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Hard coal — Determination of ash fusibility

Houille — Détermination de la fusibilité des cendres

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This document was prepared by Technical Committee ISO/TC 27, *Coal and coke*, Subcommittee SC 5, *Methods of analysis*.

This fifth edition cancels and replaces the fourth edition (ISO 540:2008), which has been technically revised.

The main changes are as follows:

— change of the document title;

— removal of coke from scope;

— increase of the allowance of the pyramid to between 12 mm and 19 mm.

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The method for determination of the fusibility temperatures of coal ash described in this document 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, 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.[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.