BRITISH STANDARD

BS EN
12697-27:2001

Bituminous mixtures — Test methods for hot mix asphalt —

Part 27: Sampling

The European Standard EN 12697-27:2000 has the status of a British Standard

ICS 93.080.20

National foreword

This British Standard is the official English language version of EN 12697-27:2000.

The UK participation in its preparation was entrusted by Technical Committee B/510, Road materials, to Subcommittee B/510/1, Coated macadam and hot mix asphalt, which has the responsibility to:

— aid enquirers to understand the text;

— present to the responsible European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;

— monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this subcommittee can be obtained on request to its secretary.

Cross-references

The British Standards which implement international or European publications referred to in this document may be found in the BSI Standards Catalogue under the section entitled "International Standards Correspondence Index", or by using the "Find" facility of the BSI Standards Electronic Catalogue.

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Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 19 and a back cover.

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Bituminous mixtures — Test methods for hot mix asphalt — Part 27: Sampling

Mélanges bitumineux — Essais pour enrobés à chaud — Patie 27: Echantillonnage

Asphalt — Prüfverfahren für Heißasphalt — Teil 27: Probenahme

This European Standard was approved by CEN on 24 November 2000.

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EUROPÄISCHES KOMITEE FÜR NORMUNG

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Contents

Foreword

This European Standard has been prepared by Technical Committee CEN/TC 227, Road materials, the Secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2001, and conflicting national standards shall be withdrawn at the latest by August 2005.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom

This European Standard is one of a series of standards as listed below:

EN 12697-1, *Bituminous mixtures — Test methods for hot mix asphalt — Part 1: Soluble binder content*

prEN 12697-2:1998, *Bituminous mixtures — Test methods for hot mix asphalt — Part 2: Particle size distribution*

EN 12697-3, *Bituminous mixtures — Test methods for hot mix asphalt — Part 3: Binder recovery: Rotary evaporator*

EN 12697-4, *Bituminous mixtures — Test methods for hot mix asphalt — Part 4: Binder recovery: Fractionating column*

prEN 12697-5:1996, *Bituminous mixtures — Test methods for hot mix asphalt — Part 5: Determination of the maximum density*

prEN 12697-6:1996, *Bituminous mixtures — Test methods for hot mix asphalt — Part 6: Determination of bulk density of bituminous specimen by hydro-static method*

prEN 12697-7:1996, *Bituminous mixtures — Test methods for hot mix asphalt — Part 7: Determination of bulk density of bituminous specimens by gamma rays*

prEN 12697-8:1996, *Bituminous mixtures — Test methods for hot mix asphalt — Part 8: Determination of the air voids content of bituminous materials*

prEN 12697-9:1997, *Bituminous mixtures — Test methods for hot mix asphalt — Part 9: Determination of the reference density, gyrator compactor*

prEN 12697-10:1996, *Bituminous mixtures — Test methods for hot mix asphalt — Part 10: Compactibility*

prEN 12697-11:1999, *Bituminous mixtures — Test methods for hot mix asphalt — Part 11: Determination of the affinity between aggregate and bitumen*

prEN 12697-12:1999, *Bituminous mixtures — Test methods for hot mix asphalt — Part 12: Determination of the water sensitivity of bituminous specimens*

EN 12697-13, *Bituminous mixtures — Test methods for hot mix asphalt — Part 13: Temperature measurement*

EN 12697-14, *Bituminous mixtures — Test methods for hot mix asphalt — Part 14: Water content*

prEN 12697-15:1997, *Bituminous mixtures — Test methods for hot mix asphalt — Part 15: Determination of the segregation sensitivity of bituminous mixtures*

prEN 12697-16:2000, *Bituminous mixtures — Test methods for hot mix asphalt — Part 16: Abrasion by studded tyres*

prEN 12697-17, *Bituminous mixtures — Test methods for hot mix asphalt — Part 17: Particle loss of specimen*

prEN 12697-18:1997, *Bituminous mixtures — Test methods for hot mix asphalt — Part 18: Binder drainage from porous asphalt*

