



Standard Test Method for CAVITATION EROSION-CORROSION CHARACTERISTICS OF ALUMINUM IN ENGINE COOLANTS USING ULTRASONIC ENERGY¹

This Standard is issued under the fixed designation D 2966; 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.

1. Scope

1.1 This method covers a laboratory procedure for the evaluation of engine coolants to determine their capability to prevent cavitation-erosion of aluminum test specimens using ultrasonic energy to produce the cavitation. This is a screening test method, and final evidence of satisfactory cavitation erosion prevention should be confirmed by Method D 2809 and by vehicle tests.

2. Applicable Documents

2.1 ASTM Standards:

- B 179 Specification for Aluminum Alloys in Ingot Form for Sand Castings, Permanent Mold Castings, and Die Castings²
- D 1176 Sampling and Preparing Aqueous Solutions of Engine Antifreezes or Antirusts for Testing Purposes³
- D 1384 Corrosion Test for Engine Coolants in Glassware³
- D 2809 Test for Cavitation Erosion-Corrosion Characteristics of Aluminum Pumps with Engine Coolants³

3. Summary of Method

3.1 Aluminum specimens are totally immersed in a 15 % coolant solution for 20 h at $82 \pm 2^\circ\text{C}$ in an ultrasonic tank. The capability of coolant to prevent cavitation-erosion is determined by comparing the average weight loss incurred by specimens in the test solution with that of specimens in a reference coolant solution. Each test is run with three aluminum specimens, and the average weight loss is used to calculate an aluminum cavitation rating between 1 and 10.

4. Significance

4.1 This method will generally distinguish between coolants that provide inadequate protection against cavitation-erosion attack and those that are suitable for further evaluation. The results of this test are not sufficient evidence of satisfactory cavitation-erosion inhibition. The service value of a coolant formulation can be determined only by more comprehensive simulated service tests and vehicle tests.

5. Apparatus (see Fig. 1)

5.1 *Ultrasonic Generator*, with a minimum power output of 200 W and a minimum frequency of 19 kHz.

5.2 *Transducer Tank* with nominal dimensions of 250 by 250 by 250 mm (10 by 10 by 10 in.).

5.3 *Cast Aluminum Specimens* conforming to Alloy SC 64C (Specification B 179, SAE 329) and prepared according to the procedure outlined in Method D 1384. Specimen size, 50 by 25 by 3 mm (2 by 1 by $\frac{1}{8}$ in.).

5.4 *Temperature-Regulating Device*.

5.5 *Tank Cover*—This may be any suitable material such as plastic or stainless steel plate or aluminum foil.

5.6 *Separatory Funnel*, 3-litre.

¹ This method is under the jurisdiction of ASTM Committee D-15 on Engine Coolants and is the direct responsibility of Subcommittee D 15.09 on Simulated Service Tests.

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² *Annual Book of ASTM Standards*, Part 7.

³ *Annual Book of ASTM Standards*, Part 30.