

ISO

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

ISO RECOMMENDATION R 502

DETERMINATION OF THE GRAY-KING COKE TYPE OF COAL

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BRIEF HISTORY

The ISO Recommendation R 502, *Determination of the Gray-King Coke Type of Coal*, was drawn up by Technical Committee ISO/TC 27, *Solid Mineral Fuels*, the Secretariat of which is held by the British Standards Institution (BSI).

Work on this question by the Technical Committee began in 1951 and led, in 1960, to the adoption of a Draft ISO Recommendation.

In October 1962, this Draft ISO Recommendation (No. 552) was circulated to all the ISO Member Bodies for enquiry. It was approved, subject to a few modifications of an editorial nature, by the following Member Bodies:

Australia	Italy	Spain
Austria	Japan	Switzerland
Belgium	Netherlands	Turkey
Brazil	New Zealand	United Kingdom
Chile	Poland	U.S.S.R.
Czechoslovakia	Portugal	Yugoslavia
Denmark	Republic of	
Germany	South Africa	
India	Romania	

One Member Body opposed the approval of the Draft:

France

The Draft ISO Recommendation was then submitted by correspondence to the ISO Council which decided, in September 1966, to accept it as an ISO RECOMMENDATION.

DETERMINATION OF THE GRAY-KING COKE TYPE OF COAL

1. SCOPE

This ISO Recommendation describes one method of assessing the caking power of coal under standard conditions.

The purpose of the Gray-King coke test, which is one of the parameters adopted for the International Classification of Hard Coal by Type by the United Nations Economic Commission for Europe, is to assess the caking properties of a type of coal or a blend of coals by carbonizing under standard conditions. Although the Gray-King test and the Roga test both assess the caking properties of a coal they do not measure precisely the same parameters and should not be regarded as alternative methods.

2. PRINCIPLE

The coal is heated under standard conditions to a final temperature of 600 °C. The coke residue obtained is classified by reference to a series of standard residues (Fig. 1, page 6). If the coke residue produced is so swollen that it fills the cross section of the retort tube, the determination is repeated with the coal admixed with a suitable quantity of electrode carbon or equivalent material (see Note 1, page 11). For these highly swelling coals the Gray-King coke type is defined by the minimum amount of electrode carbon required to produce a strong hard coke residue of the same volume as the original coal and electrode carbon mixture.

3. APPARATUS

3.1 Furnace

Horizontal electric furnace, 5 cm internal diameter and 30 cm long, with one end closed and the other carrying a plug of insulating material which is bored centrally with a hole 2.5 cm in diameter. The winding of the furnace should be such that the middle 20 cm is at a uniform temperature within ± 5 degrees Celsius at both 300 and 600 °C. Alternatively the furnace may be constructed from an electrically-heated aluminium-bronze block, with one or several bores of 2.5 cm diameter. The furnace should be insulated and located in a cover of metal or other suitable material, and should be equipped with a suitable thermocouple, lying above the retort tube when the latter is in position and with the junction at the centre of the furnace. An indicator should be provided for showing the furnace temperature with an accuracy of ± 5 degrees Celsius. A suitable means of controlling the energy input should also be provided to permit an increase in temperature at a rate of 5 degrees Celsius per minute. A multiple tube furnace to allow simultaneous determinations is convenient. The furnace may be of the fixed type or mounted on rails. Suitable furnaces are shown in Figures 2 and 3, page 8.