
**Brown coals and lignites —
Determination of the yields of tar,
water, gas and coke residue by low
temperature distillation**

*Charbons bruns et lignites — Détermination des rendements en
goudron, en eau, en gaz et en résidu de coke par distillation à basse
température*

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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html. (standards.iteh.ai)

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This second edition cancels and replaces the first edition (ISO 647:1974), of which it constitutes a minor revision. The changes compared to previous edition are as follows: dated references and other minor items have been changed.

Introduction

The yield of distillation products by low temperature distillation, especially the yield of tar, forms the basis for the classification of brown coal and lignite for use in low temperature carbonization.

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Brown coals and lignites — Determination of the yields of tar, water, gas and coke residue by low temperature distillation

1 Scope

This document specifies a method for the determination of the yields of tar, water, gas and coke residue obtained from brown coal and lignite by distillation to a final temperature of 520 °C.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 5068-2, *Brown coals and lignites — Determination of moisture content — Part 2: Indirect gravimetric method for moisture in the analysis sample*

ISO 1170, *Coal and coke — Calculation of analyses to different bases*

3 Terms and definitions (standards.iteh.ai)

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

4 Principle

The sample is heated in an aluminium retort to a temperature of 520 °C during a period of 80 min. The products of decomposition pass into a water-cooled receiver. The tar and water are condensed while gaseous products pass to atmosphere. The coke residue remaining in the retort is weighed. The receiver and its contents are also weighed and the mass of the water in it determined by entrainment with toluene or xylene. The mass of tar is obtained by difference.

The total water in the receiver includes the moisture in the coal as well as that from the decomposition of the coal. A separate determination of moisture in the coal is made so that the decomposition water can be calculated.

The percentage of gas (plus errors) is obtained by subtracting from 100 the sum of the percentages of coke residue, tar and total water. The results are reported on the “as analysed” basis and on the “dry” basis.

5 Reagents

5.1 Graphite paste.

Ground dry and made into suitable paste with water or thick lubricating oil.

5.2 Xylene.

Boiling point 135 °C to 140 °C.

5.3 Toluene.

Boiling point 110 °C.

6 Apparatus

6.1 Retort.

Made of aluminium, with the dimensions shown in [Figure 1](#). With the cover fitted, its capacity with the outlet tube shall be 170 ml ± 10 ml. The outlet tube shall be made of brass and its internal wall shall be clean and polished. A new assembly shall be heated at 520 °C for 20 min before use.

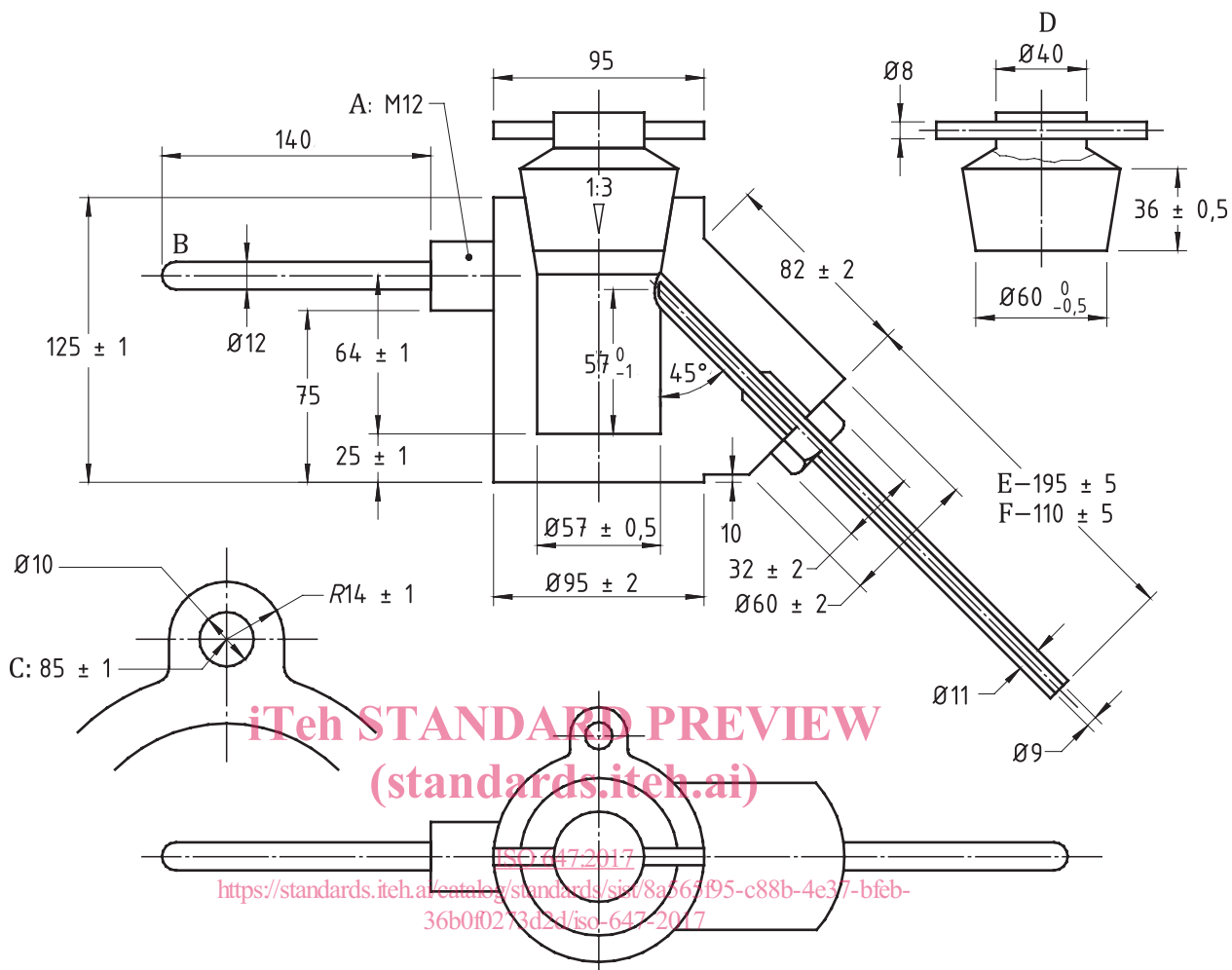
If, through wear, the upper edge of the conical portion of the cover is below the top surface of the retort, its free volume will be less than 160 ml and a new cover is required. The new oversize cover shall be ground so that when fitted, the upper edge of the round portion is less than 7 mm above the top surface of the retort. This will ensure that the free volume of the retort does not exceed 180 ml.

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Dimensions in millimetres



Materials: Aluminium retort, aluminium content > 99 %

Volume of retort: 170 ml ± 10 ml

Outlet tube: Brass

Key

- A screw thread
- B bearer bar
- C depth of hole for the thermometer
- D cover
- E as in Figure 2 a)
- F as in Figure 2 b)

Figure 1 — Retort

6.2 Furnace.

Heated either electrically or by gas. For electrical heating, a resistance wire furnace or a silicon carbide rod furnace may be used.