

Guidance Notes

South Gloucestershire Council's (SGC) materials testing requirements are applicable on ALL highway works proposed for public adoption. Site specific testing regimes should be agreed with SGC dependant on the site conditions and materials used.

Materials Testing Contractors will be employed directly by the Developer (or contractor) and should hold all relevant UKAS accreditations for the tests to be undertaken. The preferred testing contractor shall be approved in principle by SGC where adoptable materials are concerned. Copies of the UKAS accreditations for chosen testing contractors will be required by SGC

Where Highway construction is intended for adoption by SGC, SGC will be provided with copies of all material testing results. The Developer will allow SGC to have direct dialogue with the UKAS testing contractor regarding testing and testing results.

Under the terms of the Highway Dedication (adoption) Agreement, SGC reserve the right to test any plant or materials at the Developer's expense. Failure to permit SGC access to copies of test certificates and permission to communicate directly with the chosen testing contractor will result in SGC invoking their rights under the terms of the dedication agreement. Failure to comply will result in SGC instructing a testing contractor of their own choice to re-test any materials and recover expenses from the Developer.

It is the responsibility of the Developer to ensure that all testing identified in the requirements is undertaken at the appropriate times and rates per tonnage.

In accordance with the requirements, the appointed testing contractor must be provided with appropriate notice to allow attendance to site for the purposes of sampling materials and the monitoring of placement and compaction where necessary.

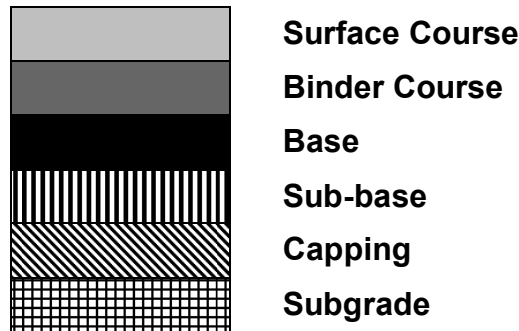
Failure to ensure that testing is being carried out in accordance with the requirements may result in Highway being deemed unacceptable for adoption.

The Developer/Contractor is to provide appropriate plant and labour for access and site testing as appropriate for example in the case of plate bearing testing, a suitable excavator and driver shall be available for use during the testing.

Material test certificates and reports will always be provided by the testing contractor to both Developer/Contractor and SGC regardless of the results, but it is the responsibility of the Developer/Contractor to agree the acceptance or rejection of materials with SGC.

Material Source Approval

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Basics

- Source approval is required on all capping materials, granular sub-bases, bituminous base courses, bituminous binder courses and bituminous surface course materials.
- All sampling and testing shall be carried out by a laboratory/contractor holding the current and relevant UKAS accreditations for each test type and material.
- Recycled aggregate will conform to the WRAP/EA Quality Protocol “Aggregates from inert waste” October 2013 ¹. The materials will be inert as defined by the QP and will need to be accompanied by the suppliers’ WRAP protocol documentation for each load of recycled aggregate.

All source approval testing must be carried out in accordance with the

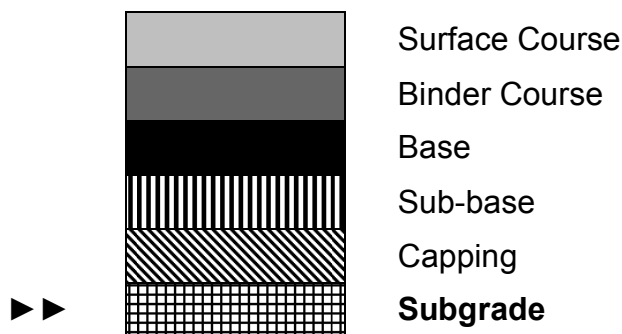
- Specification for Highway Works Volume 1,
- the relevant current BS/BS EN standards, and,
- the materials must comply with the requirements of the Council’s specification.

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Testing Requirements for Subgrade/Formation

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In Situ testing

Finished subgrade/formation level CBR Value determinations shall be conducted by in-situ CBR Tests (in accordance with BS1377: Part 9: 1990) or by in-situ Plate Loading Tests (in accordance with IAN 73/06 Revision 1 2009) or other method approved by SGC.

(CBR Value test method is determined by material type and size. Generally speaking; Sands/Clays <20mm size will be by CBR test; whereas material with >20mm present would require Plate Loading tests).

The required frequency of CBR Value tests is 1 per 25 linear metres or at the discretion of SGC.

Other in-situ testing may be required depending on site conditions. Additional tests may be requested, if deemed necessary by SGC. These could be as follows:

- In-situ permeability in accordance with BRE Digest 365 (Soil Infiltration Test)
- Redox potential in accordance with BS 1377 : Parts 3 or 9: 1990.
- Resistivity in accordance with BS 1377: Parts 3 or 9 : 1990.
- Handheld Dynamic Cone Penetration (DCP) testing in accordance with TRL PROJECT REPORT PR/INT/277/04.

