BS EN 13016-1:2018

BSI Standards Publication

Liquid petroleum products - Vapour pressure

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

bsi.

National foreword

This British Standard is the UK implementation of EN 13016-1:2018. It supersedes BS EN 13016-1:2007, which is withdrawn.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 secretary.

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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)

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European foreword

This document (EN 13016-1:2018) 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of an identical text or by endorsement, at the latest by October 2018, and conflicting national standards shall be withdrawn at the latest by October 2018.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.

This document supersedes EN 13016-1:2007.

This new edition has been updated by enlarging the scope to include ethanol blends of up to 85 % (*V/V*). The range for the instrument verification fluids has been widened and new typical/consensus values added in an annex. The precision statements have been updated following a global evaluation in 2016.

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 and developed in parallel with IP 394 [9] and ASTM D5191 [5].

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.

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1 Scope

This European Standard 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 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 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 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 ISO 3170, *Petroleum liquids — Manual sampling (ISO 3170)*

3 Terms and definitions

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

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]

4 Principle

A cooled air saturated sample of known volume is injected into a thermostatically controlled evacuated chamber, or into a chamber that is evacuated by means of a moveable piston after sample introduction, the internal volume of which is five times that of the total test portion introduced into the chamber. After