

Australian Standard[®]

**CLASSIFICATION AND CODING
SYSTEMS FOR AUSTRALIAN
COALS**

This Australian standard was prepared by Committee MN/1/1, Coal Evaluation under the supervision of Committee MN/1, Coal and Coke. It was approved on behalf of the Council of the Standards Association of Australia on 10 October 1986 and published on 5 January 1987.

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Australasian Institute of Mining and Metallurgy
Australian Coal Association
Australian Coal Industry Research Laboratories Ltd
Australian Institute of Energy
Bureau of Steel Manufacturers of Australia
Coal Preparation Societies of New South Wales and Queensland
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COALS**

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PREFACE

This edition of this standard was prepared by the Association's Subcommittee on Coal Evaluation under the supervision of the Committee on Coal and Coke and the direction of the Minerals Standards Board. It is a revision and enlargement of AS 2096—1977 which was a modification of the 'International Classification of Hard Coals by Type' prepared by the Economic Commission for Europe (ECE). This standard has been extended to cover coals of all ranks.

In preparing this classification system, the Committee was mindful of developments in Europe where a new ECE classification is being prepared. Other well established systems of classification, such as those of the National Coal Board (NCB) and the American Society for Testing and Materials (ASTM), are in use in various parts of the world.

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FOREWORD

Some methods used for testing Australian coals do not apply to coals of all ranks and this is clearly stated in the relevant Australian standard method. For application of the standard method the class of the coal must be known.

Australian coals can be classified into two classes according to rank: (a) 'Higher rank'; and (b) 'Lower rank'.

Specific energy on both dry, ash-free and ash-free, moist bases is used as the means of determining the division.

The new classification system can be used to differentiate between higher rank coals, which are normally transported before use, and lower rank coals which are usually used or upgraded in the vicinity of the deposit because of their high bed moisture content.

At times it is necessary to classify coals in terms of the traditional names anthracite, semi-anthracite, bituminous coal, sub-bituminous coal and brown coal, for example, for resource estimates by international bodies. For such purposes the standard defines the various classes in terms of volatile matter on a dry, ash-free basis, specific energy on an ash-free, moist basis and crucible swelling number, where appropriate.

Coding systems, suitable for Australian coals, have also been developed. Coding is primarily intended for industrial purposes and so properties which can be readily measured in most laboratories were chosen. The coding system provides an initial evaluation of coals for such purposes. It can be applied to in situ, raw and washed coals.

Coding is intended to describe coals on the basis of the most meaningful coal properties measured and in a way which is easily remembered. To this end separate coding systems have been developed for higher rank and lower rank coals with the first three parameters being the same in each case. These are mean maximum reflectance of vitrinite, gross specific energy (daf) and volatile matter (daf). The fourth parameter is crucible swelling number for higher rank coals and bed moisture for lower rank coals. The fifth and sixth parameters are once again common to both systems, being ash percentage and total sulphur, both on a dry basis.

The following acronyms are suggested to make the coding parameters and their order easier to remember:

REVCAS Code: Coding system for higher rank coals.

REVMAS Code: Coding system for lower rank coals.

where

R stands for mean maximum Reflectance of vitrinite.

E stands for specific Energy (daf).

V stands for Volatile matter (daf).

C stands for Crucible swelling number.

M stands for bed Moisture.

A stands for Ash (d).

S stands for total Sulphur (d).

Thus the systems code coals in terms of rank and grade. The number of digits for each parameter has been chosen so that the value of each property, over a narrow range, can easily be ascertained from the code number. Since for lower rank coals only one digit is required for the reflectance parameter whereas two digits are used for higher rank coals, it can be easily determined at a glance whether the code number refers to a higher rank or lower rank coal.

The relationship between petrographic composition and performance in utilization is different for Australian and other Gondwanan coals than it is for Laurasian coals from Europe and North America. For this reason petrographic parameters, other than mean maximum reflectance of the vitrinite, have not been used in the coding system.