prEN 12697-19:2000, *Bituminous mixtures — Test methods for hot mix asphalt — Part 19: Permeability of specimen*

prEN 12697-20:1999, *Bituminous mixtures — Test methods for hot mix asphalt — Part 20: Indentation using cube or Marshall specimens*

prEN 12697-21:1999, *Bituminous mixtures — Test methods for hot mix asphalt — Part 21: Indentation using plate specimens*

prEN 12697-22:1999, *Bituminous mixtures — Test methods for hot mix asphalt — Part 22: Wheel tracking*

prEN 12697-23:1999, *Bituminous mixtures — Test methods for hot mix asphalt — Part 23: Determination of the indirect tensile strength of bituminous specimens*

prEN 12697-24:1999, *Bituminous mixtures — Test methods for hot mix asphalt — Part 24: Resistance to fatigue*

prEN 12697-25, *Bituminous mixtures — Test methods for hot mix asphalt — Part 25: Dynamic creep test*

prEN 12697-26:1999, *Bituminous mixtures — Test methods for hot mix asphalt — Part 26 Stiffness*

EN 12697-27, *Bituminous mixtures — Test methods for hot mix asphalt — Part 27: Sampling*

EN 12697-28, *Bituminous mixtures — Test methods for hot mix asphalt — Part 28: Preparation of samples for determining binder content, water content and grading*

prEN 12697-29:1996, *Bituminous mixtures — Test methods for hot mix asphalt — Part 29: Determination of the dimensions of bituminous specimen*

prEN 12697-30:2000, *Bituminous mixtures — Test methods for hot mix asphalt — Part 30: Specimen preparation, impact compactor*

prEN 12697-31:2000, *Bituminous mixtures — Test methods for hot mix asphalt — Part 31: Specimen preparation, gyratory compactor*

prEN 12697-32:1997, *Bituminous mixtures — Test methods for hot mix asphalt — Part 32: Laboratory compaction of bituminous mixtures by a vibratory compactor*

prEN 12697-33:1999, *Bituminous mixtures — Test methods for hot mix asphalt — Part 33: Specimen preparation, slab compactor*

prEN 12697-34:1999, *Bituminous mixtures — Test methods for hot mix asphalt — Part 34: Marshall test*

prEN 12697-35, *Bituminous mixtures — Test methods for hot mix asphalt — Part 35: Laboratory mixing*

prEN 12697-36:1996, *Bituminous mixtures — Test methods for hot mix asphalt — Part 36: Method for the determination of the thickness of a bituminous pavement*

prEN 12697-37:1999, *Bituminous mixtures — Test methods for hot mix asphalt — Part 37: Hot sand test for the adhesivity of binder on precoated chippings for HRA*

prEN 12697-38, *Common equipment and calibration*

The applicability of this European Standard is described in the product standards for bituminous mixtures.

No existing European Standard is superseded.

1 Scope

This European Standard describes test methods for sampling bituminous mixtures for roads and other paved areas to determine their physical properties and composition.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 58, *Sampling bituminous binders.*

prEN 13108-6:2000, *Bituminous mixtures — Material specifications — Part 6: Mastic asphalt.*

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions in EN 58 and the following apply:

3.1
increment
single quantity of material taken from a larger body of the material under examination

3.2
bulk sample
sample obtained when increments from the material being sampled are combined to provide sufficient material for all required purposes

3.3
representative sample
sample consisting of a specified number of increments purposely taken to represent a specific quantity or area of material

NOTE A representative sample is assumed to have the same composition as the material sampled, within the limits of precision associated with the method of sampling.

3.4
spot sample
sample of material taken in a single operation at a single place and time of the material being sampled

NOTE If it can be assumed that the material is homogeneous, a spot sample can be regarded as an average sample. If the material is not homogeneous, a spot sample only can be regarded as representative of a limited region around the sampling point.

3.5
laboratory sample
sample despatched to the laboratory

NOTE It may be the whole or part of the bulk or representative sample and should be of sufficient quantity for all tests required.