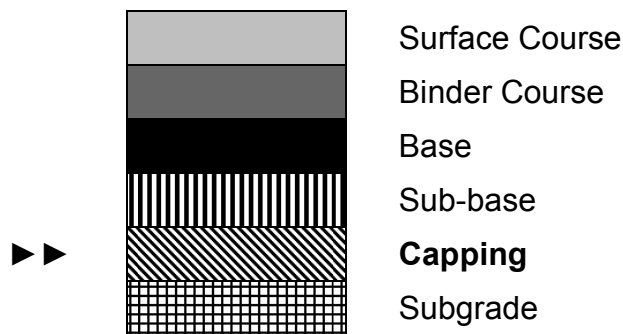
Laboratory testing

Moisture Content in accordance with BS1377 : Part 2: 1990

Mechanical & Physical properties of aggregates in accordance with BS EN 1097

Testing Requirements for Capping Materials

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In Situ Testing

On finished surfaces of capping layers in-situ Plate Loading Tests shall be conducted (in accordance with IAN 73/06 Revision 1 2009, Clause 7.14 - Empirical Relationship) or other method approved by SGC; at the rate of 1 per 25 linear metres. This will report an estimated CBR value

In-situ density testing by Nuclear Density Meter (NDM) and/or Sand Replacement Test (SRT) may be specified at the discretion of SGC.

On Site Sampling

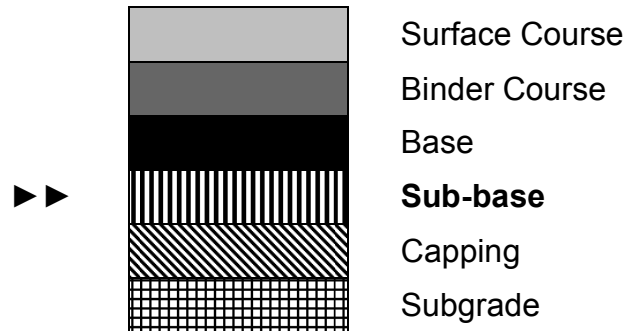
Sampling of capping material for laboratory analysis shall be carried out by an organisation approved by UKAS holding the relevant and current accreditation. Samples of granular Capping shall be taken at the minimum rate of **1 per 400 tonnes** of stockpiled / delivered material (**1 per 200 tonnes for recycled materials with WRAP/EA QP documents**) with a minimum of 2 samples per operation.

Laboratory testing

Source approval and routine laboratory testing will be carried out in accordance with the specification for highway works volume 1 series 600 table 6/1.

Testing Requirements for Sub-base Materials

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In Situ testing

On finished surfaces of capping layers in-situ Plate Loading Tests shall be conducted (in accordance with IAN 73/06 Revision 1 2009, Clause 7.14 - Empirical Relationship) or other method approved by SGC; at the rate of 1 per 25 linear metres. This will report an estimated CBR value

In-situ density testing by Nuclear Density Meter (NDM) and/or Sand Replacement Test (SRT) on the sub base layers will be carried out at the minimum rate of 1 test per 25 linear meters per compacted layer.

On Site Sampling

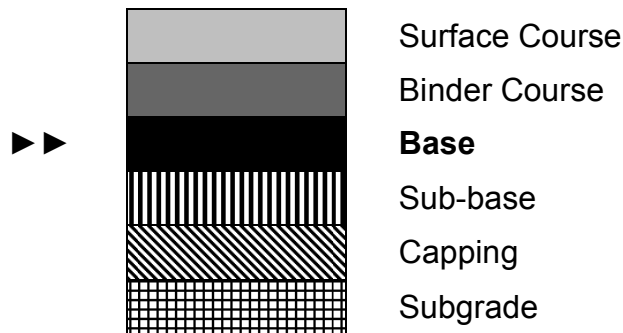
Sampling of capping material for laboratory analysis shall be carried out by an organisation approved by UKAS holding the relevant and current accreditation. Samples of granular sub base shall be taken at the minimum rate of **1 per 400 tonnes** of stockpiled / delivered material (**1 per 200 tonnes for recycled materials with WRAP/EA QP documents**) with a minimum of 2 samples per operation.

Laboratory testing

Source approval and routine laboratory testing will be carried out in accordance with the specification for highway works volume 1 series 800 : Clauses 801, 803, 804,805,806 and 807.

Testing Requirements for Base Materials

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Site monitoring

“In-hopper” delivery temperature and “exit screed” rolling temperature readings in accordance with BS EN 12697-13:2000.

A record will be made of

- the type and number of compaction plant used during the work together with
- rolling patterns, joint cutting /painting.
- Records will be made of bond coat application and weather conditions.
- Records of substrate conditions will be noted prior to and during laying/working time.
- Laying techniques and delivery ticket information from every load will be recorded

Representative samples will be taken in accordance with EN 12697-27 : 2001 at a rate of **one per 80 tonne** laid for all base courses.

In Situ testing

Compaction checks as per clause 929 of the Specification for Highway Works and BS 594987 2007 for compaction control by Nuclear Density Meter Testing and/or in-situ Bituminous Coring.

