
International Standard



6293

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Petroleum products — Determination of saponification number

Produits pétroliers — Détermination de l'indice de saponification

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been authorized has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 6293 was developed by Technical Committee ISO/TC 28, *Petroleum products and lubricants*, and was circulated to the member bodies in January 1982.

It has been approved by the member bodies of the following countries :

Australia	Iraq	South Africa, Rep. of
Austria	Ireland	Spain
Belgium	Israel	Sri Lanka
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Egypt, Arab Rep. of	Netherlands	United Kingdom
France	Peru	USA
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The member body of the following country expressed disapproval of the document on technical grounds :

India

Petroleum products — Determination of saponification number

1 Scope and field of application

This International Standard specifies a method for the determination of the amount of constituents in petroleum products that will saponify under the conditions of the test. Since compounds of sulfur, phosphorus, the halogens, and certain other elements which are sometimes added to petroleum products also consume alkali and acids under test conditions, the results obtained include the effect of these extraneous materials in addition to the saponifiable material present. Results on products containing such materials, on used internal-combustion-engine crank-case oils and on used turbine oils shall be interpreted in this respect.

NOTE — The materials referred to above, which are not normally considered saponifiable matter, include inorganic or certain organic acids, most non-alkali soaps, etc. The presence of such materials increases the saponification number above that of fatty saponifiable materials for which the method is primarily intended. The odour of hydrogen sulfide near the end of the back-titration in the saponification test is an indication that certain types of reactive sulfur compounds are present in the sample. In the case of other reactive sulfur, chlorine, and phosphorus compounds and other interfering materials, no simple indication is given during the test. A gravimetric determination of the actual amount of fatty acids is probably the most reliable method for the estimation of such compounds.

2 Definition

saponification number: The number of milligrams of potassium hydroxide that is consumed by 1 g of oil under the conditions of the test as prescribed in this International Standard.

3 Principle

A test portion of known mass, dissolved in methylethylketone, is heated with a known amount of potassium hydroxide ethanolic solution. The excess alkali is titrated with standard volumetric hydrochloric acid solution and the saponification number calculated.

4 Reagents

During the analysis, unless otherwise specified, use only reagents of recognized analytical reagent grade, and only distilled water or water of equivalent purity.

4.1 Ethanol.

Purify 95 % (V/V) ethanol (see the note), or 95 % (V/V) ethanol to which has been added 10 % by volume of methanol, or absolute ethanol with silver oxide, in the following manner:

Dissolve 1,5 g of silver nitrate in about 3 ml of water, add to 1 litre of the ethanol in a glass-stoppered bottle, and mix thoroughly. Dissolve 3 g of potassium hydroxide in 10 to 15 ml of warm ethanol. After cooling, add slowly to the silver nitrate ethanolic solution, stirring slightly. Allow the precipitated silver oxide to settle, siphon off the clear solution, and distil on a steam-bath. Discard the first 5 % overhead, and also the final 5 %.

NOTE — It has been found that 99 % (V/V) 2-propanol (isopropyl alcohol) may be substituted for the purified ethanol with entirely satisfactory results. This substitution is not permissible however, in referee tests.

4.2 Potassium hydroxide, 0,5 mol/l ethanolic solution.

Prepare the solution by dissolving potassium hydroxide in the ethanol (4.1). Allow the solution to settle in a dark place. Dispense the potassium hydroxide (KOH) by siphoning or pressure from an inert gas so that any precipitate is not entrained. Allow the solution to stand for 24 h before using.

NOTE — Where saponification numbers below 1 are expected, better precision may be obtained by substituting 0,1 mol/l potassium hydroxide solution and 0,1 mol/l hydrochloric acid solution for the 0,5 mol/l reagents in 4.2, 4.3 and clause 8.

4.3 Hydrochloric acid, $c(\text{HCl}) = 0,5 \text{ mol/l}$, standard volumetric solution.

Standardize frequently enough to detect concentration changes of 0,000 5 mol/l (see the note to 4.2).