4 Methods of obtaining bulk samples from all materials except coated chippings

4.1 Sampling from a lorry load of material

4.1.1 Apparatus

Sampling shovel (such as that shown in Figure 1) or sampling scoop (such as that shown in Figure 2) for materials whose nominal size is 16 mm and smaller.

4.1.2 Procedure

4.1.2.1
Using a sampling shovel or scoop, take a minimum of four increments of approximately 3 kg each for material containing aggregate of nominal size smaller than 16 mm.

4.1.2.2
Using a sampling shovel, take a minimum of four increments of approximately 7 kg each for material containing aggregate of nominal size larger than 16 mm.

4.1.2.3
Take the increments from about 100 mm below the surface of the material from different positions as widely spaced as practicable but not closer than 300 mm from the side of the lorry. Remove all the surface material including any coarse material that may fall into the hole during sampling.

4.1.2.4
Combine the increments obtained to form the bulk sample.

NOTE 1 The number of increments specified is a minimum and more may be necessary in some circumstances.

NOTE 2 With some less cohesive materials the use of a metal plate, pushed into the material to facilitate digging 100 mm down is recommended to stop surface material falling into the hole.

NOTE 3 The advantages of this method are as follows:

- there is only a small risk to sampler's personal safety;
- sampling is easy to perform;
- no special equipment is needed.

The disadvantages of this method are as follows:

- there is a risk of an unrepresentative sample due to segregation during loading and haulage;
- there is uncertainty about the precise location of material when laid in the pavement;
- the sample is taken from a limited quantity of material.

4.2 Sampling mastic asphalt during discharge from a mixer transporter

4.2.1 Apparatus

4.2.1.1
Sampling shovel (such as that detailed in Figure 1).

NOTE A bucket shall not be used because of the risk of settlement of the largest aggregates during the collection operation dependant on mixture consistency.

4.2.1.2
Suitable moulds.

4.2.2 Procedure

Take two increments at the outlet shute of the mastic asphalt vessel after discharging one third of the mastic asphalt and immediately use these with a mould to form a slab of a size sufficient to meet the minimum required by prEN 13108-6:2000.

NOTE 1 To facilitate easy removal from the mould either:

- line the mould with silicon paper, aluminium, teflon or similar; or
- lightly paint the mould with a slurry of limestone filler mixed with water, soda oleate or similar.

NOTE 2 Avoid sampling the first and last material discharged unless the purpose of sampling is to examine this particular part of the discharge.

NOTE 3 The advantages of this method are as follows:

- an individual batch can be sampled;
- material is immediately available for testing for control of production;
- observation of material can detect gross errors.

The disadvantages of this method are as follows:

- special equipment is required;
- there is uncertainty of the precise location of the material when laid in the pavement.

4.3 Sampling from the material around the augers of the paver

4.3.1 Apparatus

Sampling shovel (such as that shown in Figure 1).

4.3.2 Procedure

4.3.2.1
Using a sampling shovel take two increments of approximately 7 kg from each side of the paver, a total of four increments. Take increments only when augers are charged throughout their length. Take the increment by pushing the shovel into the charge of material in front of the auger and removing it when full.

4.3.2.2
Combine the increments obtained to form the bulk sample.

NOTE 1 Where easy access is obstructed by structural members of the paver, a sampling shovel blade fitted with a suitable handle approximately 2 m long may be used.

NOTE 2 The advantages of this method are as follows:

- there is certainty of the location of the material in the pavement;
- there is no interruption to paving operations;
- sampling is easy to perform;
- no special equipment is needed.

The disadvantages of this method are as follows:

- there is risk of segregation at the ends of the paver augers;
- there is risk of segregation if the auger box is not correctly filled;
- there is risk to the sampler's personal safety;
- the method is only applicable when the material is accessible from both sides of the paver.

4.4 Sampling of workable material in heaps

4.4.1 Apparatus

Sampling shovel (such as that shown in Figure 1) or scoop (such as that shown in Figure 2).

