INTERNATIONAL STANDARD 349

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Hard coal — Audibert-Arnu dilatometer test

Houille — Essai au dilatomètre Audibert-Arnu

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FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO Member Bodies). The work of developing International Standards is carried out through ISO Technical Committees. Every Member Body interested in a subject for which a Technical Committee has been set up 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.

Draft International Standards adopted by the Technical Committees are circulated to the Member Bodies for approval before their acceptance as International Standards by the ISO Council.

Prior to 1972, the results of the work of the Technical Committees were published as ISO Recommendations; these documents are now in the process of being transformed into International Standards. As part of this process, Technical Committee ISO/TC 27 has reviewed ISO Recommendation R 349 and found it technically suitable for transformation. International Standard ISO 349 therefore replaces ISO Recommendation R 349-1963 to which it is technically identical.

ISO Recommendation R 349 was approved by the Member Bodies of the following countries :

Austria	India	Romania
Belgium	Italy	Turkey
Canada	Japan	United Kingdom
Czechoslovakia	Mexico	U.S.S.R.
Denmark	New Zealand	Yugoslavia
Germany	Poland	
Greece	Portugal	

The Member Body of the following country expressed disapproval of the Recommendation on technical grounds :

Spain

No Member Body disapproved the transformation of ISO/R 349 into an International Standard.

Printed in Switzerland

Hard coal — Audibert-Arnu dilatometer test

0 INTRODUCTION

The Audibert-Arnu test is one of the parameters adopted for the International Classification of Hard Coals by Type of the United Nations Economic Commission for Europe. The object of the test is to determine the coking properties of hard coal or hard coal blends on the laboratory scale.

In principle, the test is not designed, nor can it be used, to indicate the pressures exerted by hard coals on the walls of industrial carbonization ovens.

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies a method for determining the swelling properties of hard coal when heated under standard conditions in a dilatometer.

2 PRINCIPLE AND TERMINOLOGY

A pencil made of powered coal formed under pressure is inserted into a precisely calibrated narrow tube and topped by a calibrated steel rod (piston) which slides in the bore of the tube.

The whole is heated at a constant and definite rate.

By making regular readings of the displacement of the piston as a function of the temperature and expressing the displacements observed as percentages of the original length of the pencil, a curve of the type shown in figure 1 can be plotted.

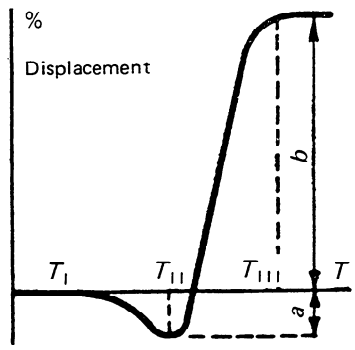

FIGURE 1

The following items are characteristic (see note below) :

T_I temperature at which the piston has moved down 0,5 mm[1] : *softening temperature.*

T_{II} temperature at which the piston reaches its lowest point : *temperature of maximum contraction.*

T_{III} temperature at which the piston reaches its highest point : *temperature of maximum dilatation.*

a maximum contraction of length of pencil, per cent.

b maximum dilatation of length of pencil, per cent.

If, after contraction has taken place, the piston does not return to its original level, the dilatation, equal, in absolute value, to the difference between the final level of the piston and the original zero level, is reported as negative.

NOTE — The principal factors capable of distorting the results of this empirical test are the following :

a) Deterioration of the coal, consequent on bad storage or faulty drying;

b) Deviation from the tolerances of

1) the internal dimensions of the dilatometer tube,

2) the clearance between tube and piston,

3) the mass of the piston,

4) the dimensions of the mould;

c) Deviation from the specified mean rate and regularity of heating;

d) Deviation from the specification for the preparation of the sample in respect of maximum particle size, or for the pencil in respect of its length after tamping.

3 APPARATUS

3.1 Apparatus for preparing the coal pencil

3.1.1 Mould, polished internally, with accessories; see figures 2 and 2A.

3.1.2 Gauge, see figure 2.

3.1.3 Ram, of which figure 3 shows an example.

3.1.4 Press, of which figure 4 shows an example.

1) Or one division, if the scale is calibrated in percentage of the standard length of pencil.