



# Standard Test Method for Semi-Quantitative Field Test Method for Base Number in New and Used Lubricants by Color-Indicator Titration<sup>1</sup>

This standard is issued under the fixed designation D5984; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

## 1. Scope\*

1.1 This test method covers a procedure for determining the basic constituents in petroleum products in the field or laboratory using a pre-packaged test kit. The test uses a micro-titration resulting in a visual endpoint facilitated by a color indicator.

1.1.1 This test method covers base numbers from 0 to 20. It can be extended to higher ranges by diluting the sample or by using a smaller sample size; however, the precision data were obtained for base numbers up to 20.

1.2 This test method can be used to indicate relative changes that occur in an oil during use under oxidizing conditions. Although the test is performed under closely specified conditions with standardized reagents, the test method does not measure an absolute basic property that can be used to predict performance of an oil under service conditions. No general relationship between bearing corrosion and base number is known.

1.3 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

## 2. Referenced Documents

2.1 *ASTM Standards:*<sup>2</sup>

[D1193 Specification for Reagent Water](#)

[D2896 Test Method for Base Number of Petroleum Products by Potentiometric Perchloric Acid Titration](#)

<sup>1</sup> This test method is under the jurisdiction of ASTM Committee D02 on Petroleum Products and Lubricants and is the direct responsibility of Subcommittee D02.06 on Analysis of Lubricants.

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<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

[D4057 Practice for Manual Sampling of Petroleum and Petroleum Products](#)

[D4177 Practice for Automatic Sampling of Petroleum and Petroleum Products](#)

## 3. Terminology

3.1 *Definitions:*

3.1.1 *base number, n*—the quantity of a specified acid, expressed in terms of the equivalent number of milligrams of potassium hydroxide per gram of sample, required to titrate a sample in a specified solvent to a specified endpoint using a specified detection system.

3.1.1.1 *Discussion*—This test method uses fixed amounts of *isooctane* and alcoholic hydrochloric acid as the sample solvent and the endpoint is defined as the amount of titrant required to reach a yellow endpoint with a methyl red indicator solution.

## 4. Summary of Test Method

4.1 To determine the base number of an oil sample, the sample is dissolved in a fixed amount of *iso* octane and alcoholic hydrochloric acid. The solution is mixed well with 7 mL of sodium chloride solution and the aqueous and organic phases are allowed to separate. The aqueous phase is then decanted off and a small amount of methyl red indicator is added. The solution is titrated with a solution of sodium hydroxide contained in a calibrated 1 mL micro-burette. When the solution changes from magenta to yellow, the titration is stopped and the base number is read off the side of the titration burette.

## 5. Significance and Use

5.1 New and used petroleum products can contain basic constituents that are present as additives or as degradation products formed during service. The amount of these additives in an oil can be determined by titrating against an acid. The base number is a measure of the amount of basic substance in the oil, always under the conditions of the test. A decrease in base number is often used as a measure of lubricant degradation, but any condemning limits must be empirically established.

5.2 This test method uses reagents that are considered less hazardous than most reagents used in alternate base number

\*A Summary of Changes section appears at the end of this standard