4.4.2 Procedure

4.4.2.1
Using a sampling shovel or scoop, take a minimum of four increments of approximately 3 kg for material containing aggregate of a nominal size smaller than 16 mm.

4.4.2.2
Using a sampling shovel, take a minimum of four increments of approximately 7 kg each for material containing aggregate of a nominal size larger than 16 mm.

4.4.2.3
Take the increments from different positions, at least 100 mm from the outer surface of the heap. Remove all the surface material including any coarse material that may fall into the hole.

4.4.2.4
Combine the increments obtained to form the bulk sample.

NOTE 1 The number of increments specified above is a minimum and more may be necessary in some circumstances.

NOTE 2 With some less cohesive materials the use of a metal plate, pushed into the material to facilitate digging 100 mm down is recommended to stop surface material falling into the hole.

NOTE 3 The advantages of this method are as follows:

- sampling is easy to perform;
- no special equipment is needed;
- there is little risk to the sampler's personal safety.

The disadvantages of this method are as follows:

- there is risk of segregation;
- there is uncertainty of the precise location of the material in the pavement;
- there is some possibility of contamination.

4.5 Sampling from the laid but not rolled material using sampling trays

4.5.1 General

This method shall not be used in the following circumstances:

a) for wearing course material;

b) for mixtures in which the difference between the thickness being laid and the nominal size of aggregate is less than 20 mm.

4.5.2 Apparatus

Sampling trays of steel, nominally (375 ± 25) mm square, (3,25 ± 0,25) mm thick and not more than 10 mm deep. A steel multi-strand wire at least 3 m long is attached to one corner of each tray. The wire attachment is designed to withstand effectively the forces exerted during the passage of the paver over the tray.

NOTE A wire of 9 mm circumference and 4,5 kN breaking load has been found satisfactory. Welded wire attachments have been found unsatisfactory.

4.5.3 Procedure

4.5.3.1
Place two sampling trays just ahead of the paver, one on each side of the centre line of the strip to be laid by the paver. Place the trays not more than 10 m apart in the direction parallel to the movement of the paver and positioned so that the trays are not damaged by the paver.

4.5.3.2
Lay the wires connected to the trays as flat as possible on the surface to be covered, with the free ends of the wires outside the area to be covered. Prevent the wires from being entangled with the paver. After the material has been laid raise the wires to locate the trays. Lift the corners of the trays by the wires and ease the trays across the laid material.

4.5.3.3
Combine the two increments obtained to form the bulk sample.

NOTE The advantages of this method are as follows:

- there is certainty of the location of the material in the pavement;
- there is a minimal risk of segregation;
- there is no interruption to paving operations.

The disadvantages of this method are as follows:
- there is a possibility of affecting the finished surface;
- labour requirements are increased;
- special equipment is required;
- there is some possibility of the trays being displaced.

4.6 Sampling from the laid but not rolled material from a cut trench

4.6.1 General

This method shall not be used in the following circumstances:

a) for wearing course material;

b) for mixtures in which the difference between the thickness being laid and the nominal size of the aggregate is less than 20 mm.

4.6.2 Apparatus

Sampling shovel (such as that shown in Figure 1) or sampling scoop (such as that shown in Figure 6), for materials whose nominal size is 16 mm and smaller.

4.6.3 Procedure using sampling shovel

4.6.3.1
Mark out the position of the trench to be cut transversely across the strip laid. Using a sampling shovel excavate a trench to the same width as the sampling shovel and to the full depth of the layer of material. Ensure that the sides of the excavation are trimmed vertically and transfer the trimmed material together with the remainder of the excavated material to a clean sampling plate to form a heap.

4.6.3.2
Use the method for sampling of workable material in heaps (see 4.4) to obtain a representative sample.

NOTE The advantages of this method are as follows:

- there is certainty of the location of the material in the pavement;
- there is a minimal risk of segregation;
- there is no interruption to paving operations.

