

## **Liquid petroleum products - Vapour pressure - Part 1: Determination of air saturated vapour pressure (ASVP)**

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

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

<p>Käesolev Eesti standard EVS-EN 13016-1:2007 sisaldab Euroopa standardi EN 13016-1:2007 ingliskeelset teksti.</p> <p>Käesolev dokument on jõustatud 22.11.2007 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes.</p> <p>Standard on kättesaadav Eesti standardiorganisatsioonist.</p>	<p>This Estonian standard EVS-EN 13016-1:2007 consists of the English text of the European standard EN 13016-1:2007.</p> <p>This document is endorsed on 22.11.2007 with the notification being published in the official publication of the Estonian national standardisation organisation.</p> <p>The standard is available from Estonian standardisation organisation.</p>
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<p><b>Käsitlusala:</b></p> <p>This European Standard specifies a method for the determination of the total pressure, exerted in vacuo, by volatile, low viscosity petroleum products, components, and feedstocks containing air. A dry vapour pressure equivalent (DVPE) can be calculated from the air containing vapour pressure (ASVP) measurement.</p>	<p><b>Scope:</b></p> <p>This European Standard specifies a method for the determination of the total pressure, exerted in vacuo, by volatile, low viscosity petroleum products, components, and feedstocks containing air. A dry vapour pressure equivalent (DVPE) can be calculated from the air containing vapour pressure (ASVP) measurement.</p>
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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  
Berechnung des trockenen Dampfdruckäquivalentes  
(DVPE)

This European Standard was approved by CEN on 28 July 2007.

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 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 Management Centre has the same status as the official versions.

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## Foreword

This document (EN 13016-1:2007) 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 March 2008, and conflicting national standards shall be withdrawn at the latest by March 2008.

This document supersedes EN 13016-1:2000, which has been updated by the explicit addition of DVPE to better reflect its use in EN 228 [1]. The range for the instrument verification fluids has been widened and typical/consensus values added in an informative Annex. A revision to the sample introduction has been included as this was part of the original procedure that precision was based on. Editorial clarification of the sampling, sample preparation and calibration of the pressure transducer have been included. The precision statements have been updated following a global evaluation in 2003.

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 vapour pressure (AVP) between 40 °C and 100 °C.*

This part is based on and developed in parallel with IP 394 [2] and ASTM D 5191 [3]. It describes a general determination method, whereas part 2 describes a determination method at elevated temperatures.

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, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and 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.

## 1 Scope

This European Standard specifies a method for the determination of the total pressure, exerted in vacuo, by volatile, low viscosity petroleum products, components, 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.

For referee testing the requirement to employ 1 l sample containers is mandatory. However, due to sample container size restrictions in taking automatic samples from vapour-locks either onboard a ship or from some land based storage tanks, the precision for 250 ml containers forms part of this standard and shall be used for referee purposes.

NOTE 1 This standard states precision for both 1 l and 250 ml sample containers. Annex A provides information on the precision values when using 50 ml at 37,8 °C or using 1 l samples at a test temperature of 50,0 °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 that exert an air-saturated vapour pressure of between 9,0 kPa and 150,0 kPa at 37,8 °C.

This document is applicable to fuels containing oxygenated compounds up to the limits stated in the relevant EC Directive 85/536/EEC [4].

NOTE 2 For the purposes of this European Standard, the term "% (m/m)" and "% (V/V)" are used to represent the mass, respectively the volume fraction.

**WARNING — Use of this standard may 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 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 referenced documents are indispensable for the application 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 3170:2004)*

ISO 3007, *Petroleum products and crude petroleum - Determination of vapour pressure - Reid method*

## 3 Terms and definitions

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

### 3.1

#### **air-saturated vapour pressure**

total 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