

SOCIETY OF AUTOMOTIVE ENGINEERS, Inc.
485 LEXINGTON AVENUE
NEW YORK 17, N.Y.

AEROSPACE RECOMMENDED PRACTICE

ARP 788

PROCEDURE FOR THE DETERMINATION OF THE SILTING INDEX OF A FLUID

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Revised

1. **SCOPE:** This test measures the tendency of a fluid to cause silting in close tolerance devices as the result of fine particles and gelatinous materials suspended in the fluid. It expresses this tendency as a "Silting Index". The procedure provides a precision such that the arithmetic average of three successive tests may be reproduced within 20% of the same figure within 90% confidence limits.
2. **OUTLINE OF THE METHOD:** The fluid under test is filtered through a membrane filter having a uniform pore size of 0.8μ (microns) at a high constant pressure differential. While particles larger than 5μ (of the type determined by ARP 598) tend to form a loose open flowing cake, particles below 5μ and gelatinous materials will tend to block the flow passages of the filter and cause a decay in rate of flow. The rate of flow decay is expressed as the dimensionless Silting Index. With a given Silting Head, the higher the Silting Index, the greater the fluid's silting tendency; when the Silting Index is below 0.5, a Silting Head with a smaller filtering area should be selected as described in Para. 6.1. The procedure is independent of viscosity and external variables such as temperature¹ providing they remain constant during the test. To insure this, sample and equipment should be at ambient temperature before the test.
3. **APPARATUS:** Silting Index Apparatus (Figure 1) consisting of:
 - (a) A rigid stand with post and clamped support arm.
 - (b) A 10-ml syringe with markings as shown, complete with "O" ring-sealed steel plunger.
 - (c) A plunger weight of 26 ± 1 lbs.
 - (d) A three-way valve.
 - (e) A split-hand stopwatch having two hands; one of which may be stopped and re-started independently.
 - (f) Forceps with unserrated tips.
 - (g) Membrane filters, $0.8\mu + 0.05\mu$ pore size, 13 mm diameter.
 - (h) A Silting Head into which a membrane filter may be sealed and supported².

4. TEST PROCEDURE:

4.1 Preparation of Apparatus:

- 4.1.1 Clean apparatus thoroughly before each sample with solvent appropriate for the fluid to be tested. The solvent must also be compatible with the elastomer seals. Particular care should be given to the syringe barrel, three-way valve with hose and sinker, and the silting heads.

¹The test must never be run in direct sunlight or close to heat sources which may change temperature (and therefore viscosity) during the test.

²Because of the wide variation in the amount of suspended fine contaminant encountered in actual practice, four silting heads should be provided having increasingly larger effective filtering areas. (See Fig. 1) This is because some measureable flow decay must occur, even in very clean fluids, but essentially 100% clogging must be avoided.

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- 2 -

- 4.1.2 Place syringe with plunger installed in the clamped support arm so that the graduations face toward the operator.
- 4.1.3 Attach three-way valve with hose and sinker to the syringe.
- 4.1.4 Using forceps, place 0.8μ membrane filter in the selected silting head³. Moisten filter with one drop of the fluid to be tested and assemble the silting head.
- 4.1.5 Shake sample container vigorously for 15 seconds immediately prior to each determination.
- 4.1.6 Insert hose into sample container. With valve in "INTAKE" position, pull fluid to be tested through the hose, and into the syringe to the "FILL" line. Turn the valve to "FLOW" position and exhaust⁴ into waste cup. Repeat flushing cycle three times.
- 4.1.7 Install Silting Head. Turn valve to "INTAKE" position, and pull test fluid into syringe until the fluid level reaches the "FILL" line. Then turn valve to "OFF" position.
- 4.2 Conducting the Test:
- 4.2.1 Carefully place weight on syringe so that the top of the syringe plunger is in the circular recess of the weight cross bar, as shown in Figure 1.
- 4.2.2 Turn valve handle to vertical ("FLOW") position. Start timer⁵ when plunger passes "0".⁶
- 4.2.3 Record time (T_1) when plunger passes " V_1 ". If T_1 is less than 0.10 minutes, the third decimal place must be estimated.
- 4.2.4 Record time (T_2) when plunger passes " V_2 ".
- 4.2.5 Record time (T_3) when plunger passes " V_3 ".

³See Section 6 - Silting Head Selection.

⁴Greater precision in the timing of the cycle will be achieved if the air bubbles are dispelled from the test chamber in this cycle.

⁵Times are read to an accuracy of minutes and hundredths of a minute.

⁶The plug in the valve may be reversed so that it communicates with all three parts simultaneously if a particular laboratory wished to determine the pressure variation during a run.