits for target grading


D	4	6 (6,3)	8	10	12 (12,5)	14	16	20	32 (31,5)
Sieve	Passing sieve % by mass								
1.4D	100	100	100	100	100	100	100	100	100
D	90 - 100	90 - 100	90 - 100	90 - 100	90 - 100	90 - 100	90 - 100	90 - 100	90 - 100
2	50 - 85	15 - 72	10 - 72	10 - 60	10 - 55	10 - 50	10 - 50	10 - 50	10 - 50
0,063	5.0 - 17,0	2,0 - 15,0	2,0 - 13,0	2,0 - 12,0	2,0 - 12,0	0 - 12,0	0 - 12,0	0 - 11,0	0 - 11,0



EN 13108-1 Limits for target grading

32mm Asphalt Concrete

40mm	100
31,5mm	90 - 100
2mm	10 - 50
0,063mm	0 - 11,0



Example of a declared specification

AC 32 HDM bin 40/60

Test sieve mm	Target composition PD 6691 Annex B	Declared target grading/binder	Tolerances from EN 13108-21 Table A.1
40	100	100	-2 + 0
31,5	99 - 100	99	-9 + 5
20	80 - 86	82	± 9
6.3	52	52	± 9
2	27 - 33	28	± 7
0,250	11 - 15	12	± 5
0,063	8	8	± 3
Binder (Limestone Aggregate)	4,2	4,2	± 0,6



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0,250	11 - 15	12	± 5
0,063	8	8	± 3
Binder (Limestone Aggregate)	4,2	4,2	± 0,6



Example of a declared specification

AC 32 HDM bin 40/60

Test sieve mm	Target composition PD 6691 Annex B	Declared target grading/binder	Tolerances from EN 13108-21 Table A.1	Conformity specification
40	100	100	-2 + 0	98 - 100
31,5	99 - 100	99	-9 + 5	90 - 100
20	80 - 86	82	± 9	73 - 91
6.3	52	52	± 9	43 - 61
2	27 - 33	28	± 7	21 - 35
0,250	11 - 15	12	± 5	7 - 17
0,063	8	8	± 3	5,0 - 11,0
Binder (Limestone Aggregate)	4,2	4,2	± 0,6	3,6 - 4,8



Example of a declared specification

AC 32 HDM bin 40/60

Test sieve mm	Conformity specification
40	98 - 100
31,5	90 - 100
20	73 - 91
6.3	43 - 61
2	21 - 35
0,250	7 - 17
0,063	5,0 - 11,0
Binder (Limestone Aggregate)	3,6 - 4,8



Example of a declared specification

AC 32 HDM bin 40/60

Test sieve mm	Conformity specification
40	100
31,5	99 - 9 + 5
20	82 ± 9
6.3	52 ± 9
2	28 ± 7
0,250	12 ± 5
0,063	8,0 ± 3
Binder (Limestone Aggregate)	4,2 ± 0,6



Are we nearly there yet ?



Not long now....



Impacts Elsewhere

- Laying standards – Part 2's
- SHW
- Sector Schemes – 14 & 16
- HAPAS
- Laboratory Testing and Database Software



BS 594987 Transport and laying etc.

- Replaces Parts 2 of BS 594987
- Covers all EN 13108 asphalt mixes found in PD 6691
- Min and max compacted thicknesses
- Accuracy of finish
- Improved clarity on laying, joints etc



BS 594987 Transport and laying etc.

- Application of PCC
- Rates of spread
- Measurement of texture depth
- Compaction
- Sampling and testing for assessment of compacted asphalt



BS 594987 Transport and laying etc.

Informative Annexes:

Annex A

Delivery and rolling temperatures

Annex B

Rates of spread including HRA, SMA and EME2



BS 594987 Transport and laying etc.

Informative Type Testing protocols:

Annex C

DBM/HDM/HMB design voids (SHW 929)

Annex D

DBM/HDM/HMB resistance to permanent deformation (SHW 952)

Annex E

EME2 design and properties (TRL 636)



BS 594987 Transport and laying etc.

Annex F

Performance HRA properties (SHW 943)

Annex G

SMA binder course properties (SHW 937)

Annex H

HRA Surface course design (BS 598 Pt 107)



BS 594987 Transport and laying etc.

Annex I

Calibration and operation of indirect density gauges



BS 594987 Transport and laying etc.

BSI public comment process closed end of March, date of Publication 29 June 2007.



BS 594987 Transport and laying etc.

- BS 594987 is intended as the **BASELINE** document for all applications including :
 - roads
 - car parks
 - footways & cycleways
 - play areas
 - etc.



Specification for Highways Works

- Installation requirements above those in BS 594987 can still be called up by SHW
- 900 series being specifically reviewed to make it consistent with EN's and BS 594987



Sector Schemes

- The scope of FPC is narrower than SS14 and ISO 9001
- FPC comprises detailed requirements for the mechanics of production and conformity assessment
- Sector 14 calls up FPC and adds the full scope of ISO 9001



Sector Schemes

- For CE marking, SS14 Certification Body will need to be a Notified Body (NoBo) to assess Part 21 requirements
- Scheme 16 for Asphalt Laying
 - BS 594987 becomes the main Normative reference, otherwise – carry on as before



Other specifications

- HAPAS
- SAPCA
- Defence Estates
- BAA

All will need to be appropriately amended



What next?

- Publication of BS 594987 and PD 6691 29 & 30 June 2007
- **Educate and Train before Jan 2008!!
Well, YOU are here – spread the word.**
- Withdrawal of equivalent British Standards
- Guidance on www.qpa.org



What you need to do

- Read, engage with PD6691
- Become knowledgeable with the new product descriptions
- Visit the QPA website – download the bulletins



What you need to do +

- Translate your material specifications
- Look at the implications for current/ongoing contracts (transitional arrangements)
- Look at the implications of laying and compaction specification changes



What will industry do ?

- Turn our systems inside out
- We will support you through this change
- Try to make it simple for you
- We will look after proprietary materials
- Continue to supply you with a quality product



Remember, *the material doesn't change*
(but everything else does !)



ANY QUESTIONS ?