Laboratory testing

In-situ and Refusal Air Voids determined in accordance with BS EN 126978:2003.

Reference/Refusal Density/Percentage Refusal Density in accordance with BS EN 12697- 9:2002

Determination of Bulk Density to BS EN 12697- 6:2012

Testing Requirements for Base Materials

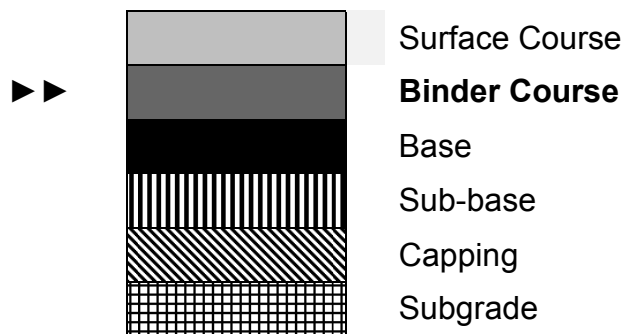
Base Materials..... cont

Determination of Maximum Density in accordance with BS EN 12697-5 : 2009
CLAUSE 9.2

Soluble binder and mineral aggregate particle size distribution in accordance with
BS EN 12697-1: 2012 (Clause B.1.4.3 & B.2.2) & BS EN 12697-2 : 2002

Testing Requirements for Binder Materials

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Site monitoring

“In-hopper” delivery temperature and “exit screed” rolling temperature readings in accordance with BS EN 12697-13:2000.

- A record will be made of the type and number of compaction plant used during the work together with rolling patterns, joint cutting /painting.
- Records will be made of bond coat application and weather conditions.
- Records of substrate conditions will be noted prior to and during laying/working time.
- Laying techniques and delivery ticket information from every load will be recorded

Representative samples will be taken in accordance with EN 12697-27 : 2001 at a rate of **one per 80 tonne** laid for all binder courses.

In Situ testing

Compaction checks as per clause 929 of the Specification for Highway Works and BS 594987 2007 for compaction control by Nuclear Density Meter Testing and/or In-situ Bituminous Coring.

Surface regularity will be checked using a Rolling Straight Edge (as per TRL SR 290).

Laboratory testing

¶In-situ and Refusal Air Voids determined in accordance with BS EN 126978:2003.

Reference/Refusal Density/ Percentage Refusal Density in accordance with BS EN 12697- 9:2002

Testing Requirements for Binder Materials

Binder Course Materials..... cont.

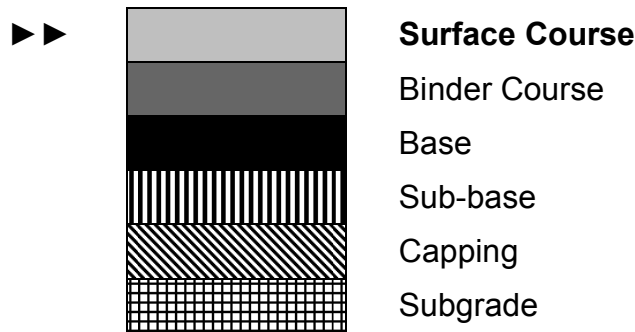
Determination of Bulk Density to BS EN 12697- 6:2012

Determination of Maximum Density in accordance with BS EN 12697-5 : 2009
CLAUSE 9.2

Soluble binder and mineral aggregate particle size distribution in accordance with
BS EN 12697-1: 2012 (Clause B.1.4.3 & B.2.2) & BS EN 12697-2 : 2002

Testing Requirements for Surface Course Materials

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Site monitoring

“In-hopper” delivery temperature and “exit screed” rolling temperature readings in accordance with BS EN 12697-13:2000.

- A record will be made of the type and number of compaction plant used during the work together with rolling patterns, joint cutting /painting.
- Records will be made of bond coat application and weather conditions.
- Records of substrate conditions will be noted prior to and during laying/working time.
- Laying techniques and delivery ticket information from every load will be recorded

Representative samples will be taken in accordance with EN 12697-27 : 2001 at a rate of **one per 60 tonne** laid for all surface courses.

In Situ testing

Surface regularity will be checked using a Rolling Straight Edge (as perTRL SR 290).

Surface Texture Depth checks will be carried out in accordance with BS 598: Part 105: 2000(Sand Patch) and in case of doubt using Glass Beads to BS EN 13036-1:2002

Compaction checks if required by Nuclear Density Meter Testing (more commonly applicable to Base and Binder layers).

Testing Requirements for Surface Course Materials

Surface Course Materials..... cont.

Laboratory testing

Determination of Maximum Density in accordance with BS EN 12697-5 : 2009
CLAUSE 9.2 (more commonly applicable to Base and Binder layers).

Soluble binder and mineral aggregate particle size distribution in accordance with
BS EN 12697-1 : 2012 (Clause B.1.4.3 & B.2.2) & BS EN 12697-2 : 2002