BS EN 15199-3:2020

BSI Standards Publication

Petroleum products — Determination of boiling range distribution by gas chromatography method

Part 3: Crude oil

bsi.

National foreword

This British Standard is the UK implementation of EN 15199-3:2020. It supersedes BS EN 15199-3:2008, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee PTI/13, Petroleum Testing and Terminology.

A list of organizations represented on this committee can be obtained on request to its committee manager.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Published by BSI Standards Limited 2021

ISBN 978 0 539 05818 5

ICS 75.080

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 January 2021.

Amendments/corrigenda issued since publication

Date	Text affected

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 15199-3

December 2020

ICS 75.080

Supersedes EN 15199-3:2008

English Version

Petroleum products - Determination of boiling range distribution by gas chromatography method - Part 3: Crude oil

Produits pétroliers - Détermination de la répartition dans l'intervalle de distillation par méthode de chromatographie en phase gazeuse - Partie 3 : Pétrole brut

Mineralölerzeugnisse - Gaschromatographische Bestimmung des Siedeverlaufes - Teil 3: Rohöle

This European Standard was approved by CEN on 23 November 2020.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Contents

Page

European foreword ... 3

1 Scope ... 4

2 Normative references ... 4

3 Terms and definitions ... 4

4 Principle ... 6

5 Reagents and materials ... 7

6 Apparatus ... 10

7 Sampling ... 11

8 Preparation of the apparatus ... 12
8.1 Gas chromatograph preparation ... 12
8.2 System performance check ... 12

9 Corrected sample and reference material preparation ... 12

10 Calibration ... 13

11 Procedure ... 15

12 Visual inspection of the chromatograms ... 15
12.1 Blank run ... 15
12.2 Reference material ... 16
12.3 Sample run ... 16

13 Calculation ... 16

14 Expression of results ... 17

15 Precision ... 17
15.1 General ... 17
15.2 Repeatability ... 17
15.3 Reproducibility ... 17

16 Test report ... 19

Annex A (normative) **Calculation procedure** ... 20

Annex B (informative) **Additional guidance for the calculation algorithm** ... 23

Annex C (normative) **System performance check** ... 27

Annex D (normative) **Algorithm for merging boiling point distribution results of EN 15199-3 and EN 15199-4** ... 29

Annex E (informative) **Boiling points of normal alkanes** ... 37

Bibliography ... 39

European foreword

This document (EN 15199-3:2020) has been prepared by Technical Committee CEN/TC 19 Gaseous and liquid fuels, lubricants and related products of petroleum, synthetic and biological origin", the secretariat of which is held by NEN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2021, and conflicting national standards shall be withdrawn at the latest by June 2021.

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

This document supersedes EN 15199-3:2008.

The main changes in this edition are:

— the algorithm for merging the results of the light end analysis and the simulated distillation analysis has been added as an informative annex;

— additional information on the determination of the IBP and FBP is added to help the user to improve the test results.

EN 15199 consists of the following parts, under the general title *Petroleum products — Determination of boiling range distribution by gas chromatography method*:

— *Part 1: Middle distillates and lubricating base oils*

— *Part 2: Heavy distillates and residual fuels*

— *Part 3: Crude oil*

— *Part 4: Light fraction of crude oil*

This document describes the determination of boiling range distribution of materials with initial boiling points (IBP) below 100 °C and final boiling points (FBP) above 750 °C. For testing materials with initial boiling points (IBP) above 100 °C and final boiling point (FBP) below 750 °C, Part 1 of the standard may be used. For testing materials with initial boiling points (IBP) above 100 °C and final boiling point (FBP) above 750 °C, Part 2 of the standard may be used. Part 4 is used for the determination of the boiling range distribution of hydrocarbons up to *n*-nonane in crude oil.

This document is harmonized with IP 545 [6] and ASTM D 7169 [4].

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

This document describes a method for the determination of the boiling range distribution of petroleum products by capillary gas chromatography using flame ionization detection. The standard is applicable to crude oils. The boiling range distribution and recovery to C_{100} or C_{120} can be determined.

Two procedures are described: single and dual analysis mode. The basis of each is the calculation procedure as described in Annex A.

Procedure A (or Single analysis mode) determines the boiling range through C_{100} or C_{120} in a single analysis.

Procedure B (or Dual analysis mode) combines procedure A with the boiling point distribution from C_1 up to C_9 using the Detailed Hydrocarbon Analysis (DHA) according EN 15199-4. The results of both analyses are merged into one boiling point distribution.

NOTE 1 There is no specific precision statement for the combined results obtained by procedure B. For the precision of the boiling range distribution according to procedure B the precision statements of procedure A and EN 15199-4 apply. No precision has been determined for the results after merging.

NOTE 2 For the purpose of this document, the terms "% (*m/m*)" and "% (*V/V*)" are used to represent the mass fraction, μ, and the volume fraction, φ, of a material respectively.

WARNING — Use of this document may involve hazardous materials, operations and equipment. This document does not purport to address all of the safety problems associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and to determine the applicability of regulatory limitations prior to use.

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.

EN 15199-4, *Petroleum products — Determination of boiling range distribution by gas chromatography method — Part 4: Light fractions of crude oil*

EN ISO 3170, *Petroleum liquids — Manual sampling (ISO 3170)*

EN ISO 3171, *Petroleum liquids — Automatic pipeline sampling (ISO 3171)*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

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 https://www.iso.org/obp

NOTE Explanation of some of the terms is given in Figure 1.