



BSI Standards Publication

Liquid petroleum products – Vapour pressure

Part 3: Determination of vapour pressure and calculated dry vapour pressure equivalent (DVPE) (Triple Expansion Method)

National foreword

This British Standard is the UK implementation of EN 13016-3:2018.

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 secretary.

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Amendments/corrigenda issued since publication

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English Version

Liquid petroleum products - Vapour pressure - Part 3: Determination of vapour pressure and calculated dry vapour pressure equivalent (DVPE) (Triple Expansion Method)

Produits pétroliers liquides - Pression de vapeur - Partie 3 : Détermination de la pression de vapeur et de la pression de vapeur sèche équivalente calculée (PVSE) (Méthode triple expansion)

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European foreword

This document (EN 13016-3:2018) 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of an identical text or by endorsement, at the latest by October 2018, and conflicting national standards shall be withdrawn at the latest by October 2018.

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.

EN 13016 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 ASTM D6378 [3].

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

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 may 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 may not vaporize readily enough, resulting in difficult starting, slow warm-up and poor acceleration.

Liquid petroleum products – Vapour pressure —

Part 3:

Determination of vapour pressure and calculated dry vapour pressure equivalent (DVPE) (Triple Expansion Method)

1 Scope

This European Standard specifies a method for the determination of the vapour pressure, exerted *in vacuo*, by volatile, low viscosity petroleum products, components, ethanol blends up to 85 % (V/V), and feedstocks using a variable volume chamber. A dry vapour pressure equivalent (DVPE) is calculated from the vapour pressure.

The conditions used in the test described in this standard 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.

This procedure calculates the partial pressure of the air dissolved in the test portion during the triple expansion process. It is suitable for samples with a DVPE between 13,7 kPa and 98,3 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 [6], and for ethanol-fuel blends up to 85 % (V/V) ethanol.

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

WARNING — The use of this Standard can involve hazardous materials, operations and equipment. This Standard does not purport to address all of the safety problems associated with its use. It is the responsibility of users of this standard to take appropriate measures to ensure the safety and health of personnel prior to application of the standard, and fulfil statutory and regulatory requirements for this purpose.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 13016-1, *Liquid petroleum products — Vapour pressure — Part 1: Determination of air saturated vapour pressure (ASVP) and calculated dry vapour pressure equivalent (DVPE)*

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.