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# Australian Standard 2137-1978

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## DETERMINATION OF THE PLASTIC PROPERTIES OF HARD COAL BY THE GIESELER PLASTOMETER

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**STANDARDS ASSOCIATION OF AUSTRALIA**  
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THE FOLLOWING SCIENTIFIC, INDUSTRIAL AND GOVERNMENTAL organizations and departments were officially represented on the committee entrusted with the preparation of this standard:

Associated Chambers of Manufactures of Australia

Australasian Institute of Mining and Metallurgy

Bureau of Steel Manufacturers of Australia

Department of Mines, N.S.W

Department of National Resources

Electricity Supply Association of Australia

Institution of Engineers, Australia

Joint Coal Board

Mines Department, Queensland

Mines Department, Victoria

Queensland Coal Board

Royal Australian Chemical Institute

Universities

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This standard, prepared by Committee CH/15, Coal and Coke, was approved on behalf of the Council of the Standards Association of Australia on 11 November 1977, and was published on 1 March 1978.

In order to keep abreast of progress in industry, Australian standards are regularly reviewed. Suggestions for improvement to published standards, addressed to the head office of the Association, are welcomed.

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*This standard was issued in draft form for public review as DR 75148.*

**AUSTRALIAN STANDARD**

**METHOD FOR THE  
DETERMINATION OF THE  
PLASTIC PROPERTIES OF  
HARD COAL  
BY THE GIESELER PLASTOMETER**

**AS 2137—1978**

First published ..... 1978

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## PREFACE

This standard was prepared by the Association's Committee on Coal and Coke, under the direction of the Chemical Standards Board. It describes procedures for determining the plastic properties of hard coal and coal blends, using either continuous or discontinuous plastometers. It is based on ASTM D1812, Plastic Properties of Coal by the Gieseler Plastometer, and ASTM D2639, Plastic Properties of Coal by the Constant Torque Gieseler Plastometer.

The test is used to obtain data on the plastic behaviour of coal and coal blends used in carbonization and for other purposes where a knowledge of the plastic behaviour of coal is of practical importance.

Attention is drawn to the fact that the results obtained are dependent upon the method of measurement used and that different results could be obtained from the same sample, depending on whether continuous or discontinuous plastometers are used.

Standards organizations around the world are considering refinements and modifications to the traditional test developed by Gieseler. The main areas under study are:

- The crucible geometry—the aim being to prevent the solidified coke mass from revolving.
- New methods of calibration—using standard viscous fluids.
- Measurement of high fluidities using anthracite dilution—extrapolating back to zero anthracite addition to obtain the actual result.

This standard requires reference to the following Australian standards:

AS 1152 Test Sieves

AS 1676 Methods for the Sampling of Hard Coal

AS K149 Glossary of Terms for Coal and Coke.

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# STANDARDS ASSOCIATION OF AUSTRALIA

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## Australian Standard

### METHOD FOR THE DETERMINATION OF THE PLASTIC PROPERTIES OF HARD COAL USING THE GIESELER PLASTOMETER

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**1 SCOPE.** This standard describes a procedure for obtaining a relative measure of the plastic behaviour of hard coal when heated under prescribed conditions.

It applies to methods in which the stirrer is operated continuously or discontinuously.

**2 PRINCIPLE.** The plastic properties of the coal are determined by application of a constant torque to a standardized stirrer placed in a crucible into which the coal sample is charged and uniformly packed. The charge is heated uniformly through a temperature range and the rate of movement of the stirrer is determined in relation to the temperature.

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

**3.1 Continuous plastometer**—a plastometer in which the torque is applied continuously.

**3.2 Discontinuous plastometer**—a plastometer in which the torque is applied intermittently.

**3.3 Manual plastometer**—a plastometer, the dial movement of which is observed and the rate of dial movement recorded, by an operator.

**3.4 Automatic plastometer**—a plastometer which incorporates automatic temperature control and dial movement read-out systems.

**3.5 Initial softening temperature\***—the temperature at which the rate of dial pointer movement reaches 1.0 dial divisions per minute.

**3.6 Maximum fluidity temperature**—the temperature at which the rate of dial pointer movement reaches its maximum.

**3.7 Maximum fluidity**—the maximum rate of dial pointer movement expressed in dial divisions per minute.

**3.8 Solidification temperature**—the temperature at which the dial pointer movement stops.

**3.9 Plastic range**—the difference between the initial softening temperature and the solidification temperature.

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\*It is permissible to characterize this temperature by an alternative rate of dial division per minute provided that these conditions are included in the test report.