The disadvantages of this method are as follows:
- there is a possibility of affecting the finished surface;
- labour requirements are increased.

4.6.4 Procedure using asphalt sampling scoop

4.6.4.1
Push the asphalt sampling scoop into the material at approximately a 30° angle to the laid material flattening it out when reaching the bottom of the layer to be sampled and then push forwards until the scoop is full.

4.6.4.2
Trim the material at the front of the scoop and transfer the increment to a clean sampling plate to form a heap.

4.6.4.3
Use the method for sampling of workable material in heaps (see 4.4) to obtain a representative sample.

NOTE 1 An asphalt scoop, when filled, typically contains about 1,8 kg of material.

NOTE 2 The advantages of this method are as follows:

- there is certainty of the location of the material in the pavement;
- there is a minimal risk of segregation;
- there is no interruption to paving operations;
- there is little risk to the sampler's personal safety.

The disadvantages of this method are as follows:

- there is a possibility of affecting the finished surface;
- labour requirements are increased.

4.7 Sampling of laid and compacted materials by coring

4.7.1 Apparatus

Core-cutting machine, capable of removing cores of the required diameter to the full depth of the course to be sampled.

4.7.2 Procedure

For the measurement of thickness, compacted density, void content, water content and/or compositional analysis of a layer of bituminous mixture for further investigation, one, two or more samples of at least 100 mm diameter shall be removed by coring. The number and spacing of the cores shall be defined elsewhere.

NOTE 1 The diameter of the cores to be cut will depend on the tests to be performed. For analysis and grading tests, a diameter of 140 mm or greater should be used.

NOTE 2 A different pattern of cores may be necessary when it is required to establish the properties of discrete areas. The pattern should be agreed between the purchaser and the supplier.

NOTE 3 The advantage of this method is as follows:

- there is certainty of the location of the material in the pavement.

The disadvantages of this method are as follows:

- there is a possibility of affecting the finished surface;
- special equipment is required;
- cutting operations will affect the grading of the mineral aggregate;
- the sample may be contaminated by extraneous material.

4.8 Sampling of laid and compacted material by hacking out or sawing out slabs

4.8.1 Apparatus

4.8.1.1
Wheel cutting machine, capable of cutting to the full depth of the course to be sampled.

4.8.1.2
Wooden frame, of suitable dimensions.

4.8.1.3
Plastic foil, approximately 0,02 mm thick.

4.8.1.4
Gypsum.

4.8.1.5
Trowel.

4.8.1.6
Wire mesh, for reinforcing.

4.8.1.7
Wooden plank, of suitable size.

4.8.2 Procedure

4.8.2.1
When physical properties are to be measured, take slabs at a suitable ambient air temperature such that damage and distortion do not occur.

4.8.2.2
At the locations selected for the removal, delineat the slabs by chalk lines in such a way that a strip of 150 mm width approximately is provided around the slab as a removal slot (see Figure 3).

4.8.2.3
Expose the slabs in such a way that they will not suffer any damage. In the case of layers which do not adhere to one another quite as firmly, and which might easily suffer a deformation when being detached from the lower layer, proceed as follows:

a) once the slabs have been exposed, place a wooden frame around each one which provides a distance of 50 mm to 60 mm margine around the slab, and project at least 10 mm above the top edge of each slab. Lay a thin plastic foil over each slab and its fram a gypsum plaster. Spread gypsum onto this foil between the slab and the wooden frame, and smooth plaster by trowelling at the top edge of the wooden frame (see Figure 4 for details). Insert a wire mesh into the plaster for reinforcement, if necessary;

NOTE 1 No gypsum plaster is necessary in the case of mastic asphalt or where breaking up of any slab is unlikely or irrelevant.

b) once the plaster has hardened, carefully loosen the slab, together with the wooden frame, from the base. As soon as the slab can be lifted off, lay it top face down onto a plank suitably cut to size (see Figure 5) and tie it to the plank.

NOTE 2 For this purpose it may in certain cases be necessary to carefully loosen the bottom layer beneath the exposed slab and to break it up.

