

Liquid petroleum products — Vapour pressure —

**Part 2: Determination of absolute vapour
pressure (AVP) between 40 °C and 100 °C**

(Identical with IP 409/2001)

The European Standard EN 13016-1:2000 has the status of a
British Standard

ICS 75.160.20

National foreword

This British Standard is the official English language version of EN 13016-2:2000.

The UK participation in its preparation was entrusted to Technical Committee PTI/13, Petroleum testing and terminology, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
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The Institute of Petroleum publishes and sells all parts of BS 2000, and all BS EN petroleum test methods that would be part of BS 2000, both in its annual publication “Standard methods for analysis and testing of petroleum and related products and British Standard 2000 parts” and individually.

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Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 14, an inside back cover and a back cover.

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English version

**Liquid petroleum products - Vapour pressure - Part 2:
Determination of absolute vapour pressure (AVP) between
40 °C and 100 °C**

Produits pétroliers liquides - Pression de vapeur - Partie 2:
Détermination de la pression de vapeur absolue (PVA)
entre 40 °C et 100 °C

Flüssige Mineralölerzeugnisse - Dampfdruck - Teil 2:
Bestimmung des absoluten Dampfdruckes (AVP) im
Temperaturbereich 40 °C -100 °C

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Foreword

This European Standard has been prepared by Technical Committee CEN/TC 19, Petroleum products, lubricants and related products, the Secretariat of which is held by NNI.

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of an identical text or by endorsement, at the latest by February 2001, and conflicting national standards shall be withdrawn at the latest by February 2001.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Annex A is for information only.

This European Standard is one of a series of standards as listed below:

EN 13016, *Liquid petroleum products - Vapour pressure -*

Part 1: Determination of air saturated vapour pressure (ASVP).

Part 2: Determination of absolute vapour pressure (AVP) between 40 °C and 100 °C.

NOTE Part 1 is based on IP 394¹⁾ and ASTM D 5191²⁾.

¹⁾ IP 394: Determination of air saturated vapour pressure (ASVP)

²⁾ ASTM D 5191:1996: Test method for vapor pressure of petroleum products (mini method)

Introduction

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 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 absolute vapour pressure of liquid petroleum products at elevated temperatures.

The conditions used in the test described in this standard are a vapour to liquid ratio of 3:2 and an initial injection temperature of 37,8 °C or 31,0 °C.

The method described is suitable for testing air-saturated samples that exert an air saturated vapour pressure of between 50 kPa and 500 kPa at temperatures between 40 °C and 100 °C.

This European Standard is applicable to fuels containing oxygenated compounds up to the limits stated in the relevant EC Directive³⁾.

NOTE 1 If a sample container of 1 l is utilized and the initial sample injection is into a test chamber at 37,8 °C, the initial measurement corresponds with the measurement in Part 1 of this standard.

NOTE 2 For the purposes of this European Standard, the term “% (V/V)” is used to represent the volume fraction.

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 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

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN ISO 3170, *Petroleum liquids - Manual sampling (ISO 3170: 1988, including Amendment 1:1998)*.

³⁾ EC Directive 85/536/EEC, Council Directive on crude-oil savings through the use of substitute fuel components in petrol.

3 Terms and definitions

For the purposes of this standard, the following terms and definitions apply:

3.1

air saturated vapour pressure

ASVP

total pressure exerted in vacuo by air-saturated petroleum products, components and feedstocks, in the absence of undissolved water, the total pressure being the sum of the partial pressure of the sample and the partial pressure of the dissolved air

3.2

absolute vapour pressure

AVP

air saturated vapour pressure minus the partial pressure due to dissolved air in the liquid

4 Principle

A cooled air-saturated sample of known volume is injected into an evacuated, temperature controlled chamber in two equal test portions. After the injection of each test portion, the air saturated vapour pressure is determined. The partial pressure of the dissolved air is calculated from the two resulting pressures.

The temperature of the test chamber is then increased to a specified value and the air-saturated vapour pressure determined. The absolute vapour pressure (AVP) is calculated by subtracting the partial pressure of the dissolved air in the liquid, which has been corrected for temperature and compensated for compressive effects and solubility, from the air saturated vapour pressure. The procedure may be repeated at further temperatures.

5 Reagents

5.1 Pentane, reagent grade 99,5 % (V/V) minimum purity.