
INTERNATIONAL STANDARD



647

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

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 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 647 and found it technically suitable for transformation. International Standard ISO 647 therefore replaces ISO Recommendation R 647-1968 to which it is technically identical.

ISO Recommendation R 647 was approved by the Member Bodies of the following countries :

Australia	Germany	Romania
Austria	India	South Africa, Rep. of
Belgium	Ireland	Spain
Brazil	Italy	Sweden
Canada	Japan	Switzerland
Chile	Korea, Rep. of	Turkey
Czechoslovakia	Netherlands	United Kingdom
Denmark	New Zealand	U.S.S.R.
Egypt, Arab Rep. of	Poland	Yugoslavia
France	Portugal	

No Member Body expressed disapproval of the Recommendation.

No Member Body disapproved the transformation of ISO/R 647 into an International Standard.

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

0 INTRODUCTION

The yield of the 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.

1 SCOPE AND FIELD OF APPLICATION

This International Standard 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 REFERENCE

ISO/R 1015, *Determination of moisture in brown coals and lignites by the direct volumetric method.*

3 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, also by entrainment with toluene or xylene, 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, of tar and decomposition water. The results are reported on the "as analysed" and on the "dry" basis.

4 REAGENTS

4.1 Graphite paste, ground dry and made into a suitable paste with water or thick lubricating oil.

4.2 Xylene, boiling point 135 to 140 °C;

or **Toluene**, boiling point 110 °C.

5 APPARATUS

5.1 Retort, of aluminium, with the dimensions shown in figure 1; with the cover fitted, its capacity with the outlet tube shall be 170 ± 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.

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

5.3 Thermocouple and millivoltmeter, or a **nitrogen-filled mercury thermometer**, calibrated and capable of indicating the temperatures up to 550 °C.

NOTE – A new thermometer shall be aged and then calibrated before use and shall be rechecked at intervals of 1 month by comparing it with a standard thermometer in a manner approved by a national testing authority.

5.4 Receiver: round bottomed glass flask, capacity 750 ml, with conical ground joint and with either long or short neck depending on the method of connection to the retort (see figure 2), provided with a rubber or glass stopper.

5.5 Cooling bath, such that the distance between the receiver and the walls of the bath is not less than 20 mm. The water flow shall be adjusted to maintain a temperature of between 10 and 15 °C in the bath.

5.6 Distillation apparatus, suitable for the determination of moisture in brown coal or lignite, as specified in ISO/R 1015.