4.8.2.4
Samples which cannot be removed in one whole slab shall nevertheless contain the entire mass from the area of the layers being excavated and in such cases the area of the pavement and the thickness of the layers shall be recorded.

NOTE The advantage of this method is as follows:

- there is certainty of the location of the material in the pavement.

The disadvantages of this method are as follows:

- there is a possibility of affecting the finished surface;
- special equipment is required;
- the sample may be contaminated by extraneous material.

4.9 Sampling from the slat conveyor of a continuous process plant

4.9.1 Apparatus

Removable container, of suitable design.

4.9.2 Procedure

NOTE 1 Sampling from a slat conveyor may be carried out using a specially constructed sampling flap fitted on the underside of the slat conveyor.

NOTE 2 The sampling slot shall be the full width of the slat and fitted with a timer allowing discharge of four slat lengths of material charge into a removable container.

NOTE 3 The advantages of this method are as follows:

- material is immediately available for control testing for the plant;
- observation of material can detect errors in the product at an early stage;
- there is minimal risk to the sampler's personal safety;
- there is no risk of an unrepresentative sample being taken due to aggregate segregation.

The disadvantages of this method are as follows:

- there is uncertainty of precise location of material in the pavement;
- the sample is taken from a limited quantity of material;
- special equipment is required.

5 Sampling coated chippings from stockpiles

5.1 Apparatus

Sampling shovel (such as that shown in Figure 1) or sampling scoop (such as that shown in Figure 2).

5.2 Procedure

5.2.1
Using a sampling shovel or sampling scoop take 10 increments at least 100 mm from the outer surface of the heap from different positions to obtain a total mass of not less than 25 kg. Remove from the adjacent surface of the stockpile any material that may fall into any hole.

5.2.2
Combine the increments obtained to form the bulk sample.

6 Marking and packaging of laboratory samples

6.1 Sampling report

Each sample or container shall be clearly marked and accompanied by a sampling report containing at least the following information:

a) contract/project numbers;

b) location;

c) sample reference number;

d) date and time of sampling;

e) method of sampling;

f) type of material;

g) manufacturer (if known);

h) contractor (if known);

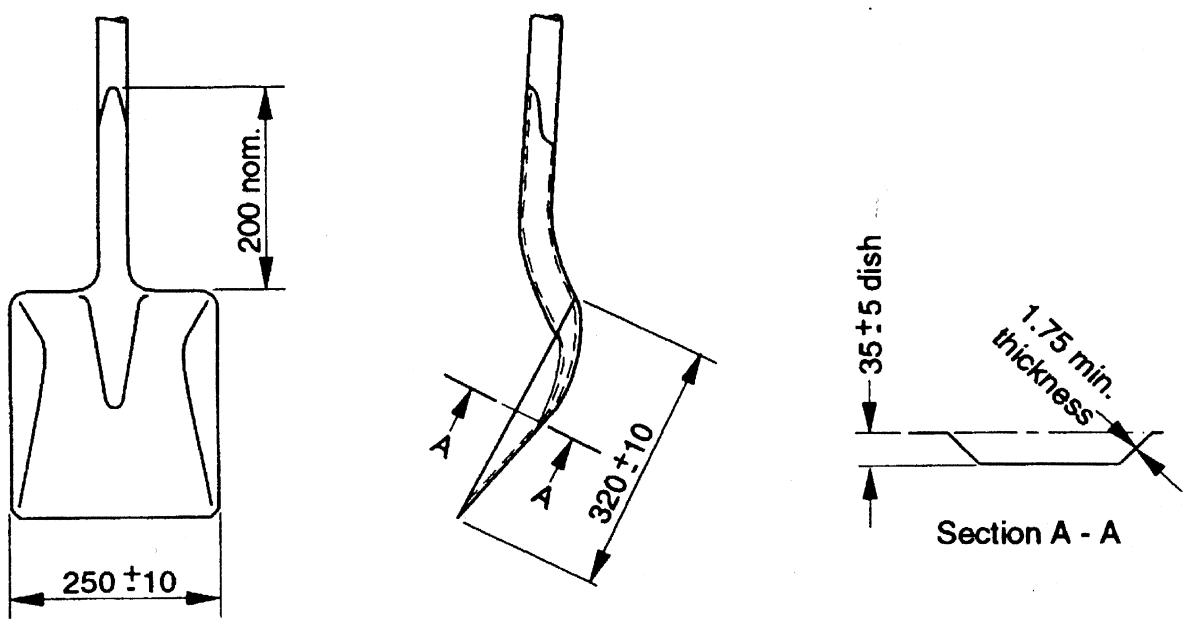
i) signature of sampler;

