

Specification for

Manufactured solid smokeless fuels for household use —

**Part 2: Cokes for domestic openable and
closed appliances and open fires with
fan-assisted primary air**

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Committees responsible for this British Standard

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- Association of County Councils
- Association of Metropolitan Authorities
- British Coal Corporation
- Chamber of Coal Traders
- Coke Oven Managers' Association
- Consumer Policy Committee of BSI
- Independent Coke Producers' Association
- Institute of Trading Standards Administration
- Low Temperature Coal Distillers Association of Great Britain Ltd.
- Solid Smokeless Fuels Federation

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Foreword

This Part of BS 3142 has been prepared under the direction of the Solid Mineral Fuels Standards Policy Committee and replaces BS 3142-2:1965 which is withdrawn.

This edition introduces technical changes to bring the standard up to date but it does not reflect a full review of the standard, which will be undertaken in due course.

The principle changes from the previous edition are as follows:

- a) the standard is extended to cover openable appliances and open fires operating with fan-assisted primary air;
- b) the larger size of coke is designated in line with current practice;
- c) the values and units of parameters have been metricated;
- d) reference to gas coke works has been deleted;
- e) the testing and requirement for shale have been deleted.

The specification provides for two size ranges of domestic coke, made by the high temperature carbonization of coal. It is not applicable to fuels produced by other processes. Appliances for which these cokes are used include small domestic hot water supply and central heating boilers, solid fuel cookers, open and closed roomheaters and open fires with fan-assisted primary air requiring these size ranges. In all cases it is essential to employ the size of coke appropriate to the appliance in use. To ensure optimum performance in domestic use these cokes should be used in appliances included in the list of "Approved Domestic Solid Fuel Appliances"¹⁾, many of which comply with current British Standards.

Because the specification covers cokes which may have different densities and other characteristics, the behaviour in use of all cokes complying with it is not the same. For this reason it may be necessary with certain domestic appliances to adjust the controls to new settings to obtain optimum performance if the source of supply of coke is changed. This specification does no more than provide for the quality of cokes at the time that they are dispatched by the producer. It is recognized that quality control cannot be absolute with a product manufactured in quantities of thousands of tonnes a day. The control procedures adopted are designed to ensure that the coke is on average of the specified quality and to limit the frequency with which the coke in any one bag or other small consignment may be found to be of a quality outside the limiting values.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 16, an inside back cover and a back cover

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

¹⁾ Published by the Solid Fuel Advisory Service and the Solid Smokeless Fuels Federation.

1 Scope

This Part of BS 3142 specifies the sampling procedure, requirements and test methods for cokes at producers' works, intended for use in coke-burning openable and closed domestic appliances and open fires operating with fan-assisted primary air. These cokes have an overall nominal aperture size range of 10.0 mm to 45.0 mm in accordance with the square aperture plate in Table 3 of BS 410:1986 and are classified as follows:

S (singles): nominal size range 10.0 mm to 25.0 mm square hole

D (doubles): nominal size range 16.0 mm to 45.0 mm square hole

The specification applies to cokes produced under the following manufacturing arrangements:

- a) S only;
- b) S and D simultaneously from the same coals.

NOTE 1 When a plant is producing S and D coke simultaneously the reactivities of these cokes will be similar. For this reason a combustion test on the S coke is regarded as providing adequate control of the quality of the D coke and no separate combustion test of the D coke is required by this Part of BS 3142.

NOTE 2 The cokes may be dispatched in weighed bags and/or in bulk.

NOTE 3 The titles of the publications referred to in this Part of BS 3142 are listed on the inside back cover.

2 Sampling and preparation of samples

Regular sampling of cokes that are intended to comply with this Part of BS 3142 shall be carried out at producers' works. The samples shall be collected in the manner described in Appendix A and shall be prepared for testing in accordance with Appendix B.

3 Size

When tested in accordance with Appendix C, cokes shall comply with one of the following sets of requirements:

a) S coke

1) **Undersize.** The mean proportion of coke passing a 10.0 mm square-aperture test sieve complying with BS 410 shall be not greater than 5 % (but see clause 6).

2) **Oversize.** The mean proportion of coke retained on a 25.0 mm square-aperture test sieve complying with BS 410 shall be not greater than 5 % (but see clause 6).

b) D coke

1) **Undersize.** The mean proportion of coke passing a 16.0 mm square-aperture test sieve complying with BS 410 shall be not greater than 5 % (but see clause 6).

2) **Oversize.** The mean proportion of coke retained on a 45.0 mm square-aperture test sieve complying with BS 410 shall be not greater than 5 % (but see clause 6).

NOTE The purchase contract for the coke may indicate a narrower range of sieve sizes if specified by the supplier.

4 Total moisture

When tested in accordance with Appendix D, the mean total moisture content of S or D cokes as dispatched from producers' works shall be not greater than 12 % (but see clause 6).

5 Combustion test

When tested in accordance with Appendix E, cokes shall comply with the following requirements (but see clause 6).

Not more than one failure to meet the requirements of a) or b) in this clause shall be permitted in any assessment period.