It is recognized that no classification or coding system can adequately describe all the properties of coals which affect the behaviour of coals in industrial use. The coding systems should save time and effort in the initial evaluation of coals for a particular purpose but a full set of chemical, physical, petrological and utilization tests must be carried out for final assessment of coals for industrial processes.

STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard

for

CLASSIFICATION AND CODING SYSTEMS FOR AUSTRALIAN COALS

1 SCOPE. This standard describes the classification of Australian coals into two rank classes. It also sets out systems for coding coals within each class and provides quantitative definitions for traditional names.

2 REFERENCED DOCUMENTS. The following standards are referred to in this standard:

- AS 1038 Methods for the Analysis and Testing of Coal and Coke
 Part 3 —Proximate Analysis of Hard Coal†
 Part 5 —Gross Specific Energy of Coal and Coke†
 Part 6.3 —Ultimate Analysis of Higher Rank Coal—Determination of Total Sulphur
 Part 12.1—Determination of Crucible Swelling Number of Coal
 Part 17 —Determination of Moisture Holding Capacity of Higher Rank Coals*
- AS 2418 Glossary of Terms Relating to Solid Mineral Fuels
 Part 3 —Terms Relating to Brown Coal
- AS 2434 Methods for the Analysis and Testing of Lower Rank Coal and Its Chars
 Part 1 —Determination of the Moisture Content of Brown Coal
 Part 2 —Determination of the Volatile Matter in Lower Rank Coal
 Part 3 —Determination of the Moisture Holding Capacity of Lower Rank Coals
 Part 6.1 —Ultimate Analysis of Lower Rank Coal—Classical Methods
- AS 2486 Methods for Microscopical Determination of the Reflectance of Coal Macerals.

3 DEFINITIONS. For the purpose of this standard the definitions given in AS 2418 and the following apply:

3.1 Bases for reporting.

3.1.1 Dry, ash free (*daf*)—a hypothetical condition used to approximate a dry, mineral-matter-free sample, for which the sample is assumed to be completely free of moisture and ash.

3.1.2 Ash-free, moist (*afm*)—a hypothetical condition in which the sample is assumed to be free of ash, with a moisture determined by its moisture holding capacity.

3.1.3 As sampled (*as*)—the result is not subject to any qualification. The analyses are reported for the sample with total moisture as sampled.

3.1.4 Dry (*d*)—the condition in which the sample is assumed to be completely free of moisture, thereby removing the dependence of an analysis result on the humidity of a laboratory atmosphere.

3.2 Bed-moisture—the natural moisture content of the coal in situ in the seam, as defined in AS 2418.3. Care must be taken to ensure that samples for this determination are free of open fissures, voids or other features which might entrain free water and that there is no loss of moisture during sampling and sample preparation.

3.3 Moist—the condition in which coal has a moisture content equal to its moisture holding capacity at 30°C and 96 percent relative humidity. The moisture holding capacity shall be determined according to AS 2434.3 for lower rank coals and according to AS 1038.17 for higher rank coals.

4 TEST METHODS. The parameters referred to in this standard shall be determined in accordance with the methods specified in Table 1.

5 CLASSIFICATION OF COALS.

5.1 General. Australian coals are usually classified to assist in estimating reserves and determining the applicability of standard methods for analysis and testing.

* In course of preparation.

† In course of revision.

TABLE 1
TEST METHODS FOR DETERMINATION OF CLASSIFICATION/CODING PARAMETERS

Test	For higher rank coal	For lower rank coal
Gross specific energy	AS 1038.5†	AS 1038.5†
Mean maximum reflectance of vitrinite	AS 2486	AS 2486
Volatile matter	AS 1038.3†	AS 2434.2
Bed-moisture	—	AS 2434.1
Ash	AS 1038.3†	AS 1038.3†
Total sulphur	AS 1038.6.3	AS 2434.6.1
Crucible swelling number	AS 1038.12.1	—

NOTE: The moisture holding capacity of lower rank coals is normally much lower than the bed-moisture. Moisture holding capacity is determined by AS 1038.17 for higher rank coals and by AS 2434.3 for lower rank coals.

† In course of revision.