j) name of sampler in block capitals.

6.2 Packaging

Bulk samples of bituminous mixtures shall be packaged so that no contamination or damage to the sampled materials takes place.

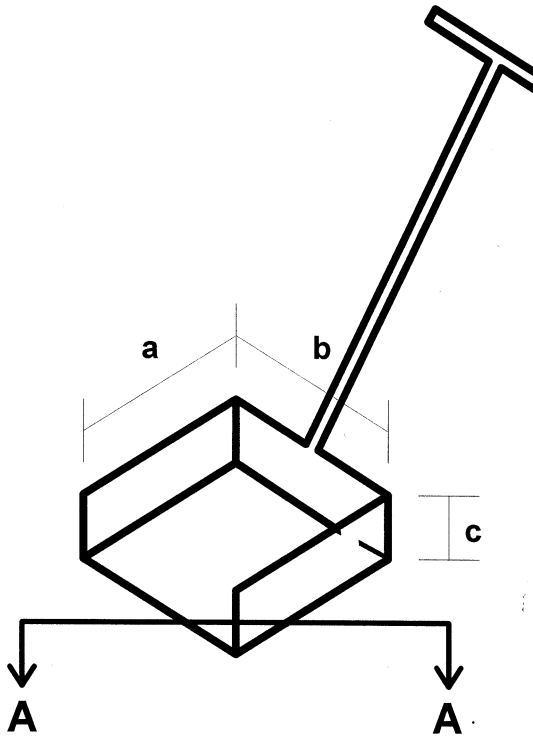
Dimensions in millimetres



NOTE The shovel shown complies with the essential requirements for a square mouth open socket shovel, size 2, to BS 3388:1973

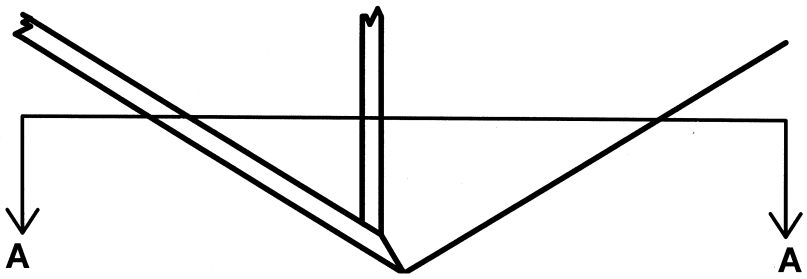
Figure 1 — Typical sampling shovel

Dimensions in millimetres



a = 145, b = 130, c = 55

Figure 2a)

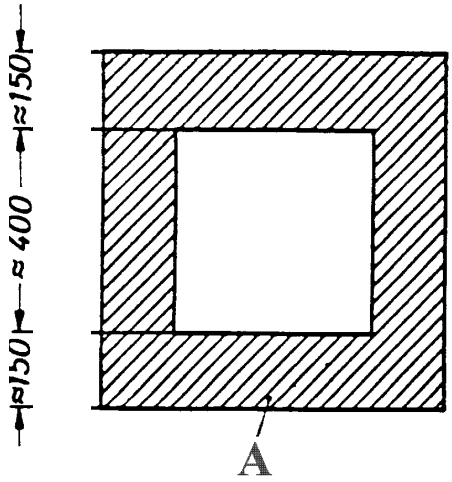


Front edge : Angle is 45° ± 5°

Figure 2b)

