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Hard coal and coke — Determination of ash fusibility

Houille et coke — Détermination de la fusibilité des cendres

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 540 was prepared by Technical Committee ISO/TC 27, *Solid mineral fuels*, Subcommittee SC 5, *Methods of analysis*.

This fourth edition cancels and replaces the third edition (ISO 540:1995), which has been technically revised.

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Introduction

The method for determination of the fusibility temperatures of coal ash and coke ash described in this International Standard provides information about the fusion and melting behaviour of the composite inorganic constituents of the ash at high temperatures. The standard method is based on the “Seger Cone” method, which is well known in the ceramic industry, the use of which predates the year 1900. The conditions of the test, as well as basic studies on the influence of ash chemistry and of gas composition on ash fusibility temperatures (which have led to the standardization of the method), arose from the pioneering work of Fieldner, Hall and Field [1].

In the laboratory, the ash used for the test is a homogeneous mixture prepared from a representative sample of the coal or coke, and the determination is performed at a controlled rate of heating in either a reducing or an oxidizing atmosphere. In contrast, under industrial conditions, the complex processes of combustion and fusion involve heterogeneous mixtures of particles, heating rates (that can be several orders of magnitude greater than those used in the standard test) and variable gas composition.

During the first quarter of the 20th century, laboratory, pilot-scale and field studies were undertaken to establish that the ash fusibility test can provide a reasonable indication of the propensity of ash to form fused deposits (referred to as “clinker”) in stoker and other fuel-bed type furnaces (Nicholls and Selvig [2]). Subsequently, the test has been used as a general indicator of the tendency for ash to fuse on heating and of ash slagging propensity in pulverized coal-fired furnaces.

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