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Australian Standard 2579.1—1983

HARD COAL—FROTH FLOTATION TESTING

Part 1—LABORATORY PROCEDURE

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Bureau of Steel Manufacturers of Australia
Coal Preparation Societies of N.S.W. and Queensland
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Department of Minerals and Energy, Victoria
Department of Mineral Resources, N.S.W.
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PREFACE

This standard was prepared by the Association's Committee on Coal and Coke under the direction of the Minerals Standards Committee.

The froth flotation of coal has widespread application for the concentration and separation of fine coal particles from mineral matter. The response of coal to the froth flotation process is initially measured by a laboratory scale test. Although the principles used for the laboratory tests are generally similar, the precise type of equipment and techniques used vary considerably.

The recommended procedure for the laboratory froth flotation test sets out, in detail, the type of equipment to be used and methods to be adopted. The purpose of this recommended procedure is to provide a standard method of test. This is particularly important for exploration programs. This standard also serves as an introduction for operators who are not familiar with the techniques (and problems) associated with the laboratory froth flotation of coals.

A guide to the evaluation of the basic parameters affecting the froth flotation of hard coal will be found in AS 2579, Part 2*.

*In course of preparation.

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STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard
HARD COAL—FROTH FLOTATION TESTING

PART 1—LABORATORY PROCEDURE

1 SCOPE. This standard sets out a laboratory procedure for the froth flotation testing of fine coal, e.g. coal of particle size less than 0.5 mm. The procedure provides a means of evaluating the flotation characteristics of a coal.

Flotation characteristics are sensitive to a number of parameters and a variation in most of these parameters will usually be necessary to get the best results with a particular coal. A guide to the evaluation of these parameters is given in AS 2579.2.

Pulp samples which cannot be dewatered without the use of heat or chemical additives are not covered by this standard.

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 17—Size Analysis of Hard Coal*
AS 1152	Test Sieves
AS 1676	Methods for the Sampling of Hard Coal
AS 2579	Hard Coal—Froth Flotation Testing Part 2—Evaluation of Basic Parameters*

3 DEFINITIONS. For the purpose of this standard, the following definitions apply:

3.1 Collector (collecting agent)—a reagent added to a pulp to promote adherence between coal particles and air bubbles.

3.2 Concentrate—the cleaned product recovered in froth flotation.

3.3 Conditioning—the preparatory stage in the flotation process in which the reagent is brought into intimate contact with the solids of the pulp.

3.4 Frother (frothing agent)—a reagent used to control the size and stability of the air bubbles in the flotation process.

3.5 Froth flotation—a process for cleaning fine coal in which the coal particles, with the aid of reagent(s), become attached to air bubbles in an aqueous medium and are removed in a froth.

3.6 Pulp—a mixture of solid particles and water.

3.7 Tailings—the discard from froth flotation.

4 PRINCIPLE. A coal sample is suspended in water in the flotation cell. Collector and frother are added and air is introduced. The concentrate and tailings are recovered and the yield and ash determined.

The results of the flotation test are influenced by the particle size and a complete particle size analysis of the coal, carried out in accordance with AS 1038, Part 17†, should be reported (see Fig. 7). A subsample should also be retained for the determination of ash and other parameters as required (see Clause 8(h)).

5 SAMPLE. The history and method of preparation of samples can affect considerably the flotation characteristics of the coal. The history of the sample should be recorded and care should be taken to ensure that samples for comparison purposes are prepared in a similar manner and, where applicable, in accordance with the sampling procedures specified in AS 1676.

NOTE: The use of chemical additives or heat can affect the flotation characteristics of the coal.

6 APPARATUS.

6.1 General. The apparatus shall be a mechanical impeller type flotation machine (Fig. 1) with the following specifications.

6.2 Cell, manufactured from stainless steel. It has been shown that the results obtained from laboratory froth flotation tests are very dependent on the procedure used to remove the concentrate from the surface of the pulp. For this reason, a deflector block manufactured from suitable plastics

*In course of preparation.

†Until AS 1038, Part 17 is published, ISO 1953 may be used.