Figure 2 — Typical asphalt sampling scoop

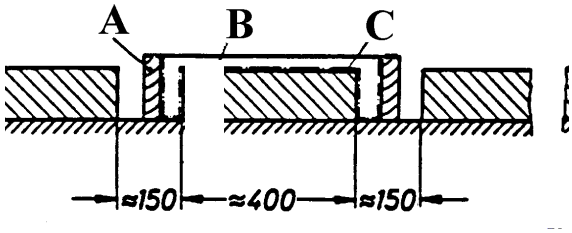
Dimensions in millimetres



Key
A Removal slot

Figure 3 — Top view on removal slot

Dimensions in millimetres



Key
A Wooden frame
B Gypsum plaster
C Plastic foil

Figure 4 — Diagram illustrating sampling in the case of samples cut from a surfacing

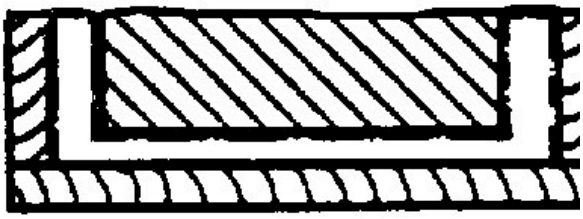


Figure 5 — Sample cut from a surfacing lying on a plank and tied on firmly

Dimensions in millimetres

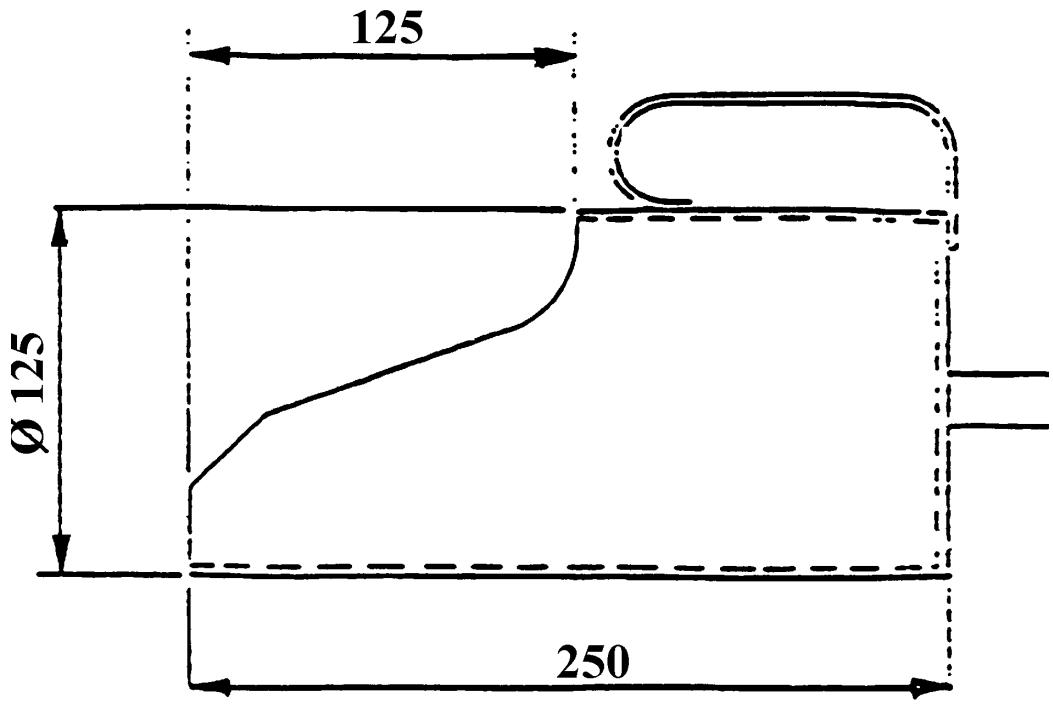


Figure 6 — Typical sampling scoop for coated chippings

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