If D coke is produced from plant which is at the same time producing S coke complying with the requirements of a) and b) as follows, provided that such D coke complies with the appropriate requirements of clauses 3, 4 and 6, it shall be deemed to comply with this Part of BS 3142 without being subjected to a combustion test.

a) **High output test.** The mean water heating output during the 2 h high output test shall be not less than 4.4 kW.

b) **Banking test.** The coke shall be capable of burning for a minimum period of 10 h with a mean water heating output not greater than 1.4 kW.

6 Quality control

Representative samples shall be taken in accordance with Appendix A. Determinations of total moisture, undersize and oversize shall be carried out on samples taken each day that the coke is dispatched from the works.

In order to control the consistency of quality of the coke the statistical treatment described in Appendix F shall be carried out on the test results for total moisture and size, obtained in accordance with Appendix C and Appendix D.

The results of these tests shall be assessed on running averages, corresponding with 40 consecutive results or an eight-week period, which are recalculated at approximately weekly intervals to ensure that the average values satisfy the specified mean values. As a further control of the consistency of the coke, limiting values are also specified beyond which not more than two results in the assessment period shall fall.

The limiting values for individual determinations (see Appendix F) shall be as follows:

total moisture:	16 % maximum
undersize:	8 % maximum
oversize:	8 % maximum.

Combustion tests shall be carried out on every third sample of coke. The results shall be examined individually and not more than one result in the assessment period shall fall outside the specified high output or banking requirements.

Appendix A Sampling procedure

A.1 Introduction

This appendix outlines the methods to be followed and the precautions to be observed in taking samples.

It is important to ensure that the samples taken reflect the quality and consistency of all the coke dispatched. This requires special attention if the coke is dispatched in bags and/or bulk from more than one point.

NOTE Point of dispatch refers to the point in the works at which either bags are filled and loaded for dispatch or wagons are loaded with coke.

A.2 Frequency of sampling

Carry out sampling on every day that coke is dispatched from the producer's works. Take samples at such times in the course of each week that the whole loading period is covered.

A.3 Methods of sampling

Individual works differ in their procedures of coke handling. Some works dispatch coke in weighed bags, some in bulk and others by both methods. Two methods of sampling are specified, one for sampling where coke is filled into bags, the other for sampling the coke when it is loaded in bulk. The two procedures are described in **A.5** and **A.6** respectively.

If both the bag and the bulk loading points are fitted with similar debreezing or guard screens it is probable that the coke from each point will have the same size distribution. If this is found to be so by a series of tests, all samples shall be taken from the bag loading points by the method described in **A.5**, provided that all such points are covered in the sampling scheme.

For plants where a difference is found between samples of the coke loaded from different dispatch points, all such points shall be included in the sampling scheme, samples being taken from each by the methods described in **A.5** and **A.6**, with a frequency in proportion to the quantity of coke loaded from that point.

A.4 Stock and bought-in coke

Any coke taken from stock, or bought-in from other works, which forms a part of the coke bagged or loaded in bulk for subsequent dispatch, shall be taken into account in the scheme of sampling.

NOTE 1 If such coke is returned to the screening plant and mixed with current product for dispatch, no special arrangements are required.

If coke is loaded direct from stock heaps, take an appropriate number of the samples from this coke.

NOTE 2 As a guide the frequency of sampling from stock heaps should depend on the proportions loaded from stock and loaded direct from current production.

If there is a significant difference between the quality of the coke from stock and that of the coke from the current production, they shall be regarded as separate products for the purposes of sampling and testing.

A.5 Bag sampling

When sampling 50 kg bags of S coke take two bags together each day from those filled for dispatch. Use one of these bags as the sample for a total moisture determination and the other for size analysis. If smaller bags are being filled, take sufficient bags to provide the two 50 kg samples. Use these samples as necessary for the combustion test as indicated in Appendix B.

When sampling bags of D coke the same principles apply. In this instance take bags for size analysis each day the coke is dispatched and for a total moisture determination either each day or every third day that it is dispatched.

NOTE 1 The relaxation of sampling D coke every third day for total moisture is permitted only so long as the S coke complies with the total moisture requirements specified in clause 4 and provided that both cokes are being dispatched without being mixed with coke taken from stock.

After the samples have been taken ensure that the coke is removed from the bags otherwise changes may occur in size or total moisture content, or both. Unless the samples are to be prepared immediately for testing by the methods described in Appendix B, transfer the coke samples at once to closeable containers of metal or other rigid material and close the containers immediately.

NOTE 2 Sanitary dustbins with tight-fitting lids complying with BS 792 are suitable for this purpose.

A.6 Sampling during bulk loading

Take two samples of S coke each day that coke is dispatched, one for total moisture determination and the other for size analysis. The mass of each sample shall be approximately 50 kg and in no circumstances greater than 100 kg. These samples shall also be used as necessary for the combustion test as indicated in Appendix B.

When sampling D coke the same principles shall apply. Take samples for size analysis each day the coke is dispatched and for a total moisture determination either each day or every third day that it is dispatched.

Sample either at the loading point or at some position between the last screen (final debreezing screen if fitted) and the loading point. Take each sample as one increment with the loading boom or conveyor temporarily stopped, the whole cross section of the coke being sampled, or collect it at a point where the coke is falling freely and taken so that the whole cross-section of the stream is sampled at once.