



Designation: D8126 – 21

Standard Test Method for Efficient Basicity Determination by Potentiometric Hydrochloric Acid Titration¹

This standard is issued under the fixed designation D8126; 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 (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope*

1.1 This test method covers a procedure for the determination of the efficient basicity (EBas) in new marine cylinder lubricants that lubricate the upper part, that is, piston-ring-cylinder area, of two-stroke marine engines.

1.2 This test method has been developed for marine cylinder lubricants, having base number (BN) (measured by Test Method [D2896](#)) from 20 mg KOH/g to 100 mg KOH/g, and an EBas from 10 mg KOH/g to 36 mg KOH/g.

1.3 In this test method, only the efficient basicity is determined, corresponding to the components or part of components that have a major role in neutralization of the acidic species formed in the combustion of the fuel in the marine engine. It differentiates between the fastest reacting species and the last one to react like overbasing compounds in detergent (classically mineral calcium carbonate, CaCO_3). The values obtained, however, are intended to be compared with the other values obtained by this test method only; base numbers obtained by this test method are not intended to be equal to values by other test methods.

1.4 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.5 *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, health, and environmental practices and determine the applicability of regulatory limitations prior to use. Some specific hazards statements are given in Sections 6 and 7.*

1.6 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 ASTM Standards:²

- [D1193](#) Specification for Reagent Water
- [D2896](#) Test Method for Base Number of Petroleum Products by Potentiometric Perchloric Acid Titration
- [D4057](#) Practice for Manual Sampling of Petroleum and Petroleum Products
- [D4177](#) Practice for Automatic Sampling of Petroleum and Petroleum Products
- [D4739](#) Test Method for Base Number Determination by Potentiometric Hydrochloric Acid Titration
- [D6300](#) Practice for Determination of Precision and Bias Data for Use in Test Methods for Petroleum Products, Liquid Fuels, and Lubricants

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.

3.1.2 *efficient basicity, EBas, n* —the quantity of hydrochloric acid, expressed in terms of the equivalent number of milligrams of potassium hydroxide per gram of sample, required to neutralize the basic components, which are organic species, of the tested lubricant in a specified solvent to a specified buffer endpoint using a specified detection system.

4. Summary of Test Method

4.1 The sample is dissolved in a mixture of toluene, propan-2-ol (isopropyl alcohol), chloroform, and a small amount of water and titrated potentiometrically with alcoholic hydrochloric acid solution. The test results of this procedure are obtained by titration mode of fixed increment and fixed time additions of the titrant. An endpoint is selected from a

¹ This test method is under the jurisdiction of ASTM Committee [D02](#) on Petroleum Products, Liquid Fuels, and Lubricants and is the direct responsibility of Subcommittee [D02.06](#) on Analysis of Liquid Fuels and Lubricants.

Current edition approved Nov. 1, 2021. Published November 2021. Originally approved in 2017. Last previous edition approved in 2017 as D8126 – 17. DOI: 10.1520/D8126-21.

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

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