

Petrographic analysis of bituminous coal and anthracite —

Part 4: Method of determining microlithotype, carbominerite and minerite composition

UDC 552.574.08 + 552.573.08 + 552.574.1.087.22:620.186:681.723.22

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The preparation of this British Standard was entrusted by the Solid Mineral Fuels Standards Policy Committee (SFC/-) to Technical Committee SFC/4, upon which the following bodies were represented:

- British Coal Corporation
- British Gas plc
- British Steel Industry
- International Committee for Coal Petrography
- Natural Environment Research Council (Institute of Geological Science)
- Power Plant Contractors' Association

This British Standard, having been prepared under the direction of the Solid Mineral Fuels Standards Policy Committee, was published under the authority of the Board of BSI and comes into effect on 28 February 1990

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The following BSI references relate to the work on this standard:
Committee reference SFC/4
Draft for comment 85/55642 DC

ISBN 0 580 17529 4

Amendments issued since publication

Amd. No.	Date of issue	Comments

Contents

	Page
Committees responsible	Inside front cover
National foreword	ii
0 Introduction	1
1 Scope and field of application	1
2 References	2
3 Definitions	2
4 Principle	2
5 Material	2
6 Apparatus	2
7 Procedure	3
8 Expression of results	4
9 Precision	5
10 Test report	6
Figure 1 — Design of grid for microlithotype analysis	2
Figure 2 — Criteria used to determine the categories of accepted and rejected points	7
Table 1 — Maximum permissible number of intersections falling on mineral matter for the point to be classified as a microlithotype	3
Table 2 — Delimitation of microlithotypes	3
Table 3 — Delimitation of carbominerite (excluding carbopolyminerite with sulfide) and minerite	4
Table 4 — Delimitation of carbopolyminerite with sulfide	4
Table 5 — An example of a method of expressing the results	5
Table 6 — Nature of coal associated with carbominerite and minerite (example)	5
Table 7 — Theoretical standard deviation and repeatability of the percentage of a component based on 500 point counts	5
Publications referred to	Inside back cover

National foreword

This Part of BS 6127 has been prepared under the direction of the Solid Mineral Fuels Standards Policy Committee.

It is identical with ISO 7404-4:1988 “*Methods for the petrographic analysis of bituminous coal and anthracite — Part 4: Method of determining microlithotype, carbominerite and minerite composition*”, prepared by Technical Committee ISO/TC 27, Solid mineral fuels, of the International Organization for Standardization (ISO).

Cross-references

International Standard	Corresponding British Standard
	BS 6127 <i>Petrographic analysis of bituminous coal and anthracite</i>
ISO 7404-1:1984	Part 1:1981 <i>Glossary of terms relating to the petrographic analysis of bituminous coal and anthracite</i> (Technically equivalent)
ISO 7404-2:1985	Part 2:1982 <i>Method of preparing coal samples for petrographic analysis</i> (Technically equivalent)
ISO 7404-3:1984	Part 3:1981 <i>Method of determining maceral group composition of bituminous coal and anthracite</i> (Technically equivalent)
ISO 7404-5:1984	Part 5:1981 <i>Method of determining microscopically the reflectance of vitrinite</i> (Technically equivalent)

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 8, 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.

0 Introduction

0.1 Petrographic analyses have been recognized internationally as important in the context of the genesis, vertical and lateral variation, continuity, metamorphism and usage of coal. The International Committee for Coal Petrology (ICCP) has made recommendations concerning nomenclature and analytical methods and has published an extensive handbook describing in detail the characteristics of a wide range of coals. The text of this International Standard agrees substantially with the text of the handbook and incorporates many useful comments made by members of the ICCP and by member bodies of ISO/TC 27, *Solid mineral fuels*.

Petrographic analyses of a single coal provide information about the rank, the maceral and microlithotype compositions and the distribution of mineral matter in the coal. The reflectance of vitrinite is a useful measure of coal rank and the distribution of the reflectance of vitrinite in a coal blend, together with a maceral group analysis, can provide information about some important chemical and technological properties of the blend.

This International Standard is concerned with the methods of petrographic analysis currently employed in characterizing bituminous coal and anthracite in the context of their technological use. It establishes a system for petrographic analysis and comprises five parts, as follows:

- *Part 1: Glossary of terms;*
- *Part 2: Method of preparing coal samples;*
- *Part 3: Method of determining maceral group composition;*
- *Part 4: Method of determining microlithotype, carbominerite and minerite composition;*
- *Part 5: Method of determining microscopically the reflectance of vitrinite.*

For information on the nomenclature and analysis of brown coals and lignites, reference should be made to the *International Handbook of Coal Petrography* published by the ICCP¹⁾.

0.2 Microlithotypes are the naturally occurring associations of macerals which characterize the visibly different types of coal. By convention, the identity of a microlithotype is determined by the maceral group or groups occurring within an area of at least $50\ \mu\text{m} \times 50\ \mu\text{m}$ and which are present in amounts equal to or exceeding 5 % by volume. Hence they can comprise a single maceral or maceral group if it exceeds these dimensions. Microlithotypes may include up to 20 % by volume of minerals such as clay, quartz and carbonates or up to 5 % by volume of sulfide minerals. If the content of mineral matter exceeds these amounts, the material is designated as minerite or carbominerite depending on the proportions of coal and mineral matter.

Carbominerites can be subdivided according to the type of mineral matter.

Microlithotypes contribute information on the genesis of coal seams and can assist in solving problems of seam correlation. Because they determine, together with rank and mineral matter, the hardness and density of the bulk coal substance, microlithotypes affect the behaviour of coal in mining and coal preparation processes. The different microlithotypes determine, under given geological conditions, the distribution of micro-cracks and to some extent the cleat in the coal. The results of maceral analyses can be interpreted more meaningfully from a knowledge of microlithotype composition. Such information can assist in explaining the behaviour of coal in commercial and experimental utilization processes where the association of macerals is known to be important.

NOTE The percentage volume of carbonate, clay and quartz minerals on the one hand and sulfide minerals on the other, which define the carbominerites and minerites, correspond to the densities which separate coal from middlings and middlings from discard in coal preparation.

1 Scope and field of application

This part of ISO 7404 specifies a method, using a graticule with 20 crossline intersections, for determining the proportions of microlithotypes, carbominerite and minerite in coals. It applies only to determinations made on polished particulate blocks using reflected white light.

¹⁾ The second edition (1963), together with the supplement issued in 1971, may be obtained from Professor D.G. Murchison, Organic Geochemistry Unit, Department of Geology, University of Newcastle, Newcastle-upon-Tyne, NE1 7RU, United Kingdom. The supplement issued in 1973 may be obtained from Centre National de la Recherche Scientifique, 15 quai Anatole-France, F-75007 Paris, France.