



BSI Standards Publication

Liquid petroleum products — Vapour pressure

Part 1: Determination of air saturated vapour pressure (ASVP)
and calculated dry vapour pressure equivalent (DVPE)

This is a preview of BS EN 13016-1:2024. [Click here to purchase the full version from the ANSI store.](#)

National foreword

This British Standard is the UK implementation of EN 13016-1:2024. It supersedes BS EN 13016-1:2018, which is withdrawn.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.

Contractual and legal considerations

This publication has been prepared in good faith, however no representation, warranty, assurance or undertaking (express or implied) is or will be made, and no responsibility or liability is or will be accepted by BSI in relation to the adequacy, accuracy, completeness or reasonableness of this publication. All and any such responsibility and liability is expressly disclaimed to the full extent permitted by the law.

This publication is provided as is, and is to be used at the recipient's own risk.

The recipient is advised to consider seeking professional guidance with respect to its use of this publication.

This publication is not intended to constitute a contract. Users are responsible for its correct application.

© The British Standards Institution 2024
Published by BSI Standards Limited 2024

ISBN 978 0 539 24042 9

ICS 75.160.20

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 30 June 2024.

Amendments/corrigenda issued since publication

Date	Text affected
------	---------------

This is a preview of BS EN 13016-1:2024. [Click here to purchase the full version from the ANSI store.](#)

EUROPÄISCHE NORM

June 2024

ICS 75.160.20

Supersedes EN 13016-1:2018

English Version

Liquid petroleum products - Vapour pressure - Part 1: Determination of air saturated vapour pressure (ASVP) and calculated dry vapour pressure equivalent (DVPE)

Produits pétroliers liquides - Pression de vapeur -
Partie 1 : Détermination de la pression de vapeur
saturée en air (PVSA) et de la pression de vapeur sèche
équivalente calculée (PVSE)

Flüssige Mineralölerzeugnisse - Dampfdruck - Teil 1:
Bestimmung des luftgesättigten Dampfdruckes (ASVP)
und des berechneten dem trockenen Dampfdruck
entsprechenden Druckes (DVPE)

This European Standard was approved by CEN on 22 April 2024.

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, Türkiye 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
Introduction	4
1 Scope	5
2 Normative references	5
3 Terms and definitions	5
4 Principle	6
5 Reagents and materials	6
6 Apparatus	6
7 Sampling	7
8 Sample preparation	8
9 Preparation of apparatus	8
10 Calibration of apparatus	8
11 Verification of apparatus	9
12 Procedure	10
13 Calculation	11
14 Expression of results	11
15 Precision	11
16 Test report	12
Annex A (informative) Precision for elevated temperature and smaller sample containers	13
Annex B (normative) Accepted reference values	14
Annex C (normative) Precision and relative bias using 1 000 ml containers	16
C.1 Precision	16
C.1.1 General	16
C.1.2 Repeatability, r	16
C.1.3 Reproducibility, R	16
C.1.4 See Table C.1 for a summary of the precision values	17
C.2 Relative bias	17
Bibliography	18

This is a preview of BS EN 13016-1:2024. [Click here to purchase the full version from the ANSI store.](#)

European foreword

This document (EN 13016-1:2024) 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 December 2024, and conflicting national standards shall be withdrawn at the latest by December 2024.

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 13016-1:2018.

The main changes compared to the previous edition EN 13016-1:2018 are listed below:

- updated safety warning;
- revised 15.1 to include 250 ml and 1 000 ml sample details;
- updated 15.2 and 15.3 text;
- new Annex C giving precision for 1 000 ml containers.

The EN 13016 series consists of the following parts, under the general title *Liquid petroleum products — Vapour pressure*:

- Part 1: Determination of air saturated vapour pressure (ASVP) and calculated dry vapour pressure equivalent (DVPE);
- Part 2: Determination of absolute pressure (AVP) between 40 C and 100 C;
- Part 3: Determination of vapour pressure and calculated dry vapour pressure equivalent (DVPE) (Triple Expansion Method).

This part is based on and developed in parallel with IP 394 [9] and ASTM D5191 [5].

Any feedback and questions on this document should be directed to the users’ national standards body.

A complete listing of these bodies can be found on the CEN website. 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, Türkiye and the United Kingdom.

This is a preview of BS EN 13016-1:2024. [Click here to purchase the full version from the ANSI store.](#)

Introduction

Vapour pressure is used as a classification criterion for the safe handling and carriage of petroleum products, feedstocks and components; it has a relationship to the potential for hydrocarbon emissions, under uncontrolled conditions, and thus is the subject of environmental scrutiny.

Vapour pressure limitations are often imposed to prevent pump cavitation during transfer operations.

Vapour pressure is one measure of the volatility characteristics of fuels used in many differing types of engines with large variations in operating temperatures. Fuels having a high vapour pressure can vaporize too readily in the fuel handling systems, resulting in decreased flow to the engine and possible stoppage by vapour lock. Conversely, fuels of low vapour pressure can vaporize not readily enough, resulting in difficult starting, slow warm-up and poor acceleration.

This is a preview of BS EN 13016-1:2024. [Click here to purchase the full version from the ANSI store.](#)

1 Scope

This document specifies a method for the determination of the air saturated vapour pressure (ASVP) (total vapour pressure), exerted *in vacuo*, by volatile, low viscosity petroleum products, components, ethanol blends up to 85 % (V/V), and feedstocks containing air. A dry vapour pressure equivalent (DVPE) can be calculated from the air containing vapour pressure (ASVP) measurement.

The conditions used in the test described in this document are a vapour-to-liquid ratio of 4:1 and a test temperature of 37,8 °C.

The equipment is not wetted with water during the test, and the method described is therefore suitable for testing samples with or without oxygenates; no account is taken of dissolved water in the sample.

The method described is suitable for testing air saturated samples with a DVPE between 15,5 kPa and 106,0 kPa; vapour pressures outside this range can be measured, but the precision has not been determined.

This document is applicable to fuels containing oxygenated compounds up to the limits stated in the relevant Council Directive 85/536/EEC [10], and for ethanol-fuel blends up to 85 % (V/V) ethanol.

NOTE For the purposes of this document, the terms “% (m/m)” and “% (V/V)” are used to represent the mass and volume fractions, respectively.

WARNING — The use of this document can 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 users of this document to take appropriate measures to ensure the safety and health of personnel prior to application of the document, and to determine the applicability of any other restrictions for this purpose.

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

3 Terms and definitions

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

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

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

3.1

air saturated vapour pressure

ASVP

observed pressure exerted in vacuo consisting of the partial pressure of petroleum products, components and feedstocks, in the absence on non-dissolved water, and the partial pressure of dissolved air

3.2

dry vapour pressure equivalent

DVPE

vapour pressure equivalent value calculated by a statistical correlation formula to a dry Reid vapour pressure as measured by ASTM D4953 [4]